

## “What’s New?” – Newsletter with the latest publications at CliSAP and CEN

– 19 January 2017 –

### Content:

- I. Overview
- II. Abstracts, links, contact information

### I. Overview CliSAP/CEN Publications

1. [2017](#): Brasseur, G. P., Jacob, D., & Schuck-Zöller, S. (Hrsg.). (2017). Klimawandel in Deutschland. Berlin: Springer. doi:10.1007/978-3-662-50397-3.
2. [2016](#): Jantke K., Lottermoser F., Reinhardt J., Rothe D. and Stöver J. (2016). Nachhaltiger Konsum - Institutionen, Instrumente, Initiativen, Nomos Verlagsgesellschaft, Baden-Baden, 472 p., ISBN 978-3-8487-3222-7.
3. [2016](#): Quante, M.; Colijn, F. (editors). North Sea Region Climate Change Assessment. Springer International Publishing, 1st Edition. ISBN 978-3-319-39743-6.
4. [December 2016](#): Ernst, A., Seuss, B., Taylor, P. D., & Nützel, A. (2016). Bryozoan fauna of the Boggy Formation (Deese Group, Pennsylvanian) of the Buckhorn Asphalt Quarry, Oklahoma, USA. *Palaeobiodiversity and Palaeoenvironments*, 1-24.
5. [30 December 2016](#): Sismanidis, P.; Keramitsoglou, I.; Bechtel, B.; Kiranoudis, C.T. Improving the Downscaling of Diurnal Land Surface Temperatures Using the Annual Cycle Parameters as Disaggregation Kernels. *Remote Sens.* 2017, 9, 23. doi:10.3390/rs9010023. (issue forthcoming)
6. [29 December 2016](#): Lopez, J. M. R., Heider, K., & Scheffran, J. (2016). Human and remote sensing data to investigate the frontiers of urbanization in the south of Mexico City. *Data in Brief* (issue forthcoming)
7. [29 December 2016](#): Rodriguez Lopez J.M., Heider K., Scheffran J. (2016): Frontiers of Urbanization: Identifying and Explaining Urbanization Hot Spots in the South of Mexico City Using Human and Remote Sensing; *Applied Geography*
8. [27 December 2016](#): Peters, K., Crueger, T., Jakob, C., & Moebis, B. (2016). Improved MJO-simulation in ECHAM6. 3 by coupling a stochastic multcloud model to the convective scheme. *Journal of Advances in Modeling Earth Systems*.
9. [23 December 2016](#): Rödder, Simone (2016) The Climate of Science-Art and the Art-Science of the Climate: Meeting Points, Boundary Objects and Boundary Work. *Minerva* (2016). doi:10.1007/s11024-016-9312-y
10. [23 December 2016](#): Köpsel, V., Walsh, C., Leyshon, C. (2016), Landscape Narratives in Practice: Implications for Climate Change Adaptation. *The Geographical Journal* (issue forthcoming)
11. [17 December 2016](#): Liu, F., Fiencke, C., Guo, J., Rieth, R., Cuhls, C., Dong, R., & Pfeiffer, E. M. (2016). Bioscrubber treatment of exhaust air from intensive pig production: Case study in northern Germany at mild climate condition. *Engineering in Life Sciences*.
12. [14 December 2016](#): Wagner, D., Tinz, B., & von Storch, H. (2016). Signal Stations: Newly Digitized Historical Climate Data of the German Bight and the Southern Baltic Sea Coast. *Journal of Atmospheric and Oceanic Technology*, 33(12), 2735-2741.
13. [9 December 2016](#): Bank, A, Fröhlich, C, Schneiker, A. (2016), The Political Dynamics of Human Mobility: Migration out of, as and into Violence. *Glob Policy*. doi:10.1111/1758-5899.12384 (special issue „Critical Perspectives on Human Mobility“, ed. by Christiane Fröhlich).

14. [7 December 2016](#): Haig, D. W., Mory, A. J., McCartain, E., Backhouse, J., Håkansson, E., Ernst, A., ... & Hunter, A. W. (2016). Late Artinskian–Early Kungurian (Early Permian) warming and maximum marine flooding in the East Gondwana interior rift, Timor and Western Australia, and comparisons across East Gondwana. *Palaeogeography, Palaeoclimatology, Palaeoecology*. (issue forthcoming)
15. [November 2016](#): Ide, T. (2016). Critical geopolitics and school textbooks: The case of environment-conflict links in Germany. *Political Geography*, 55, 60-71.
16. [30 November 2016](#): Theodor, M., Schmiedl, G., Jorissen, F. and Mackensen, A., 2016. Stable carbon isotope gradients in benthic foraminifera as proxy for organic carbon fluxes in the Mediterranean Sea. *Biogeosciences*, 13, 6385–6404. doi:10.5194/bg-13-6385-2016.
17. [30 November 2016](#): Blender, R., Raible, C. C. and Franzke, C. L. E. (2016). Vorticity and geopotential height extreme values in ERA-Interim data during boreal winters. *Q.J.R. Meteorol. Soc.* doi:10.1002/qj.2944.
18. [27 November 2016](#): Barkhordarian, A., von Storch, H., Zorita, E., and Gómez-Navarro, J. J. An attempt to deconstruct recent climate change in the Baltic Sea Basin. *Geophys. Res. Atmos.*, 121, 13, 207-13,217. doi:10.1002/2015JD024648.
19. [16 November 2016](#): Süsser, D. Coastal dwellers-power against climate change: a place-based perspective on individual and collective engagement in North Frisia. *Journal of Coastal Conservation* (2016). doi:10.1007/s11852-016-0467-3
20. [11 November 2016](#): Ma, S., Zhou, T., Stone, D., Polson, D., Dai, A., Stott, P., von Storch, H., Qian, Y., Burke, C., Wu, P., Zou, L., Ciavarella, A. Detectable anthropogenic shift toward heavy precipitation over eastern China. *Journal of Climate*. doi:10.1175/JCLI-D-16-0311.1, in press.
21. [11 November 2016](#): Liu, F., Fiencke, C., Guo, J., Rieth, R., Dong, R., & Pfeiffer, E. M. (2016). Performance evaluation and optimization of field-scale bioscrubbers for intensive pig house exhaust air treatment in northern Germany. *Science of The Total Environment*. (online, issue forthcoming)
22. [1 November 2016](#): Vinn, O., Ernst, A., & Toom, U. (2016). Earliest symbiotic rugosans in cystoporate bryozoan *Ceramopora intercellata* Bassler, 1911 from Late Ordovician of Estonia (Baltica). *Palaeogeography, Palaeoclimatology, Palaeoecology*, 461, 140-144.
23. [1 November 2016](#): Ul Hassan, S., Pascale, S., Lucarini, V., & Böhner, J. (2016). Seasonal cycle of precipitation over major river basins in South and Southeast Asia: a review of the CMIP5 climate models data for present climate and future climate projections. *Atmospheric Research*, 180, 42-63.
24. [October 2016](#): Xia, L., von Storch, H., Feser, F., & Wu, J. (2015). A study of quasi-millennial extratropical winter cyclone activity over the Southern Hemisphere. *Climate Dynamics*, 1-18.
25. [October 2016](#): Abid, M., Schneider, U. A., & Scheffran, J. (2016). Adaptation to climate change and its impacts on food productivity and crop income: Perspectives of farmers in rural Pakistan. *Journal of Rural Studies*, 47, 254-266.
26. [October 2016](#): Holdschlag, Arnd, Lisa Krause & Beate M.W. Ratter (2016). Bioinvasion des Pazifischen Rotfeuerfisches (*Pterois volitans*) und sozial-ökologische Anpassung in den Bahamas. *Geographische Rundschau*. Heft 10, Oktober 2016.
27. [October 2016](#): Holdschlag, A., & Ratter, B. (2016). Sozial-ökologische Systemdynamik in der Panarchie. Adaptivität und Umweltwissen am Beispiel karibischer Small Island Developing States (SIDS). *Geographische Zeitschrift*, 104(3), 183-211.
28. [28 October 2016](#): Süsser, D.; Döring, M.; Ratter, B. (2017) Harvesting energy: Place and local entrepreneurship in community-based renewable energy transition. *Energy Policy* 101, pp. 332-341.
29. [11 October 2016](#): Jacob, J., Sanders, T., & Dähnke, K. (2016). Nitrite consumption and associated isotope changes during a river flood event. *Biogeosciences*, 13, 5649-5659, 2016. doi:10.5194/bg-13-5649-2016
30. [06 October 2016](#): Luther-Mosebach, J., Kalinski, K., Gröngröft, A., Eschenbach, A. CO2 fluxes in subtropical dryland soils – a comparison of the gradient and the closed chamber method. *Journal of Plant Nutrition and Soil Science*. 2016, 000, 1-10. doi: 10.1002/jpln.201600137
31. [3 October 2016](#): Schubert-Frisius, M., F. Feser, H. von Storch and S. Rast: Optimal spectral nudging for global dynamical downscaling. *Monthly Weather Review*, (2016).

32. [2 October 2016](#): ul Hasson, S. (2016). Seasonality of Precipitation over Himalayan Watersheds in CORDEX South Asia and their Driving CMIP5 Experiments. *Atmosphere*, 7(10), 123.
33. [1 October 2016](#): Ibarra, D. E., Caves, J. K., Moon, S., Thomas, D. L., Hartmann, J., Chamberlain, C. P., & Maher, K. (2016). Differential weathering of basaltic and granitic catchments from concentration–discharge relationships. *Geochimica et Cosmochimica Acta*, 190, 265-293.
34. [1 October 2016](#): Bian, C., Jiang, W., Pohlmann, T., & Sündermann, J. (2016). Hydrography-Physical Description of the Bohai Sea. *Journal of Coastal Research*, 74(sp1), 1-12.
35. [September 2016](#): Alexander, P. J., Bechtel, B., Chow, W. T. L., Fealy, R., & Mills, G. (2016). Linking urban climate classification with an urban energy and water budget model: Multi-site and multi-seasonal evaluation. *Urban Climate*, 17, 196-215.
36. [30 September 2016](#): Ding, R., Huang, D., Xuan, J., Mayer, B., Zhou, F., & Pohlmann, T. (2016). Cross-shelf water exchange in the East China Sea as estimated by satellite altimetry and in situ hydrographic measurement. *Journal of Geophysical Research: Oceans*, 121(9), 7192-7211.
37. [28 September 2016](#): Tonboe, R. T., Eastwood, S., Lavergne, T., Sørensen, A. M., Rathmann, N., Dybkjær, G., ... & Kern, S. (2016). The EUMETSAT sea ice concentration climate data record. *The Cryosphere*, 10(5), 2275.
38. [26 September 2016](#): Kern, S., Rösel, A., Pedersen, L. T., Ivanova, N., Saldo, R., Tonboe, R. T. The impact of melt ponds on summertime microwave brightness temperatures and sea-ice concentrations. *The Cryosphere*, 10, 2217-2239, 2016. doi:10.5194/tc-10-2217-2016.
39. [24 September 2016](#): Bettini, G., Nash, S. L., & Gioli, G. (2016). One step forward, two steps back? The fading contours of (in) justice in competing discourses on climate migration. *The Geographical Journal*.
40. [23 September 2016](#): Li, Q., Lee, S., & Griesel, A. (2016). Eddy Fluxes and Jet-Scale Overturning Circulations in the Indo–Western Pacific Southern Ocean. *Journal of Physical Oceanography*, 46(10), 2943-2959.
41. [21 September 2016](#): Karger, D. N., Conrad, O., Böhrner, J., Kawohl, T., Kreft, H., Soria-Auza, R. W., ... & Kessler, M. (2016). Climatologies at high resolution for the earth's land surface areas. arXiv preprint arXiv:1607.00217.
42. [5 September 2016](#): Abid, M., Schneider, U. A., & Scheffran, J. (2016). Adaptation to climate change and its impacts on food productivity and crop income: Perspectives of farmers in rural Pakistan. *Journal of Rural Studies*, 47, 254-266.
43. [2 September 2016](#): Lawrence, D. M., Hurtt, G. C., Arneth, A., Brovkin, V., Calvin, K. V., Jones, A. D., ... & Seneviratne, S. I. (2016). The Land Use Model Intercomparison Project (LUMIP) contribution to CMIP6: rationale and experimental design, *Geosci. Model Dev.*, 9, 2973–2998.
44. [1 September 2016](#): Hölzel, N., Hickler, T., Kutzbach, L., Joosten, H., van Huissteden, J., & Hiederer, R. (2016). Environmental Impacts – Terrestrial Ecosystems. In *North Sea Region Climate Change Assessment* (pp. 341-372). Springer International Publishing.
45. [1 September 2016](#): Schrum, C., Lowe, J., Meier, H. M., Grabemann, I., Holt, J., Mathis, M., ... & Wakelin, S. (2016). Projected Change – North Sea. In *North Sea Region Climate Change Assessment* (pp. 175-217). Springer International Publishing.
46. [1 September 2016](#): Huthnance, J., Weisse, R., Wahl, T., Thomas, H., Pietrzak, J., Souza, A. J., ... & Haigh, I. (2016). Recent Change—North Sea. In *North Sea Region Climate Change Assessment* (pp. 85-136). Springer International Publishing.
47. [1 September 2016](#): Haumann, F. A., Gruber, N., Münnich, M., Frenger, I., & Kern, S. (2016). Sea-ice transport driving Southern Ocean salinity and its recent trends. *Nature*, 537(7618), 89-92.
48. [August 2016](#): Ping, Q., Iqbal, M. A., Abid, M., Ahmed, U. I., Nazir, A., & Rehman, A. (2016). Adoption of Off-farm Diversification Income Sources in Managing Agricultural Risks among Cotton Farmers in Punjab Pakistan. *J. Appl. Environ. Biol. Sci*, 6(8), 47-53.
49. [August 2016](#): Müller, M., Schwab, N., Schickhoff, U., Böhrner, J., & Scholten, T. (2016). Soil temperature and soil moisture patterns in a Himalayan alpine treeline ecotone. *Arctic, Antarctic, and Alpine Research*, 48(3), 501-521.

50. [31 August 2016](#): Hoppe, F., Kyzy, T. Z., Usupbaev, A., & Schickhoff, U. (2016). Rangeland degradation assessment in Kyrgyzstan: vegetation and soils as indicators of grazing pressure in Naryn Oblast. *Journal of Mountain Science*, 13(9), 1567-1583.
51. [30 August 2016](#): Ratter, B., Petzold, J. and Sinane, K. (2016). Considering the locals: coastal construction and destruction in times of climate change on Anjouan, Comoros, *Natural Resources Forum*, 40, 112–126 DOI: 10.1111/1477-8947.12102
52. [26 August 2016](#): Hasson, S. (2016). Future Water Availability from Hindukush-Karakoram-Himalaya upper Indus Basin under Conflicting Climate Change Scenarios. *Climate*, 4(3), 40.
53. [19 August 2016](#): Okoro, S.U., Schickhoff, U., Böhner, J. & Schneider, U.A. (2016): A novel approach in monitoring oil palm related land use and land cover change in the Tropics. *DIE ERDE* 147 (1): 40-52 DOI: 10.12854/erde-147-3
54. [19 August 2016](#): Callies, U., Gaslikova, L., Kapitza, H., & Scharfe, M. (2016). German Bight residual current variability on a daily basis: principal components of multi-decadal barotropic simulations. *Geo-Marine Letters*, 1-12.
55. [12 August 2016](#): Süsser, D. (2016). People-Powered Local Energy Transition: Mitigating Climate Change with Community-Based Renewable Energy in North Frisia.
56. [11 August 2016](#): Brauch, H. G., Spring, Ú. O., Grin, J., & Scheffran, J. (Eds.). (2016). *Handbook on Sustainability Transition and Sustainable Peace* (Vol. 10). Springer.
57. [11 August 2016](#): Scheffran, J. (2016). From a Climate of Complexity to Sustainable Peace: Viability Transformations and Adaptive Governance in the Anthropocene. In *Handbook on Sustainability Transition and Sustainable Peace* (pp. 305-346). Springer International Publishing.
58. [11 August 2016](#): Spring, Ú. O., Brauch, H. G., & Scheffran, J. (2016). Sustainability Transition with Sustainable Peace: Key Messages and Scientific Outlook. In *Handbook on Sustainability Transition and Sustainable Peace* (pp. 887-927). Springer International Publishing.
59. [11 August 2016](#): Ide, T., Link, P. M., Scheffran, J., & Schilling, J. (2016). The Climate-Conflict Nexus: Pathways, Regional Links, and Case Studies. In *Handbook on Sustainability Transition and Sustainable Peace* (pp. 285-304). Springer International Publishing.
60. [10 August 2016](#): Fröhlich, C., *Climate Change – Migration – Conflict. What's the Connection?* sustainablesecurity.org, August 10, 2016.
61. [08 August 2016](#): Peng, J., Loew, A., Chen, X., Ma, Y., and Su, Z. (2016): Comparison of satellite-based evapotranspiration estimates over the Tibetan Plateau, *Hydrology and Earth System Sciences*, 20(8):3167-3182.
62. [03 August 2016](#): Zhu, X., Bye, J., Fraedrich, K., & Bordi, I. (2016). Statistical structure of intrinsic climate variability under global warming. *Journal of Climate*, (2016).
63. [1 August 2016](#): Burgdorf, M., Buehler, S. A., Lang, T., Michel, S., & Hans, I. (2016). The Moon as a photometric calibration standard for microwave sensors. *Atmospheric Measurement Technique*, 9, 3467-3475.
64. [July 2016](#): Bechtel, B., See, L., Mills, G., & Foley, M. (2016). Classification of Local Climate Zones Using SAR and Multispectral Data in an Arid Environment.
65. [July 2016](#): Behrens, J. (2016). Numerical methods and scientific computing for climate and geosciences. *Mathematics and Society*, 281-293.
66. [30 July 2016](#): Brüggemann, M., Neverla, I., Hoppe, I. & Walter, S. (2016): Klimawandel in den Medien. CliSAP Working Paper.
67. [27 July 2016](#): Loew, A., Peng, J., and Borsche, M. (2016). High-resolution land surface fluxes from satellite and reanalysis data (HOLAPS v1.0): evaluation and uncertainty assessment, *Geosci. Model Dev.*, 9, 2499-2532.
68. [22 July 2016](#): Hünicke, B., Zorita, E., Statistical Analysis of the Acceleration of Baltic Mean Sea-Level Rise, 1900-2012. *Frontiers in Marine Science*, <http://dx.doi.org/10.3389/fmars.2016.00125>.
69. [19 July 2016](#): Zulfiqar, F., Ullah, R., Abid, M., & Hussain, A. (2016). Cotton production under risk: a simultaneous adoption of risk coping tools. *Natural Hazards*, 84(2), 959-974.

70. [19 July 2016](#): Lindhorst, S. & Betzler, C. (2016). The climate archive dune - sedimentary record of annual wind intensity. *Geology*, G38093.1.
71. [16 July 2016](#): Betzler, et. al (2016). The abrupt onset of the modern South Asian Monsoon winds. *Sci Rep.*, 6, 29838.
72. [13 July 2016](#): Hansen, K., Butzeck, C., Eschenbach, A., Gröngröft, A., Jensen, K., & Pfeiffer, E. M. (2016). Factors influencing the organic carbon pools in tidal marsh soils of the Elbe estuary (Germany). *Journal of Soils and Sediments*, 1-14.
73. [8 July 2016](#): Fröhlich, C. The European Response to the Syrian War. *Pathologies Uncovered*. E-International Relations, July 8, 2016.
74. [7 July 2016](#): Ide, T. (2016). Space, discourse and environmental peacebuilding. *Third World Quarterly*, 1-19.
75. [4 July 2016](#): Gagen, M. H., Zorita, E., McCarroll, D., Zahn, M., Young, G. H., & Robertson, I. (2016). North Atlantic summer storm tracks over Europe dominated by internal variability over the past millennium. *Nature Geoscience*.
76. [June 2016](#): Ahmed, U. I., Ying, L., Bashir, M. K., Abid, M., Elahi, E., & Iqbal, M. A. (2016). Access to output market by small farmers: The case of Punjab, Pakistan. *The Journal of Animal & Plant Sciences*, 26(3): 2016, Page: 787-793.
77. [June 2016](#): Fröhlich, C. 2016. Menschliche Mobilität im Kontext ökologischer und politischer Krisen. Das Beispiel Syrien. *Friedensgutachten 2016*, ed. by Margret Johannsen, Bruno Schoch, Max Mutschler et al., Münster: LIT, pp. 89-100. [in German]
78. [June 2016](#): Iqbal, M. A., Ping, Q., Abid, M., Kazmi, S. M. M., Rizwan, M. (2016). Assessing risk perceptions and attitude among cotton farmers: A case of Punjab province, Pakistan. *International Journal of Disaster Risk Reduction*, Volume 16, June 2016, Pages 68-74.
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80. [June 2016](#): Vieira do Nascimento, D. (2016). Exploring climate finance for tourism adaptation development: an overview. *Worldwide Hospitality and Tourism Themes*, 8(5). doi:10.1108/whatt-06-2016-0036.
81. [June 2016](#): Schilling, J., Weinzierl, T., Lokwang, A. E., & Opiyo, F. (2016). For better or worse: major developments affecting resource and conflict dynamics in northwest Kenya. *Zeitschrift für Wirtschaftsgeographie*, 60(1-2), 57-71.
82. [June 2016](#): Balbo, A., Gómez-Baggethun, E., Salpeteur, M., Puy, A., Biagetti, S., & Scheffran, J. (2016). Resilience of small-scale societies: a view from drylands. *Ecology and Society*, 21(2).
83. [June 2016](#): Puy, A., Balbo, A. L., & Bubenzer, O. (2016). Radiocarbon Dating of Agrarian Terraces by Means of Buried Soils. *Radiocarbon*, 58(02), 345-363.
84. [30 June 2016](#): de Guttery, C., Döring, M., & Ratter, B. (2016). Challenging the current climate change–migration nexus: exploring migrants’ perceptions of climate change in the hosting country. *DIE ERDE–Journal of the Geographical Society of Berlin*, 147(2), 109-118.
85. [28 June 2016](#): Sonntag, S., Pongratz, J., Reick, C. H., & Schmidt, H. (2016). Reforestation in a high-CO2 world—Higher mitigation potential than expected, lower adaptation potential than hoped for. *Geophysical Research Letters*, 43(12), 6546-6553.
86. [27 June 2016](#): Tian, F., von Storch, J. S., & Hertwig, E. (2016). Air-sea fluxes in a climate model using hourly coupling between the atmospheric and oceanic components. *Climate Dynamics*, pp 1–18.
87. [23 June 2016](#): Tim, N., Zorita, E., Hünicke, B., Yi, X., & Emeis, K. C. (2016). The importance of external climate forcing for the variability and trends of coastal upwelling in past and future climate. *Ocean Science*, 12(3), 807-823.
88. [20 June 2016](#): Weinert, M., Mathis, M., Kröncke, I., Neumann, H., Pohlmann, T., & Reiss, H. (2016). Modelling climate change effects on benthos: Distributional shifts in the North Sea from 2001 to 2099. *Estuarine, Coastal and Shelf Science*, 175, 157-168.



89. [16 June 2016](#): Nyawira, S. S., Nabel, J. E., Don, A., Brovkin, V., & Pongratz, J. Soil carbon response to land-use change: Evaluation of a global vegetation model using meta-data.
90. [07 June 2016](#): Rimac, A., Storch, J. S. V., & Eden, C. (2016). The Total Energy Flux Leaving the Ocean's Mixed Layer. *Journal of Physical Oceanography*, 46(6), 1885-1900.
91. [07 June 2016](#): Gerlitz, L., Bechtel, B., Böhner, J., Bobrowski, M., Bürzle, B., Müller, M., ... & Weidinger, J. (2016). Analytic Comparison of Temperature Lapse Rates and Precipitation Gradients in a Himalayan Treeline Environment: Implications for Statistical Downscaling. In *Climate Change, Glacier Response, and Vegetation Dynamics in the Himalaya* (pp. 49-64). Springer International Publishing.
92. [07 June 2016](#): Schickhoff, U., Singh, R. B., & Mal, S. (2016). Climate Change and Dynamics of Glaciers and Vegetation in the Himalaya: An Overview. In *Climate Change, Glacier Response, and Vegetation Dynamics in the Himalaya* (pp. 1-26). Springer International Publishing.
93. [07 June 2016](#): Schickhoff, U., Bobrowski, M., Böhner, J., Bürzle, B., Chaudhary, R. P., Gerlitz, L., ... & Schwab, N. (2016). Climate change and treeline dynamics in the Himalaya. In *Climate Change, Glacier Response, and Vegetation Dynamics in the Himalaya* (pp. 271-306). Springer International Publishing.
94. [07 June 2016](#): Mal, S., Singh, R. B., & Schickhoff, U. (2016). Estimating recent glacier changes in Central Himalaya, India, using remote sensing data. In *Climate Change, Glacier Response, and Vegetation Dynamics in the Himalaya* (pp. 205-218). Springer International Publishing.
95. [07 June 2016](#): ul Hasson, S., Gerlitz, L., Schickhoff, U., Scholten, T., & Böhner, J. (2016). Recent Climate Change over High Asia. In *Climate Change, Glacier Response, and Vegetation Dynamics in the Himalaya* (pp. 29-48). Springer International Publishing.
96. [07 June 2016](#): Schwab, N., Schickhoff, U., Müller, M., Gerlitz, L., Bürzle, B., Böhner, J., ... & Scholten, T. (2016). Treeline responsiveness to climate warming: insights from a krummholz treeline in Rolwaling Himal, Nepal. In *Climate Change, Glacier Response, and Vegetation Dynamics in the Himalaya* (pp. 307-345). Springer International Publishing.
97. [02 June 2016](#): Gerkenmeier, B., & Ratter, B. M. (2016). Multi-risk, multi-scale and multi-stakeholder – the contribution of a bow-tie analysis for risk management in the trilateral Wadden Sea Region. *Journal of Coastal Conservation*, 1-12.
98. [01 June 2016](#): Li, G., Hartmann, J., Derry, L. A., West, A. J., You, C. F., Long, X., ... & Li, T. (2016). Temperature dependence of basalt weathering. *Earth and Planetary Science Letters*, 443, 59-69.
99. [26 May 2016](#): Song, X., Chang, K. T., Yang, L., & Scheffran, J. (2016). Change in Environmental Benefits of Urban Land Use and Its Drivers in Chinese Cities, 2000–2010. *International journal of environmental research and public health*, 13(6), 535.
100. [26 May 2016](#): Gurgiser, W., Juen, I., Singer, K., Neuburger, M., Schauwecker, S., Hofer, M., and Kaser, G. (2016). Comparing peasants' perceptions of precipitation change with precipitation records in the tropical Callejón de Huaylas, Peru, *Earth Syst. Dynam.*, 7, 499-515. doi:10.5194/esd-7-499-2016.

#### Other publications

1. 2016: Wiederroth, N.. Südafrikas Propaganda im Zweiten Weltkrieg. Zur medialen Legitimation einer kolonialen Ordnung. St. Ingbert: Röhrig Universitätsverlag.
2. 2016: Trümper, S. Nachhaltige Erinnerung im Journalismus. PhD Thesis, Universität Hamburg, Hamburg.

## II. Abstracts, links, contact information

Date issued: 2017

### Klimawandel in Deutschland: Entwicklung, Folgen, Risiken und Perspektiven

Erstmals stellt diese nationale Untersuchung den Forschungsstand zum Klimawandel umfassend für alle Themenbereiche und gesellschaftlichen Sektoren dar. Womit müssen wir in Deutschland rechnen, welche Auswirkungen werden die Klimaveränderungen auf Wirtschaft und Gesellschaft.

**Read:** Brasseur, G. P., Jacob, D., & Schuck-Zöller, S. (Hrsg.). (2017). *Klimawandel in Deutschland*. Berlin: Springer. doi:10.1007/978-3-662-50397-3.

**Online:** <http://link.springer.com/book/10.1007/978-3-662-50397-3>

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Date issued: 2016

### **Nachhaltiger Konsum - Institutionen, Instrumente, Initiativen**

Der interdisziplinäre Band analysiert Potenziale, Herausforderungen und Grundkonflikte einer Politik des nachhaltigen Konsums. Erörtert werden institutionelle Rahmenbedingungen und Steuerungsinstrumente sowie die Möglichkeit von Initiativen, nachhaltiges Konsumverhalten zu stärken. Die Beiträge widmen sich innovativen Instrumenten und Gesetzesinitiativen im Bereich der Informationspolitik, diskutieren aktuelle institutionelle Entwicklungen im Feld des nachhaltigen Konsums und beziehen auch die Entstehung neuer zivilgesellschaftlicher Initiativen und Akteure mit ein.

This interdisciplinary volume analyses the potential of, the challenges posed by and the obstacles to sustainable consumption. It discusses institutional factors, policy instruments and civil society initiatives that aim to promote sustainable consumption. The contributions in the book assess policy innovations and regulatory instruments, observe current institutional changes in the field of sustainable consumption and critically reflect on the emergence of new actors and initiatives.

**Read:** Jantke K., Lottermoser F., Reinhardt J., Rothe D. and Stöver J. (2016). *Nachhaltiger Konsum - Institutionen, Instrumente, Initiativen*, Nomos Verlagsgesellschaft, Baden-Baden, 472 p., ISBN 978-3-8487-3222-7.

**Online:** <http://www.nomos-shop.de/Jantke-Lottermoser-Reinhardt-Rothe-St%C3%B6ver-Nachhaltiger-Konsum/productview.aspx?product=27691>

**Contact:** Kerstin Jantke ([kerstin.jantke@uni-hamburg.de](mailto:kerstin.jantke@uni-hamburg.de))

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Date issued: 2016

### **North Sea Region Climate Change Assessment**

This book offers an up-to-date review of our current understanding of climate change in the North Sea and adjacent areas, as well as its impact on ecosystems and socio-economic sectors. It provides a detailed assessment of climate change based on published scientific work compiled by independent international experts from climate-related disciplines such as oceanography, atmospheric sciences, marine and terrestrial ecology, using a regional evaluation and review process similar to that of the Intergovernmental Panel on Climate Change (IPCC). It provides a comprehensive overview of all aspects of our changing climate, discussing a wide range of topics including past, current and future climate change, and climate-related changes in marine, terrestrial and freshwater ecosystems. It also explores the impact of climate change on socio-economic sectors such as fisheries, agriculture, coastal zone management, coastal protection, urban climate, recreation/tourism, offshore activities/energy, and air pollution.

**Read:** 1. 2016: Quante, M.; Colijn, F. (editors). *North Sea Region Climate Change Assessment*. Springer International Publishing, 1st Edition. doi: 10.1007/978-3-319-39745-0, eBook ISBN: 978-3-319-39745-0, Hardcover ISBN: 978-3-319-39743-6.

**Online:** <http://link.springer.com/book/10.1007/978-3-319-39745-0>

**Contact:** Markus Quante ([markus.quante@hzg.de](mailto:markus.quante@hzg.de))

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Date issued: December 2016

### **Bryozoan fauna of the Boggy Formation (Deese Group, Pennsylvanian) of the Buckhorn Asphalt Quarry**

The Middle to Upper Pennsylvanian Buckhorn Asphalt Quarry (Boggy Formation, Deese Group) of Oklahoma, USA, is well known for its exceptionally preserved fauna of marine invertebrates, including conservation of original skeletal aragonite. Here, we describe for the first time the taxonomy of the Buckhorn bryozoans, recognising nine species, two of which are new: *Stenophragmidium buckhornensis* sp. nov. and *Streblotrypa (Streblotrypa) heltzelae* sp. nov. Two further species, *Stenoporella* sp. and *Spinofenestella* sp., are described in open nomenclature. The other species show relationships to the Pennsylvanian of the USA and Russia. The genera *Shishoviclema* and *Shulgapora* are identified for the first time in North America. Superior preservation of the Buckhorn bryozoans allows some new and poorly known skeletal characters to be described. These include nanoporations, granule bands, mural spines, spinose hemiphragms and transverse fibrous wall fabric. Nanoporations, found in the skeletal walls of several Buckhorn bryozoan species, are tiny holes around which laminae are deflected, indicating that they are not post-mortem structures. However, it is unclear whether they are features of the bryozoans or have resulted from the presence of microsymbionts. The primary wall layer of the fenestrate *Septopora blanda* Moore, 1929 is apparently composed of transverse fibrous crystallites, a skeletal fabric previously known only in post-Palaeozoic cyclostomes.

**Read:** Ernst, A., Seuss, B., Taylor, P. D., & Nützel, A. (2016). *Bryozoan fauna of the Boggy Formation (Deese Group, Pennsylvanian) of the Buckhorn Asphalt Quarry, Oklahoma, USA. Palaeobiodiversity and Palaeoenvironments, 1-24.*

**Online:** <http://link.springer.com/article/10.1007/s12549-016-0231-6>

**Contact:** Andrej Ernst ([Andrej.Ernst@uni-hamburg.de](mailto:Andrej.Ernst@uni-hamburg.de))

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Date issued: 30 December 2016 (online, issue forthcoming)

### **Improving the Downscaling of Diurnal Land Surface Temperatures Using the Annual Cycle Parameters as Disaggregation Kernels**

The downscaling of geostationary diurnal thermal data can ease the lack of land surface temperature (LST) datasets that combine high spatial and temporal resolution. However, the downscaling of diurnal LST data is more demanding. In this work, multitemporal ACPs are employed for downscaling daytime and nighttime ~4 km geostationary LST from SEVIRI (Spinning Enhanced Visible and Infrared Imager) down to 1 km. The results suggest that the ACPs increase the downscaling performance, improve the estimation of diurnal DLST range and produce more accurate spatial patterns.

**Read:** Sismanidis, P.; Keramitsoglou, I.; Bechtel, B.; Kiranoudis, C.T. *Improving the Downscaling of Diurnal Land Surface Temperatures Using the Annual Cycle Parameters as Disaggregation Kernels. Remote Sens. 2017, 9, 23. doi:10.3390/rs9010023.*

**Online:** <http://www.mdpi.com/2072-4292/9/1/23>

**Contact:** Benjamin Bechtel ([benjamin.becht@uni-hamburg.de](mailto:benjamin.becht@uni-hamburg.de))

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Date issued: 29 December 2016 (online, issue forthcoming)

### **Human and remote sensing data to investigate the frontiers of urbanization in the south of Mexico City**

The data presented here were originally collected for the article “Frontiers of Urbanization: Identifying and Explaining Urbanization Hot Spots in the South of Mexico City Using Human and Remote Sensing” (Rodriguez et al. 2017). They were divided into three databases (remote sensing, human sensing, and census information), using a multi-method approach with the goal of analyzing the impact of urbanization on protected areas in southern Mexico City. The remote sensing database was prepared as a result of a semi-automatic classification, dividing the land cover data into urban and non-urban classes. The second data set details an alternative view of the phenomena of urbanization by concentrating on illegal settlements in the conservation zone. It was based on voluntary complaints about environmental and land use offences filed at the Procuraduria Ambiental y del Ordenamiento Territorial del Distrito Federal (PAOT), which is a governmental entity responsible for reviewing and processing grievances on five basic topics: illegal land use, deterioration of green areas, waste,



noise/vibrations, and animals. Anyone can file a PAOT complaint by phone, electronically, or in person. The complaint ends with a resolution, act of conciliation, or recommendation for action by other actors, such as the police or health office. The third data about unemployment was extracted from Mexico's National Census 2010 database available via public access.

**Read:** Lopez, J. M. R., Heider, K., & Scheffran, J. (2016). *Human and remote sensing data to investigate the frontiers of urbanization in the south of Mexico City. Data in Brief.*

**Online:** <http://www.sciencedirect.com/science/article/pii/S2352340916308101>

**Contact:** Juan Miguel Rodriguez Lopez ([miguel.rodriguez@uni-hamburg.de](mailto:miguel.rodriguez@uni-hamburg.de))

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Date issued: 29 December (online, issue forthcoming)

### **Frontiers of urbanization: Identifying and explaining urbanization hot spots in the south of Mexico City using human and remote sensing**

This article applies a multi-method approach to develop a better measurement of urbanization dynamics using remote and human sensing based on a GIS platform. The results demonstrate the benefits of bringing human and remote sensing sources together in a framework of hot spot analysis for a megacity such as Mexico City. Furthermore, our analysis suggests that human and remote sensing work well together in detecting the expansion of illegal urban settlements. Looking at the driving factors of illegal settlements, the existence of strong association between the expansion of illegal urban settlements and socioeconomic factors such as unemployment, provides some answers and reveals new questions. Illegal urban growth often leads to the loss of ecological areas in the urban frontiers, especially in areas where the urbanization potential is high. As a consequence, there are conflicts with legal settlers who dislike the illegal expansion. This approach can be extended to and replicated in new urbanizing areas, in particular in Africa and Asia.

**Read:** Rodriguez Lopez J.M., Heider K., Scheffran J. (2016): *Frontiers of Urbanization: Identifying and Explaining Urbanization Hot Spots in the South of Mexico City Using Human and Remote Sensing; Applied Geography, Volume 79, February 2017, Pages 1–10.*

**Online:** <http://www.sciencedirect.com/science/article/pii/S0143622816307421>

**Contact:** Juan Miguel Rodriguez Lopez ([miguel.rodriguez@uni-hamburg.de](mailto:miguel.rodriguez@uni-hamburg.de))

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Date issued: 27 December 2016 (online)

### **Improved MJO simulation in ECHAM6.3 by coupling a Stochastic Multicloud Model to the convection scheme**

We implement a Stochastic Multicloud Model (SMCM) in an observation-informed configuration into the convection scheme of the state-of-the-art GCM ECHAM6.3. The SMCM configuration we use here has been tuned to represent observed tropical convection by associating the occurrence and strength of deep convection to mid-tropospheric vertical velocity and relative humidity. We show that compared to the ECHAM6.3 standard model, the SMCM-modified version shows improved capacity to simulate features of tropical intraseasonal variability, including MJO-like disturbances, without significantly distorting the mean model climate. This improvement goes in hand with ameliorated coupling of atmospheric convection to tropospheric moisture and spatiotemporal coherence of tropical convection compared to reanalysis and observations. We attribute these effects to (i) improved coupling of triggering and suppression of deep convective events to the model's large-scale environment and (ii) the observations-informed closure formulation which leads to an overall reduction of deep convective mass fluxes. Sensitivity tests show that while (ii) improves the convection-moisture relationship, it is (i) which improves the spatiotemporal coherence of tropical rainfall and is important for MJO simulation. Further, the simulated spatiotemporal coherence of tropical rainfall is an intrinsic property of the convection schemes themselves and not of their parameters. We

stress that this study serves as a proof-of-concept and motivates further efforts towards building a novel convection parameterization with the SMCM as a central element.

**Read:** Peters, K., Crueger, T., Jakob, C., & Moebis, B. (2016). Improved MJO-simulation in ECHAM6. 3 by coupling a stochastic multicloud model to the convective scheme. *Journal of Advances in Modeling Earth Systems*.

**Online:** <http://onlinelibrary.wiley.com/doi/10.1002/2016MS000809/full>

**Contact:** Karsten Peters ([karsten.peters@mpimet.mpg.de](mailto:karsten.peters@mpimet.mpg.de))

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Date issued: 23 December 2016 (online)

### **The Climate of Science-Art and the Art-Science of the Climate: Meeting Points, Boundary Objects and Boundary Work**

This article draws on participant observation during CliSAP's "Visiting Artist Researchers' Project" which took place in 2014 with the help of many CliSAP colleagues. The paper documents artists' and scientists' imaginations of their encounter and analyses them drawing on sociological concepts such as "boundary object" and "boundary work". In conclusion, the project allowed for artistic explorations of the scientific context, including affirmative as well as critical re-imaginings of research practices. Artists and scientists acted as publics for one another, as resources to draw on for reflection and self-identification.

**Read:** Rödder, Simone (2016) *The Climate of Science-Art and the Art-Science of the Climate: Meeting Points, Boundary Objects and Boundary Work*. *Minerva* (2016). doi:10.1007/s11024-016-9312-y

**Online:** <http://link.springer.com/article/10.1007%2Fs11024-016-9312-y>

**Contact:** Simone Rödder ([simone.roedder@uni-hamburg.de](mailto:simone.roedder@uni-hamburg.de))

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Date issued: 23 December (online, issue forthcoming)

### **Landscape narratives in practice: implications for climate change adaptation**

In the context of understanding societal dynamics of adaptation to climate change, a growing body of literature seeks to explain how individuals' relationships with the places in which they live influence their responses to a changing climate at the local scale. However, a number of critical limitations are evident in this literature; especially differences between individual place constructions and their possible implications for adaptation processes are given insufficient attention. We mobilise research on the societal construction of landscapes to uncover how actors in landscape management perceive 'their' places and changes to them. Based on interviews with key actors in landscape management in Cornwall (UK), we present contrasting narratives about local landscapes and climate change and highlight their potential implications for climate change adaptation.

**Read:** Köpsel, V., Walsh, C., Leyshon, C. (2016), *Landscape Narratives in Practice: Implications for Climate Change Adaptation*. *The Geographical Journal* (issue forthcoming)

**Online:** <http://onlinelibrary.wiley.com/doi/10.1111/geoj.12203/abstract>

**Contact:** Vera Köpsel ([vera.koepsel@uni-hamburg.de](mailto:vera.koepsel@uni-hamburg.de))

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Date issued: 17 December 2016

### **Bioscrubber treatment of exhaust air from intensive pig production: Case study in northern Germany at mild climate condition**

Treatment by field-scale bioscrubber of exhaust air, including ammonia (NH<sub>3</sub>) and the greenhouse gases methane (CH<sub>4</sub>), nitrous oxide (N<sub>2</sub>O), and carbon dioxide (CO<sub>2</sub>), from 13 intensive pig production houses located in northern Germany were investigated in 2013 and 2015. NH<sub>3</sub> removal efficiencies varied between 35 and 100% with an overall average value of 79% under the NH<sub>3</sub> inlet fluctuations from 34 to 755 g d<sup>-1</sup> m<sup>-3</sup> in both 2013 and 2015. Results of the electron microscopic analyses demonstrated that the bacteria *Nitrosomonas* sp.

and methanotrophs *type I* were the dominant NH<sub>3</sub> and CH<sub>4</sub> oxidizers, respectively. However, overall average removal efficiencies of CH<sub>4</sub> was approximately zero, which means CH<sub>4</sub> is hard to remove in bioscrubbers under normal operation. The pH of recirculation water in the bioscrubber varied from 6.1 to 8.1, and the bioscrubbers with low pH values (<7.0) had high NH<sub>3</sub> removal efficiencies (>79%). Electrical conductivity was commonly used to diagnose the bioscrubbers' performance; in the present study, electrical conductivity presented a significant linear relationship with dissolved inorganic nitrogen, which indicates the performance stability of the 13 selected bioscrubbers.

**Read:** Liu, F., Fiencke, C., Guo, J., Rieth, R., Cuhls, C., Dong, R., & Pfeiffer, E. M. (2016). *Bioscrubber treatment of exhaust air from intensive pig production: Case study in northern Germany at mild climate condition. Engineering in Life Sciences.*

**Online:** <http://onlinelibrary.wiley.com/doi/10.1002/elsc.201600169/full>

**Contact:** Fang Liu ([Fang.Liu@uni-hamburg.de](mailto:Fang.Liu@uni-hamburg.de))

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Date issued: 14 December 2016 (online)

### **Signal Stations: Newly Digitized Historical Climate Data of the German Bight and the Southern Baltic Sea Coasts**

At the German Meteorological Service in Hamburg, handwritten journals of meteorological observation data of 164 signal stations exist that were digitized. These data contain long-term time series of up to 125 years for the period 1877–1999 and allow for studies of regional meteorological conditions with greatly improved spatial resolution. Wind and air pressure data of selected signal stations along the German Bight and the southern Baltic Sea coast show a spatial data homogeneity that allows for an improved description of two historical storms, in 1906 and 1913. This is the first presentation of signal station data.

**Read:** Wagner, D., Tinz, B., & von Storch, H. (2016). *Signal Stations: Newly Digitized Historical Climate Data of the German Bight and the Southern Baltic Sea Coast. Journal of Atmospheric and Oceanic Technology, 33(12), 2735-2741.*

**Online:** <http://journals.ametsoc.org/doi/abs/10.1175/JTECH-D-15-0199.1>

**Contact:** Hans von Storch ([hvonstorch@web.de](mailto:hvonstorch@web.de))

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Date issued: 9 December

### **The Political Dynamics of Human Mobility: Migration out of, as and into Violence. Accepted for Publication in Global Policy**

Simplistic correlations between human mobility and political violence are on the rise in the European discourse on immigration, especially – but not only – in populist rhetoric. This not only lacks an empirical foundation, but also leads to simplistic solutions for a major political and humanitarian challenge of our time. However, we still lack comprehensive knowledge on the migration-violence nexus. By bringing insights from migration studies and peace and conflict studies into fruitful dialogue, this contribution aims to fill this gap. It first maps some of the central questions regarding the migration-violence nexus. Second, and on this basis, it proposes an analytical framework for future research which encompasses the interdependence of violence-migration dynamics on and between the macro, meso and micro levels by examining human mobility as: (1) a movement out of (physical and structural) violence; (2) a violent process in and of itself; (3) a path into (physical and structural) violence; and (4) it formulates some recommendations that can provide a more holistic basis for policy programmes regarding human mobility.

**Read:** Bank, A, Fröhlich, C, Schneiker, A. (2016), *The Political Dynamics of Human Mobility: Migration out of, as and into Violence. Glob Policy. doi:10.1111/1758-5899.12384 (special issue „Critical Perspectives on Human Mobility“, ed. by Christiane Fröhlich).*

**Online:** <http://onlinelibrary.wiley.com/doi/10.1111/1758-5899.12384/full>

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Date issued: 07 December 2016 (online, issue forthcoming)

**Late Artinskian-Early Kungurian (Early Permian) warming and maximum marine flooding in the East Gondwana interior rift, Timor and Western Australia, and comparisons across East Gondwana**

Substantial new information is presented on upper Artinskian–Kungurian deposits in Timor-Leste and in the Canning, Southern Carnarvon and northern Perth basins of Western Australia. These basins, situated between about 35°S and 55°S palaeolatitude, formed part of the East Gondwana interior rift, a precursor to the rift that 100 my later formed the Indian Ocean in this region. Timor lay near the main axis of the East Gondwana interior rift, whereas the Western Australian basins were marginal splays from the rift axis. The main depocentres developed as a result of faulting that was initiated during the Late Pennsylvanian. Detailed lithostratigraphic and biostratigraphic analyses have been made on the newly recognized Bua-bai limestone and the type Cribas Group in Timor, the Noonkanbah Formation in the Canning Basin, the Byro Group in the Merlinleigh Sub-basin of the Southern Carnarvon Basin, and the Carynginia Formation in the northern Perth Basin. In Timor the succession, which is highly disrupted by faulting, was deposited under open-marine conditions probably in a shelf–basin setting. Restricted, very shallow-water seas flooded the Canning Basin and the Merlinleigh–Byro–Irwin sub-basins of the Southern Carnarvon and northern Perth basins and had highly variable oxygen levels and salinities typical of estuarine environments.

A similar pattern of warming and bathymetric change is recognized in all studied basins. During the early part of the late Artinskian cool conditions prevailed, with water temperatures 0–4 °C forming sea ice in the Merlinleigh–Byro–Irwin rift. Rapid warming during the latter part of the late Artinskian was accompanied by maximum marine flooding close to the Artinskian–Kungurian boundary. Climatic and bathymetric conditions then allowed carbonate mounds, with larger fusulines and a variety of algae, to develop in the northern part of the rift system, and Tubiphytes, conodonts, and brachiopods with Tethyan affinities to migrate into the marginal-rift basins despite the generally adverse water quality at these depositional sites.

Comparison between the stratigraphic record from the East Gondwana interior rift and coeval records from Lhasa and Sibumasu indicate a similar pattern of climate change during the Carboniferous to end Cisuralian. Similar trends probably are present in Eastern Australia although there is confusion over the correlation of some units.

**Read:** Haig, D. W., Mory, A. J., McCartain, E., Backhouse, J., Håkansson, E., Ernst, A., ... & Hunter, A. W. (2016). Late Artinskian–Early Kungurian (Early Permian) warming and maximum marine flooding in the East Gondwana interior rift, Timor and Western Australia, and comparisons across East Gondwana. *Palaeogeography, Palaeoclimatology, Palaeoecology*.

**Online:** <http://www.sciencedirect.com/science/article/pii/S0031018216307994>

**Contact:** Andrej Ernst ([Andrej.Ernst@uni-hamburg.de](mailto:Andrej.Ernst@uni-hamburg.de))

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Date issued: November 2016

**Critical Geopolitics and School Textbooks: The Case of Environment-Conflict Links in Germany**

This study explores the conceptual and empirical utility of studying school textbooks from a critical geopolitics perspective. School textbooks bind together various discourses, modalities and genres and can reflect the dominant knowledge in a given society. They therefore have a high potential to reveal the citational practices resonating between the domains of formal, practical and popular geopolitics. Studying school textbooks can also enrich the literature on children's and young people's (political) geographies by analyzing how the political worldviews and agency of young people are shaped by teaching materials. Empirically, the study draws on a mix of quantitative and qualitative methods to study how environment-conflict links are textually and visually

portrayed in German geography and civics textbooks. The results suggest that German school textbooks significantly reflect the depictions of environment-conflict links in political, media and (popular) science discourses and thus reveal crucial citational practices. Drawing on the environmental security literature, it is further argued that these textbooks convey problematic geographical imaginations: they overemphasize the risk of environmental conflicts, reflect ideas of spill-over effects threatening the global north, and portray people from the global south as irresponsible and threatening.

**Read:** Ide, T. (2016). *Critical geopolitics and school textbooks: The case of environment-conflict links in Germany*. *Political Geography*, 55, 60-71.

**Online:** <http://www.sciencedirect.com/science/article/pii/S0962629816300701>

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Date issued: 30 November 2016

### **Stable carbon isotope gradients in benthic foraminifera as proxy for organic carbon fluxes in the Mediterranean Sea**

We have determined stable carbon isotope ratios of benthic foraminifera in the Mediterranean Sea to relate the inferred isotope gradient of the pore water to varying trophic conditions. The difference between the stable carbon isotope ratios of shallow infaunal and epifaunal taxa reveals a consistent relation to organic carbon fluxes estimated from satellite-derived surface water primary production in open-marine settings. Taking regional biases and uncertainties into account, we have established a first stable carbon isotope-based transfer function of organic carbon fluxes for the Mediterranean Sea.

**Read:** Theodor, M., Schmiedl, G., Jorissen, F. and Mackensen, A., 2016. *Stable carbon isotope gradients in benthic foraminifera as proxy for organic carbon fluxes in the Mediterranean Sea*. *Biogeosciences*, 13, 6385–6404. doi:10.5194/bg-13-6385-2016.

**Online:** <http://www.biogeosciences.net/13/6385/2016/>

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Date issued: 30 November 2016

### **Vorticity and geopotential height extreme values in ERA-Interim data during boreal winters**

The properties of geopotential height (GPH) and relative vorticity extremes are investigated in ERA-Interim reanalysis data during the boreal winters from 1980–2014 by a peak-over-threshold (POT) analysis. The association of GPD parameters with the large-scale flow is assessed using monthly mean indices for the North Atlantic Oscillation (NAO), Pacific–North American (PNA) pattern and El Niño Southern Oscillation (Niño 3.4 index) as covariates. While the GPH parameters are related to the covariates in the regions associated with the covariate loadings, the vorticity parameters are weakly related to all covariates. A main result is that the NAO dominates all covariates in the central tropical Pacific.

**Read:** Blender, R., Raible, C. C. and Franzke, C. L. E. (2016). *Vorticity and geopotential height extreme values in ERA-Interim data during boreal winters*. *Q.J.R. Meteorol. Soc.* doi:10.1002/qj.2944.

**Online:** <http://onlinelibrary.wiley.com/doi/10.1002/qj.2944/abstract>

**Contact:** Richard Blender ([Richard.Blender@uni-hamburg.de](mailto:Richard.Blender@uni-hamburg.de))

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Date issued: 27 November 2016

### **An attempt to deconstruct recent climate change in the Baltic Sea Basin**

We investigate whether the recently observed temperature and precipitation trends over the Baltic Sea Basin are consistent with state-of-the-art regional climate model projections. To address this question we use several

data sources: 1) multi-decadal trends derived from various observational data sets, 2) estimates of natural variability provided by a 2,000-year paleoclimatic model simulation, and 3) response to greenhouse gas forcing derived from regional climate simulations driven by the A1B and RCP4.5 scenarios (from ENSEMBLES and CORDEX projects). Results indicate that, over the past decades, the climate in the Baltic Sea Basin has undergone a change that is beyond the estimated range of natural variability. We test the hypothesis that this change may be understood as a manifestation of global warming due to increasing concentrations of greenhouse gases (GHGs). We find that changes in near-surface temperature support our hypothesis that the effect of GHG is needed to simulate the observed changes. The pattern correlation and regression results clearly illustrate the concerted emergence of an anthropogenic signal consistent with the GHG signal in summer and autumn in the 21st century. However, none of the 19 regional climate simulations used in this study reproduce the observed warming. The observed trends in precipitation and surface solar radiation are also partially inconsistent with the expected changes due to GHG forcing. We conclude that, besides the regional response to GHG forcing, other human-made drivers have had an imprint. Regional emission of industrial aerosols has been strongly reduced in this region, and we suggest that this reduction may be the missing driver.

**Read:** Barkhordarian, A., von Storch, H., Zorita, E., and Gómez-Navarro, J. J. An attempt to deconstruct recent climate change in the Baltic Sea Basin. *Geophys. Res. Atmos.*, 121, 13, 207-13,217. doi:10.1002/2015JD024648.

**Online:** <http://onlinelibrary.wiley.com/doi/10.1002/2015JD024648/abstract>

**Contact:** Hans von Storch ([hvonstorch@web.de](mailto:hvonstorch@web.de))

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Date issued: 16 November 2016 (Online)

### **Coastal dwellers-power against climate change: a place-based perspective on individual and collective engagement in North Frisia**

Climate change induces non-linear and unevenly distributed changes, such rising sea levels and extreme weather events that materialise on the regional level and considerably contribute to changes in the social fabric of regions, communities and places. Because of the need for societal responses, an in-depth understanding of individual and collective forms of engagement with climate change is of growing relevance. To contribute to close this gap, this paper applies a place-based approach for investigating how people's place attachments and meanings inform individual and collective engagement with climate change. As a case study, the district of North Frisia (Germany) was chosen, a region between climate-change vulnerability and renewable-energy potential. Qualitative interviews and a household survey with coastal dwellers of the municipality of Reußenköge have been conducted, a group discussion with the Country Youth (Landjugend) and further interviews with experts from government, companies and associations spread over North Frisia and in Kiel. The results reveal two main findings: firstly, place-dependent attachments and meanings play a pivotal role for understanding people's engagement with climate change, and secondly, the behavioural dimension of engagement involves diverse adaptation and mitigation measures adopted on individual and collective level. In sum, the findings conceptually and empirically reveal the importance of memories, experiences, knowledge and creativity for how people engage with climate change, but also exhibit the importance of policies mobilising community-based actions.

**Read:** Süßner, D. Coastal dwellers-power against climate change: a place-based perspective on individual and collective engagement in North Frisia. *Journal of Coastal Conservation* (2016). doi:10.1007/s11852-016-0467-3

**Online:** <http://link.springer.com/article/10.1007%2Fs11852-016-0467-3>

**Contact:** Diana Süßner ([Diana.Suesser@hzg.de](mailto:Diana.Suesser@hzg.de))

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Date issued: 11 November 2016 (online, in press)

### **Detectable anthropogenic shift toward heavy precipitation over eastern China**



Changing precipitation characteristics directly affect society through their impacts on drought and floods, hydro-dams and urban drainage systems. Global warming increases the water holding capacity of the atmosphere and thus the risk of heavy precipitation. Here, we analyze daily precipitation records from over 700 Chinese stations from 1956-2005. The results show a significant shift from light to heavy precipitation over eastern China. An optimal fingerprinting analysis of simulations from 11 climate models driven by different combinations of historical anthropogenic (greenhouse gases, aerosols, land use, and ozone) and natural (volcanic and solar) forcings indicates that anthropogenic forcing on climate including increases in greenhouse gases (GHG) have had a detectable contribution to the observed shift towards heavy precipitation. We find some evidence that anthropogenic aerosols (AA) partially offset the effect of the GHG forcing, resulting in a weaker shift towards heavy precipitation in simulations that include the AA forcing than in simulations with just the GHG forcing. In addition to the thermodynamic mechanism, strengthened water vapor transport from the adjacent oceans and by midlatitude westerlies, resulting mainly from GHG-induced warming, also favors heavy precipitation over eastern China. Further GHG-induced warming is predicted to lead to an increasing shift towards heavy precipitation, leading to increased urban flooding and posing a significant challenge for megacities in China in the coming decades. Future reductions in AA emissions resulting from air pollution controls could exacerbate this tendency towards heavier precipitation.

**Read:** Ma, S., Zhou, T., Stone, D., Polson, D., Dai, A., Stott, P., von Storch, H., Qian, Y., Burke, C., Wu, P., Zou, L., Ciavarella, A. Detectable anthropogenic shift toward heavy precipitation over eastern China. *Journal of Climate*. doi:10.1175/JCLI-D-16-0311.1, in press.

**Online:** <http://journals.ametsoc.org/doi/abs/10.1175/JCLI-D-16-0311.1>

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Date issued: 11 November 2016 (online, issue forthcoming)

#### **Performance evaluation and optimization of field-scale bio scrubbers for intensive pig house exhaust air treatment in northern Germany**

The treatment of exhaust air from three intensive pig houses in northern Germany by field-scale bioscrubbers (BS.1, BS.2, and BS.3) were evaluated monthly in 2015. The simultaneous removal of NH<sub>3</sub> and CH<sub>4</sub> was investigated by connecting a second bioscrubber (BS.2-2) to one of the three bioscrubbers (BS.2) to create a two-series connected bioscrubber (BS.2 + BS.2-2). Additionally, whether isolated methanotrophic bacterial inoculation in BS.2-2 intensified CH<sub>4</sub> removal was examined.

Average NH<sub>3</sub> removal efficiencies of 86%, 80%, and 77% were observed for BS.1, BS.2, and BS.3, respectively, under fluctuate NH<sub>3</sub> inlet concentrations (variation of 22%–54%) throughout the study year. However, average CH<sub>4</sub> removal efficiencies were lower than 10% in the three bioscrubbers. The pH of the recirculation water, which ranged from 5.7 to 8.1, was demonstrated to be an important factor for NH<sub>3</sub> removal and negatively correlated with NH<sub>3</sub> removal and NH<sub>4</sub><sup>+</sup>-N concentration in the recirculation water. The dominant NH<sub>3</sub>-oxidizing and methanotrophic bacteria in the bioscrubbers, analysed by transmission electron microscopy, were *Nitrosomonas* sp. and Type I methanotrophs, respectively. NH<sub>3</sub> removal efficiency reached 100% in the two-series connected bioscrubber, however, CH<sub>4</sub> removal was still low (average of 2%). After inoculating isolated methanotrophic bacteria into BS.2-2, the average CH<sub>4</sub> removal was enhanced to 35%, offering a great option for bioscrubbers application to intensify CH<sub>4</sub> removal. Therefore, a two-series connected bioscrubber inoculated with methanotrophic bacteria would be an option for simultaneous removal of NH<sub>3</sub> and CH<sub>4</sub> from the exhaust air of animal houses.

**Read:** Liu, F., Fiencke, C., Guo, J., Rieth, R., Dong, R., & Pfeiffer, E. M. (2016). Performance evaluation and optimization of field-scale bioscrubbers for intensive pig house exhaust air treatment in northern Germany. *Science of The Total Environment*.

**Online:** <http://www.sciencedirect.com/science/article/pii/S0048969716324706>

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Date issued: 1 November 2016

### **Earliest symbiotic rugosans in cystoporate bryozoan *Ceramopora intercellata***

The earliest known endobiotic rugose corals are recorded in the Katian of Estonia. Multiple rugosans were partially embedded in colonies of the cystoporate bryozoan *Ceramopora intercellata* Bassler, 1911, leaving only their apertures free on the bryozoan growth surface. *Bodophyllum* sp. and *Lambelasma* sp. are rugosans that formed a symbiotic association with *C. intercellata* which may have been mutualistic. Rugosans presumably benefitted from growth within the stable substrate provided by the bryozoan, while bryozoans presumably benefitted by protection against some types of predators. Symbiosis between rugosans and the bryozoan *Ceramopora intercellata* was most likely facultative.

**Read:** Vinn, O., Ernst, A., & Toom, U. (2016). Earliest symbiotic rugosans in cystoporate bryozoan *Ceramopora intercellata* Bassler, 1911 from Late Ordovician of Estonia (Baltica). *Palaeogeography, Palaeoclimatology, Palaeoecology*, 461, 140-144.

**Online:** <http://www.sciencedirect.com/science/article/pii/S0031018216303352>

**Contact:** Andrej Ernst ([Andrej.Ernst@uni-hamburg.de](mailto:Andrej.Ernst@uni-hamburg.de))

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Date issued: 1 November 2016

### **Seasonal cycle of precipitation over major river basins in South and Southeast Asia: a review of the CMIP5 climate models data for present climate and future climate projections**

We review the skill of thirty coupled climate models participating in the Coupled Model Intercomparison Project Phase 5 (CMIP5) in terms of reproducing properties of the seasonal cycle of precipitation over the major river basins of South and Southeast Asia (Indus, Ganges, Brahmaputra and Mekong) for the historical period (1961–2000). We also present how these models represent the impact of climate change by the end of century (2061–2100) under the extreme scenario RCP8.5. First, we assess the models' ability to reproduce the observed timings of the monsoon onset and the rate of rapid fractional accumulation (RFA) slope — a measure of seasonality within the active monsoon period. Secondly, we apply a threshold-independent seasonality index (SI) — a multiplicative measure of precipitation (P) and extent of its concentration relative to uniform distribution (relative entropy — RE).

**Read:** ul Hasson, S., Pascale, S., Lucarini, V., & Böhner, J. (2016). Seasonal cycle of precipitation over major river basins in South and Southeast Asia: a review of the CMIP5 climate models data for present climate and future climate projections. *Atmospheric Research*, 180, 42-63.

**Online:** <http://www.sciencedirect.com/science/article/pii/S016980951630117X>

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Date issued: October 2016

### **A Study of quasi-millennial extratropical winter cyclone activity over the Southern Hemisphere**

The winter extratropical cyclone activity in the Southern Hemisphere during the last one thousand years within a global climate simulation was analyzed by tracking cyclones, and then clustering them into ten clusters consecutively for each hundred years. There is very strong year-to-year variability for Southern Hemispheric winter extratropical cyclone numbers and larger variations on centennial time scale, more so than for its Northern Hemispherical counterparts. However, no obvious trend can be found. The mean tracks of clusters over the Southern Indian Ocean and near New Zealand shift poleward from the eleventh to the twentieth century while the clusters in the central Southern Pacific shift equatorward. Storm track clusters with largest deepening rates are found over the Southwestern Indian Ocean. In the twentieth century, rapidly deepening cyclones appear more often while long lifespan cyclones appear less frequently. The winter storm activity in the Southern Hemisphere is closely related to the Antarctic Oscillation. The cyclone frequency over the Indian

Ocean and South Pacific Ocean can be associated with the Indian Ocean Dipole and El Niño-Southern Oscillation respectively.

**Read:** Xia, L., von Storch, H., Feser, F., & Wu, J. (2015). A study of quasi-millennial extratropical winter cyclone activity over the Southern Hemisphere. *Climate Dynamics*, 1-18.

**Online:** <http://link.springer.com/article/10.1007/s00382-015-2954-x>

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Date issued: October 2016

### **Adaptation to climate change and its impacts on food productivity and crop income: Perspectives of farmers in rural Pakistan**

Evaluation of the ongoing efforts for farm level adaptation to climate change is crucial to understand their effectiveness and to suggest further actions at the policy level. The current study explores the adaptation of wheat farmers to climate change, its determinants and its impact on food productivity and crop income in rural Pakistan. This study is based on a primary dataset of 442 wheat farmers conducted through face-to-face structured interviews from 65 villages across three agro-ecological zones of Punjab Province, Pakistan. The study employs logistic regression analysis to find adaptation determinants and uses the propensity score matching technique to estimate the causal impact of adaptation on food productivity and crop income. The results of the study suggest that wheat farmers were well aware of climate change, but for various reasons did not adapt accordingly. The major adaptation strategies implemented by wheat farmers include changing planting dates, crop varieties and fertilizer types. Moreover, education, farming experience, access to agricultural extension, weather forecasting and marketing information were the factors that significantly affected farmers' adaptation decisions. Adapting wheat crops to climate change significantly and positively affects wheat productivity and net crop income and hence indirectly improves the farmers' wellbeing and local food security. More benefits were achieved by farmers who used a combination of different adaptation strategies. The study suggests to focus on farmers' education, easy access to farm advisory services and information on new adaptation methods for sustainable food production and local food security.

**Read:** Abid, M., Schneider, U. A., & Scheffran, J. (2016). Adaptation to climate change and its impacts on food productivity and crop income: Perspectives of farmers in rural Pakistan. *Journal of Rural Studies*, 47, 254-266.

**Online:** [http://ac.els-cdn.com/S0743016716302911/1-s2.0-S0743016716302911-main.pdf?\\_tid=d31daf82-9b90-11e6-b9fa-00000aacb35e&acdnat=1477495880\\_7641878df6f7fea89f9e3a5cc92c653a](http://ac.els-cdn.com/S0743016716302911/1-s2.0-S0743016716302911-main.pdf?_tid=d31daf82-9b90-11e6-b9fa-00000aacb35e&acdnat=1477495880_7641878df6f7fea89f9e3a5cc92c653a)

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Date issued: October 2016

### **Bioinvasion des Pazifischen Rotfeuerfisches (*Pterois volitans*) und sozial-ökologische Anpassung in den Bahamas. Geographische Rundschau**

Die rezente Ausbreitung des Indo-Pazifischen Rotfeuerfisches (*Pterois volitans*/miles) im West-Atlantik, im Karibischen Meer und im Golf von Mexiko wird mittlerweile zu den weltweit wichtigen Biodiversitätsbelangen gezählt. In den Küstenzonen der Bahamas wird die pazifische Spezies seit Mitte der 1990er Jahre beobachtet. Noch ist das Wissen um die Invasionsdynamik und die ökologischen Auswirkungen, z.B. für Biodiversität und Ressourcenreichtum der Riffe, durch Unsicherheit gekennzeichnet. Gleichzeitig sind die Reaktionsformen sozialer Akteure auf diesen ökologischen Stressor vielfältig und zeigen exemplarisch die Herausforderungen für Umwelt-Governance im Karibischen Raum.

**Read:** Holdschlag, Arnd, Lisa Krause & Beate M.W. Ratter (2016). Bioinvasion des Pazifischen Rotfeuerfisches (*Pterois volitans*) und sozial-ökologische Anpassung in den Bahamas. *Geographische Rundschau*. Heft 10, Oktober 2016.

**Online:** <http://www.geographischerundschau.de/heft/51161000/Ausgabe-Oktober-Heft-10-2016-Karibik>

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Date issued: October 2016

### **Sozial-ökologische Systemdynamik in der Panarchie – Adaptivität und Umweltwissen am Beispiel karibischer Small Island Developing States (SIDS)**

Die Vereinten Nationen haben das Jahr 2014 nicht unbegründet u.a. zum „International Year of Small Island Developing States (SIDS)“ erklärt. Vielfältige Global Change Prozesse konfrontieren SIDS als sensible sozial-ökologische Raumsysteme mit steigenden Risiken für einen nachhaltigen Entwicklungsprozess. Zur Nachhaltigkeitsdiskussion im Kontext kleiner und globalisierter Inseln kann Forschung zu Unsicherheit, Verwundbarkeit und Resilienz von gekoppelten Mensch-Umwelt-Systemen einen wichtigen Beitrag leisten. Basierend auf den Vorstellungen von Komplexität, sozial-ökologischer Adaptivität und Panarchie wird in diesem Beitrag die Bedeutung von Umweltwissenssystemen und -kulturen herausgestellt. Organisationsformen des Katastrophenmanagements in Grenada und der Umweltgovernance in den Bahamas auf unterschiedlichen raum-zeitlichen Maßstabsebenen dienen als Beispiele. Die Produktion und Kommunikation von Wissen, die (skalenübergreifende) Integration verschiedener Wissenssysteme und -ansprüche, die Rolle von Erfahrung und Erinnerung sowie sozialen/institutionellen Lernens und Trägheit erscheinen als wesentliche Einflussgrößen hinsichtlich der Stärkung sozialer Adaptivität.

**Read:** Holdschlag, A., & Ratter, B. (2016). *Sozial-ökologische Systemdynamik in der Panarchie. Adaptivität und Umweltwissen am Beispiel karibischer Small Island Developing States (SIDS)*. *Geographische Zeitschrift*, 104(3), 183-211.

**Online:** [https://www.researchgate.net/publication/309180317\\_Sozial-okologische\\_Systemdynamik\\_in\\_der\\_Panarchie\\_-\\_Adaptivitat\\_und\\_Umweltwissen\\_am\\_Beispiel\\_karibischer\\_Small\\_Island\\_Developing\\_States\\_SIDS](https://www.researchgate.net/publication/309180317_Sozial-okologische_Systemdynamik_in_der_Panarchie_-_Adaptivitat_und_Umweltwissen_am_Beispiel_karibischer_Small_Island_Developing_States_SIDS)

**Contact:** Beate M.W. Ratter ([beate.ratter@uni-hamburg.de](mailto:beate.ratter@uni-hamburg.de))

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Date issued: 28 October 2016 (Online, issue forthcoming)

### **Harvesting energy: Place and local entrepreneurship in community-based renewable energy transition**

Transition towards a renewable energy supply initiates a physical (re)shaping of places and a social transformation of communities into renewable energy communities. Although socio-cultural challenges of energy transition have been recognised (Field, 2015, IPCC, 2011 and Teske et al., 2015), understandings about socio-geographic places of energy transition and their underlying social processes and structures are insufficiently studied and often remain underestimated. To close this gap, we theoretically and empirically analysed the multifaceted interplay between place, local entrepreneurship and 'community renewable energy'. Our study is based on an analysis of regional documents and policy reports, and on qualitative interviews undertaken with inhabitants in the case-study municipality of Reußenköge (Germany). Our findings reveal two important aspects: Firstly, people's individual and shared place meanings which materialised in social, physical, historical and climate-related place-attachments and meanings of contested and innovative place are important ingredients bearing an impact on processes of adopting or rejecting renewables. Secondly, differentiated characteristics of entrepreneurs, namely grounded, collaborative, innovative, change-making, economic, communicating, networking and political aspects, appeared to be relevant for the acceptance and support in community-based renewable energy projects. Our findings reveal that energy policies, funding schemes and administrative structures should recognise local socio-geographic important elements in the context of a sustained and decentralised energy transition.

**Read:** Süßner, D.; Döring, M.; Ratter, B. (2017) *Harvesting energy: Place and local entrepreneurship in community-based renewable energy transition*. *Energy Policy* 101, pp. 332-341.

**Online:** <http://www.sciencedirect.com/science/article/pii/S0301421516305638>

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Date issued: 11 October 2016

### **Nitrite consumption and associated isotope changes during a river flood event**

In oceans, estuaries, and rivers, nitrification is an important nitrate source, and stable isotopes of nitrate are often used to investigate recycling processes (e.g. remineralisation, nitrification) in the water column. Nitrification is a two-step process, where ammonia is oxidised via nitrite to nitrate. Nitrite usually does not accumulate in natural environments, which makes it difficult to study the single isotope effect of ammonia oxidation or nitrite oxidation in natural systems. However, during an exceptional flood in the Elbe River in June 2013, we found a unique co-occurrence of ammonium, nitrite, and nitrate in the water column, returning towards normal summer conditions within 1 week. Over the course of the flood, we analysed the evolution of  $\delta^{15}\text{N-NH}_4^+$  and  $\delta^{15}\text{N-NO}_2^-$  in the Elbe River. In concert with changes in suspended particulate matter (SPM) and  $\delta^{15}\text{N SPM}$ , as well as nitrate concentration,  $\delta^{15}\text{N-NO}_3^-$  and  $\delta^{18}\text{O-NO}_3^-$ , we calculated apparent isotope effects during net nitrite and nitrate consumption. During the flood event, >97% of total reactive nitrogen was nitrate, which was leached from the catchment area and appeared to be subject to assimilation. Ammonium and nitrite concentrations increased to 3.4 and 4.4  $\mu\text{mol L}^{-1}$ , respectively, likely due to remineralisation, nitrification, and denitrification in the water column.  $\delta^{15}\text{N-NH}_4^+$  values increased up to 12‰, and  $\delta^{15}\text{N-NO}_2^-$  ranged from -8.0 to -14.2‰. Based on this, we calculated an apparent isotope effect  $^{15}\epsilon$  of  $-10.0 \pm 0.1\text{‰}$  during net nitrite consumption, as well as an isotope effect  $^{15}\epsilon$  of  $-4.0 \pm 0.1\text{‰}$  and  $^{18}\epsilon$  of  $-5.3 \pm 0.1\text{‰}$  during net nitrate consumption. On the basis of the observed nitrite isotope changes, we evaluated different nitrite uptake processes in a simple box model. We found that a regime of combined riparian denitrification and 22 to 36% nitrification fits best with measured data for the nitrite concentration decrease and isotope increase.

**Read:** Jacob, J., Sanders, T., & Dähnke, K. (2016). Nitrite consumption and associated isotope changes during a river flood event. *Biogeosciences*, 13, 5649-5659, 2016. doi:10.5194/bg-13-5649-2016

**Online:** <http://www.biogeosciences.net/13/5649/2016/>

**Contact:** Juliane Jacob ([juliane.jacob@hzg.de](mailto:juliane.jacob@hzg.de))

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Date issued: 6 October 2016

### **CO<sub>2</sub> fluxes in subtropical dryland soils — a comparison of the gradient and the closed chamber method.**

On the plot scale, closed dynamic chamber methods (CDCM) are the most popular technique to directly measure CO<sub>2</sub> fluxes from the soil surface to the atmosphere. However, the gradient method (GM) provides several advantages, which refer to the underground processes contributing to the CO<sub>2</sub> production that cannot be investigated by the CDCM. To evaluate the suitability of the GM in dryland soils, we compared feasibility and quality of results for both methods. The GM is based on Fick's law and requires knowledge on diffusion properties of the soil, concentration gradients between soil and atmosphere, and the air-filled porosity. Our study was conducted on two sites along the Okavango River, one in Namibia (semi-arid) and the other in Angola (semi-humid) with comparable sandy soil texture. The CO<sub>2</sub> concentration profile was determined by collecting soil gas samples from different soil depths. CO<sub>2</sub> efflux was measured with a vented steady-state closed chamber system. Soil gas diffusivities were measured in lab experiments using diffusion chambers and undisturbed soil cores. Modeled diffusivities were predicted according to six popular models based on air-filled porosity and total porosity as input parameters. Results show strong agreement between CDCM and GM fluxes based on measured diffusivities. However, with modeled diffusivities overestimation of fluxes for most of the tested models, especially at high air-filled porosity, were detected. We conclude that the GM offers a valuable tool for flux estimates on the pedon scale in dry ecosystems particularly in combination with measured diffusivities and includes the possibility for investigating subsurface processes involved in the CO<sub>2</sub> production.

**Read:** Luther-Mosebach, J., Kalinski, K., Gröngröft, A., Eschenbach, A. CO<sub>2</sub> fluxes in subtropical dryland soils – a comparison of the gradient and the closed chamber method. *Journal of Plant Nutrition and Soil Science*. 2016, 000, 1-10. doi: 10.1002/jpln.201600137

**Online:** <http://onlinelibrary.wiley.com/doi/10.1002/jpln.201600137/epdf>

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Date issued: 3 October 2016

### **Optimal spectral nudging for global dynamical downscaling.**

This study analyzes a method to construct a homogeneous, high-resolution global atmospheric hindcast. The method is the spectral nudging technique which was applied to a state-of-the-art general circulation model (ECHAM6, T255L95). Large spatial scales of the global climate model prognostic variables were spectrally nudged towards a reanalysis data set (NCEP1, T62L28) for the last decades. The main idea is the addition of dynamically consistent regional weather details to the coarse grid NCEP1 reanalysis. A large number of sensitivity experiments were performed, using different nudging e-folding times, vertical profiles, wave numbers, and variables. Comparisons with observations and several reanalyses showed a high dependency on the variations of the nudging configuration. At the global scale, the accordance is very high for extra-tropical regions and lower in the tropics. A wave number truncation of 30, a relatively short e-folding time of 50 min and a plateau-shaped nudging profile applied only to divergence and vorticity generally yielded the best results. This is one of the first global spectral nudging hindcast studies and the first applying an altitude-dependent profile to selected prognostic variables. The method can be applied to reconstruct the history of extreme events such as intense storms in the context of ongoing climate change.

**Read:** Schubert-Frisius, M., F. Feser, H. von Storch and S. Rast: *Optimal spectral nudging for global dynamical downscaling. Monthly Weather Review*, (2016).

**Online:** <http://journals.ametsoc.org/doi/abs/10.1175/MWR-D-16-0036.1>

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Date issued: 2 October 2016

### **Seasonality of Precipitation over Himalayan Watersheds in CORDEX South Asia and their Driving CMIP5 Experiments**

Since the Coupled Model Intercomparison Project Phase 5 (CMIP5) experiments exhibit limited skill in reproducing the statistical properties of prevailing precipitation regimes over the major Himalayan watersheds (Indus, Ganges, Brahmaputra and Mekong), this study evaluates the anticipated added skill of their dynamically refined simulations performed under the framework of Coordinated Regional Climate Downscaling Experiments for South Asia (CX-SA). For this, the fidelity of eight CX-SA experiments against their six driving CMIP5 experiments is assessed for the historical period (1971–2005) in terms of time-dependent statistical properties (onset/retreat timings and rapid fractional accumulation—RFA) of the dominant summer monsoonal precipitation regime (MPR). Further, a self-defining seasonality index (SI), which is a product of precipitation and the distance of its actual distribution relative to its uniform distribution (relative entropy—RE), has been computed for MPR, westerly precipitation regime (WPR) and annual precipitation. The time evolution of precipitation, RE and SI has also been analyzed....

**Read:** ul Hasson, S. *Seasonality of Precipitation over Himalayan Watersheds in CORDEX South Asia and their Driving CMIP5 Experiments. Atmosphere* 2016, 7(10), 123. doi:10.3390/atmos7100123.

**Online:** [www.mdpi.com/2073-4433/7/10/123](http://www.mdpi.com/2073-4433/7/10/123)

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Date issued: 1 October 2016

### **Differential weathering of basaltic and granitic catchments from concentration–discharge relationships**

A negative feedback between silicate weathering rates and climate is hypothesized to play a central role in moderating atmospheric CO<sub>2</sub> concentrations on geologic timescales. However, uncertainty regarding the processes that regulate the operation of the negative feedback limits our ability to interpret past variations in the ocean–atmosphere carbon cycle. In particular, the mechanisms that determine the flux of weathered



material for a given climatic state are still poorly understood. Here, we quantify the processes that determine catchment-scale solute fluxes for two lithologic end-members—basalt and granite—by applying a recently developed solute production model that links weathering fluxes to both discharge and the reactivity of the weathering material. We evaluate the model against long-term monitoring of concentration–discharge relationships from basaltic and granitic catchments to determine the parameters associated with solute production in each catchment. Higher weathering rates in basaltic catchments relative to granitic catchments are driven by differing responses to increases in runoff, with basaltic catchments showing less dilution with increasing runoff. In addition, results from the solute production model suggest that thermodynamic constraints on weathering reactions could explain higher concentrations in basaltic catchments at lower runoff compared to granitic catchments. To understand how the response to changing discharge controls weathering fluxes under different climatic states, we define basalt/granite weatherability as the ratio of the basalt catchment flux to the granite catchment flux. This weatherability is runoff-dependent and increases with increasing runoff. For  $\text{HCO}_3^-$  and  $\text{SiO}_2(\text{aq})$  fluxes, for modern global runoff, the derived mean basalt/granite weatherability is 2.2 (1.3–3.7,  $2\sigma$ ) and 1.7 (1.6–2.1,  $2\sigma$ ), respectively. Although we cannot determine the array of individual processes resulting in differences among catchments, the relative differences in certain model parameters that represent catchment-scale weathering fluxes of granitic and basaltic lithologies are robust. Our approach provides a mechanism that links runoff with the distribution of global sub-aerial silicate lithologies to understand how the basalt/granite weatherability of the Earth's surface may have varied on geologic timescales. The relationships between basalt/granite weatherability and runoff derived in this study could be used to parameterize the silicate weathering negative feedback to model past changes in  $p\text{CO}_2$ .

**Read:** Ibarra, D. E., Caves, J. K., Moon, S., Thomas, D. L., Hartmann, J., Chamberlain, C. P., & Maher, K. (2016). *Differential weathering of basaltic and granitic catchments from concentration–discharge relationships*. *Geochimica et Cosmochimica Acta*, 190, 265-293.

**Online:** <http://www.sciencedirect.com/science/article/pii/S0016703716303866>

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Date issued: 1 October 2016

### **Hydrography-Physical Description of the Bohai Sea**

The Bohai Sea used to be one of the most important fishing grounds in China. Recently, its ecological functions have declined rapidly due to the heavy anthropogenic activities which make ecological environment protection and restoration particularly topical in this region. Understanding the oceanographic conditions of the Bohai Sea is essential to evaluate the living environment (e. g. temperature and salinity) of planktons and transport fluxes of nutrients, sediments and contaminations. In this paper, we will analyze the published literature and data sets containing field observations, remote sensing reconstructions and numerical model results, and describe the principle features of the hydrodynamic system in the Bohai Sea, such as external forces, thermohaline patterns, tides, waves, currents and substance transport processes. The objective of this paper is to provide a general picture of the hydrography of the Bohai Sea; by this means the work may be beneficial for studies in other disciplines, too.

**Read:** Bian, C., Jiang, W., Pohlmann, T., & Sündermann, J. (2016). *Hydrography-Physical Description of the Bohai Sea*. *Journal of Coastal Research*, 74(sp1), 1-12.

**Online:** <http://www.bioone.org/doi/full/10.2112/SI74-001.1>

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Date issued: September 2016

### **Linking urban climate classification with an urban energy and water budget model: Multi-site and multi-seasonal evaluation.**

There are a number of models available for examining the interaction between cities and the atmosphere over a range of scales, from small scales - such as individual facades, buildings, neighbourhoods - to the effect of the entire conurbation itself. Many of these models require detailed morphological characteristics and material properties along with relevant meteorological data to be initialised. However, these data are difficult to obtain given the heterogeneity of built forms, particularly in newly emerging cities. Yet, the need for models which can be applied to urban areas (for instance to address planning problems) is increasingly urgent as the global population becomes more urban. In this paper, a modeling approach which derives the required land cover parameters for a mid-complex urban energy budget and water budget model (SUEWS) in a consistent manner is evaluated in four cities (Dublin, Hamburg, Melbourne and Phoenix). The required parameters for the SUEWS model are derived using local climate zones (LCZs) for land cover, and meteorological observations from off-site synoptic stations. More detailed land cover and meteorological data are then added to the model in stages to examine the impact on model performance with respect to observations of turbulent fluxes of sensible (QH) and latent (QE) heat. Replacing LCZ land cover with detailed fractional coverages was shown to marginally improve model performance, however the performance of model coupled with 'coarse' LCZ data was within the same range of error (20–40 W m<sup>-2</sup> for QE and 40–60 W m<sup>-2</sup> for QH) as high resolution data.

**Read:** Alexander, P. J., Bechtel, B., Chow, W. T. L., Fealy, R., & Mills, G. (2016). Linking urban climate classification with an urban energy and water budget model: Multi-site and multi-seasonal evaluation. *Urban Climate*, 17, 196-215.

**Online:** <http://www.sciencedirect.com/science/article/pii/S2212095516300347>

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Date issued: 30 September 2016

### **Cross-shelf water exchange in the East China Sea as estimated by satellite altimetry and in situ hydrographic measurement**

Combining satellite altimetry and in situ hydrographic measurement, we estimated the cross-shelf transport (CST) and its spatial and temporal variations across 200 m isobath in the East China Sea (ECS) from 1993 to 2014. The vertically integrated CST can be dynamically divided into three parts: surface Ekman transport, geostrophic transport, and bottom Ekman transport. The results show that the 22 year-mean, sectionally integrated CST to be  $1.7 \pm 2.0$  Sv (positive in the on-shelf direction), comprised of bottom and surface Ekman transports of  $2.7 \pm 1.0$  Sv and  $0.6 \pm 0.6$  Sv, respectively, that are partially offset by a geostrophic transport of  $-1.5 \pm 1.7$  Sv. The sectionally integrated CST shows significantly high power at roughly annual period from 1999 to 2001, with lower power at intra-annual period. The vertically integrated CST to the northeast of Taiwan is the main source of sectionally integrated CST. The vertically integrated CST also shows significant variations in the 6–15 month period band to the northeast of Taiwan as well. The temporal variations of the sectionally integrated and vertically integrated CST are both controlled primarily by geostrophic transport and modulated by bottom Ekman transport. In the upper 50 m, the geostrophic current to the northeast of Taiwan exhibits large mean and significant variability. The empirical orthogonal function analysis of vertical structure of geostrophic current shows two significant modes with strong annual signal. The first mode is associated with the migration of Kuroshio axis near Taiwan, while the second mode is associated with the variation of the meander of the Kuroshio to the northeast of Taiwan.

**Read:** Ding, R., Huang, D., Xuan, J., Mayer, B., Zhou, F., & Pohlmann, T. (2016). Cross-shelf water exchange in the East China Sea as estimated by satellite altimetry and in situ hydrographic measurement. *Journal of Geophysical Research: Oceans*, 121(9), 7192-7211.

**Online:** <http://onlinelibrary.wiley.com/doi/10.1002/2016JC011972/full>

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Date issued: 28 September 2016

### **The EUMETSAT sea ice concentration climate data record**

An Arctic and Antarctic sea ice area and extent dataset has been generated by EUMETSAT's Ocean and Sea Ice Satellite Application Facility (OSISAF) using the record of microwave radiometer data from NASA's Nimbus 7 Scanning Multichannel Microwave radiometer (SMMR) and the Defense Meteorological Satellite Program (DMSP) Special Sensor Microwave/Imager (SSM/I) and Special Sensor Microwave Imager and Sounder (SSMIS) satellite sensors. The dataset covers the period from October 1978 to April 2015 and updates and further developments are planned for the next phase of the project. The methodology for computing the sea ice concentration uses (1) numerical weather prediction (NWP) data input to a radiative transfer model for reduction of the impact of weather conditions on the measured brightness temperatures; (2) dynamical algorithm tie points to mitigate trends in residual atmospheric, sea ice, and water emission characteristics and inter-sensor differences/biases; and (3) a hybrid sea ice concentration algorithm using the Bristol algorithm over ice and the Bootstrap algorithm in frequency mode over open water. A new sea ice concentration uncertainty algorithm has been developed to estimate the spatial and temporal variability in sea ice concentration retrieval accuracy. A comparison to US National Ice Center sea ice charts from the Arctic and the Antarctic shows that ice concentrations are higher in the ice charts than estimated from the radiometer data at intermediate sea ice concentrations between open water and 100 % ice. The sea ice concentration climate data record is available for download at [www.osi-saf.org](http://www.osi-saf.org), including documentation.

**Read:** Tonboe, R. T., Eastwood, S., Lavergne, T., Sørensen, A. M., Rathmann, N., Dybkjær, G., ... & Kern, S. (2016). *The EUMETSAT sea ice concentration climate data record*. *The Cryosphere*, 10(5), 2275.

**Online:** <http://www.the-cryosphere.net/10/2275/2016/tc-10-2275-2016.pdf>

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Date issued: 26 September 2016

### **The impact of meltponds on summertime microwave brightness temperatures and sea ice concentrations**

Sea ice, frozen seawater floating on polar oceans, is covered by meltwater puddles, so-called melt ponds, during summer. Methods used to compute Arctic sea-ice concentration (SIC) from microwave satellite data are influenced by melt ponds. We apply eight such methods to one microwave dataset and compare SIC with visible data. We conclude all methods fail to distinguish melt ponds from leads between ice floes; SIC biases are negative (positive) for ponded (non-ponded) sea ice and can exceed 20&#8201;%.

**Read:** Kern, S., Rösel, A., Pedersen, L. T., Ivanova, N., Saldo, R., & Tonboe, R. T. (2016). *The impact of melt ponds on summertime microwave brightness temperatures and sea ice concentrations*. *The Cryosphere*, 10, 2217-2239, 2016. doi:10.5194/tc-10-2217-2016

**Online:** <http://www.the-cryosphere.net/10/2217/2016/>

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Date issued: 24 September 2016

### **One Step Forward, Two Steps Back? The Fading Contours of (in)Justice in Competing Discourses on Climate Migration**

In recent debates on climate change and migration, the focus on the figure of 'climate refugees' (tainted by environmental determinism and a crude understanding of human mobility) has given ground to a broader conception of the climate–migration nexus. In particular, the idea that migration can represent a legitimate adaptation strategy has emerged strongly. This appears to be a positive development, marked by softer tones that de-securitize climate migration. However, political and normative implications of this evolution are still understudied. This article contributes to filling the gap by turning to both the 'climate refugees' and 'migration as adaptation' narratives, interrogating how and whether those competing narratives pose the question of (in)justice. Our analysis shows that the highly problematic 'climate refugees' narrative did (at least) channel justice claims and yielded the (illusory) possibility of identifying concrete rights claims and responsibilities. Read

in relation to the growing mantra of resilience in climate policy and politics, the more recent narrative on 'migration as adaptation' appears to displace justice claims and inherent rights in favour of a depoliticised idea of adaptation that relies on the individual migrant's ability to compete in and benefit from labour markets. We warn that the removal of structural inequalities from the way in which the climate–migration nexus is understood can be seen as symptomatic of a shrinking of the conditions to posing the question of climate justice.

**Read:** Bettini, G., Nash, S. L., & Gioli, G. (2016). *One step forward, two steps back? The fading contours of (in) justice in competing discourses on climate migration. The Geographical Journal.*

**Online:** <http://onlinelibrary.wiley.com/doi/10.1111/geoj.12192/full>

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Date issued: 23 September 2016 (online)

### **Eddy Fluxes and Jet-Scale Overturning Circulations in the Indo–Western Pacific Southern Ocean**

The relationship between Antarctic Circumpolar Current jets and eddy fluxes in the Indo–western Pacific Southern Ocean (90°–145°E) is investigated using an eddy-resolving model. In this region, transient eddy momentum flux convergence occurs at the latitude of the primary jet core, whereas eddy buoyancy flux is located over a broader region that encompasses the jet and the interjet minimum. In a small sector (120°–144°E) where jets are especially zonal, a spatial and temporal decomposition of the eddy fluxes further reveals that fast eddies act to accelerate the jet with the maximum eddy momentum flux convergence at the jet center, while slow eddies tend to decelerate the zonal current at the interjet minimum. Transformed Eulerian mean (TEM) diagnostics reveals that the eddy momentum contribution accelerates the jets at all model depths, whereas the buoyancy flux contribution decelerates the jets at depths below ~600 m. In ocean sectors where the jets are relatively well defined, there exist jet-scale overturning circulations with sinking motion on the equatorward flank and a rising motion on the poleward flank of the jets. These jet-scale TEM overturning circulations, which are also discernible in potential density coordinates, cannot be attributed to Ekman downwelling because the Ekman vertical velocities are much weaker and their meridional structure shares little resemblance to the rapidly varying jet-scale overturning pattern. Instead, the location and structure of these thermally indirect circulations suggest that they are driven by the eddy momentum flux convergence, much like the Ferrel cell in the atmosphere.

**Read:** Li, Q., Lee, S., & Griesel, A. (2016). *Eddy Fluxes and Jet-Scale Overturning Circulations in the Indo–Western Pacific Southern Ocean. Journal of Physical Oceanography, 46(10), 2943–2959.*

**Online:** <http://journals.ametsoc.org/doi/abs/10.1175/JPO-D-15-0241.1>

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Date issued: 21 September 2016

### **Climatologies at high resolution for the Earth land surface areas**

High resolution information of climatic conditions is essential to many application in environmental sciences. Here we present the CHELSA algorithm to downscale temperature and precipitation estimates from the European Centre for Medium-Range Weather Forecast (ECMWF) climatic reanalysis interim (ERA-Interim) to a high resolution of 30 arc sec. The algorithm for temperature is based on a statistical downscaling of atmospheric temperature from the ERA-Interim climatic reanalysis. The precipitation algorithm incorporates orographic predictors such as wind fields, valley exposition, and boundary layer height, and a bias correction using Global Precipitation Climatology Center (GPCC) gridded and Global Historical Climate Network (GHCN) station data. The resulting data consist of a monthly temperature and precipitation climatology for the years 1979–2013. We present a comparison of data derived from the CHELSA algorithm with two other high resolution gridded products with overlapping temporal resolution (Tropical Rain Measuring Mission (TRMM) for precipitation, Moderate Resolution Imaging Spectroradiometer (MODIS) for temperature) and station data

from the Global Historical Climate Network (GHCN). We show that the climatological data from CHELSA has a similar accuracy to other products for temperature, but that the predictions of orographic precipitation patterns are both better and at a high spatial resolution.

**Read:** Karger, D. N., Conrad, O., Böhrner, J., Kawohl, T., Kreft, H., Soria-Auza, R. W., ... & Kessler, M. (2016). *Climatologies at high resolution for the earth's land surface areas*. arXiv preprint arXiv:1607.00217.

**Online:** <https://arxiv.org/ftp/arxiv/papers/1607/1607.00217.pdf>

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Date issued: 5 September 2016

### **Adaptation to Climate Change and Its Impacts on Food Productivity and Crop Income: Perspectives of Farmers in Rural Pakistan**

Evaluation of the ongoing efforts for farm level adaptation to climate change is crucial to understand their effectiveness and to suggest further actions at the policy level. The current study explores the adaptation of wheat farmers to climate change, its determinants and its impact on food productivity and crop income in rural Pakistan. This study is based on a primary dataset of 442 wheat farmers conducted through face-to-face structured interviews from 65 villages across three agro-ecological zones of Punjab Province, Pakistan. The study employs logistic regression analysis to find adaptation determinants and uses the propensity score matching technique to estimate the causal impact of adaptation on food productivity and crop income. The results of the study suggest that wheat farmers were well aware of climate change, but for various reasons did not adapt accordingly. The major adaptation strategies implemented by wheat farmers include changing planting dates, crop varieties and fertilizer types. Moreover, education, farming experience, access to agricultural extension, weather forecasting and marketing information were the factors that significantly affected farmers' adaptation decisions. Adapting wheat crops to climate change significantly and positively affects wheat productivity and net crop income and hence indirectly improves the farmers' wellbeing and local food security. More benefits were achieved by farmers who used a combination of different adaptation strategies. The study suggests to focus on farmers' education, easy access to farm advisory services and information on new adaptation methods for sustainable food production and local food security.

**Read:** Abid, M., Schneider, U. A., & Scheffran, J. (2016). *Adaptation to climate change and its impacts on food productivity and crop income: Perspectives of farmers in rural Pakistan*. *Journal of Rural Studies*, 47, 254-266.

**Online:** <http://www.sciencedirect.com/science/article/pii/S0743016716302911>

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Date issued: 2 September 2016

### **The Land Use Model Intercomparison Project (LUMIP) contribution to CMIP6: rationale and experimental design**

Human land-use activities have resulted in large changes to the Earth's surface, with resulting implications for climate. In the future, land-use activities are likely to expand and intensify further to meet growing demands for food, fiber, and energy. The Land Use Model Intercomparison Project (LUMIP) aims to further advance understanding of the impacts of land-use and land-cover change (LULCC) on climate, specifically addressing the following questions. (1) What are the effects of LULCC on climate and biogeochemical cycling (past-future)? (2) What are the impacts of land management on surface fluxes of carbon, water, and energy, and are there regional land-management strategies with the promise to help mitigate climate change? In addressing these questions, LUMIP will also address a range of more detailed science questions to get at process-level attribution, uncertainty, data requirements, and other related issues in more depth and sophistication than possible in a multi-model context to date. There will be particular focus on the separation and quantification of the effects on climate from LULCC relative to all forcings, separation of biogeochemical from biogeophysical effects of land use, the unique impacts of land-cover change vs. land-management change, modulation of land-

use impact on climate by land-atmosphere coupling strength, and the extent to which impacts of enhanced CO<sub>2</sub> concentrations on plant photosynthesis are modulated by past and future land use. LUMIP involves three major sets of science activities: (1) development of an updated and expanded historical and future land-use data set, (2) an experimental protocol for specific LUMIP experiments for CMIP6, and (3) definition of metrics and diagnostic protocols that quantify model performance, and related sensitivities, with respect to LULCC. In this paper, we describe LUMIP activity (2), i.e., the LUMIP simulations that will formally be part of CMIP6. These experiments are explicitly designed to be complementary to simulations requested in the CMIP6 DECK and historical simulations and other CMIP6 MIPs including Scenario MIP, C4MIP, LS3MIP, and DAMIP. LUMIP includes a two-phase experimental design. Phase one features idealized coupled and land-only model simulations designed to advance process-level understanding of LULCC impacts on climate, as well as to quantify model sensitivity to potential land-cover and land-use change. Phase two experiments focus on quantification of the historic impact of land use and the potential for future land management decisions to aid in mitigation of climate change. This paper documents these simulations in detail, explains their rationale, outlines plans for analysis, and describes a new subgrid land-use tile data request for selected variables (reporting model output data separately for primary and secondary land, crops, pasture, and urban land-use types). It is essential that modeling groups participating in LUMIP adhere to the experimental design as closely as possible and clearly report how the model experiments were executed.

**Read:** Lawrence, D. M., Hurtt, G. C., Arneeth, A., Brovkin, V., Calvin, K. V., Jones, A. D., ... & Seneviratne, S. I. (2016). *The Land Use Model Intercomparison Project (LUMIP) contribution to CMIP6: rationale and experimental design*, *Geosci. Model Dev.*, 9, 2973–2998.

**Online:** <http://www.geosci-model-dev.net/9/2973/2016/gmd-9-2973-2016.pdf>

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Date issued: 1 September 2016

### **Environmental Impacts - Terrestrial Ecosystems.**

The chapter starts with a discussion of general patterns and processes in terrestrial ecosystems, including the impacts of climate change in relation to productivity, phenology, trophic matches and mismatches, range shifts and biodiversity. Climate impacts on specific ecosystem types—forests, grasslands, heathlands, and mires and peatlands—are then discussed in detail. The chapter concludes by discussing links between changes in inland ecosystems and the wider North Sea system. Future climate change is likely to increase net primary productivity in the North Sea region due to warmer conditions and longer growing seasons, at least if summer precipitation does not decrease as strongly as projected in some of the more extreme climate scenarios. The effects of total carbon storage in terrestrial ecosystems are highly uncertain, due to the inherent complexity of the processes involved. For moderate climate change, land use effects are often more important drivers of total ecosystem carbon accumulation than climate change. Across a wide range of organism groups, range expansions to higher latitudes and altitudes and changes in phenology have occurred in response to recent climate change. For the range expansions, some studies suggest substantial differences between organism groups. Habitat specialists with restricted ranges have generally responded very little or even shown range contractions. Many of already threatened species could be particularly vulnerable to climate change. Overall, effects of recent climate change on terrestrial ecosystems within the North Sea region are still limited.

**Read:** Hölzel, N., Hickler, T., Kutzbach, L., Joosten, H., van Huissteden, J., & Hiederer, R. (2016). *Environmental Impacts—Terrestrial Ecosystems*. In *North Sea Region Climate Change Assessment* (pp. 341-372). Springer International Publishing.

**Online:** [http://link.springer.com/chapter/10.1007/978-3-319-39745-0\\_11](http://link.springer.com/chapter/10.1007/978-3-319-39745-0_11)

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Date issued: 1 September 2016



### Projected Change — North Sea

Increasing numbers of regional climate change scenario assessments have become available for the North Sea. A critical review of the regional studies has helped identify robust changes, challenges, uncertainties and specific recommendations for future research. Coherent findings from the climate change impact studies reviewed in this chapter include overall increases in sea level and ocean temperature, a freshening of the North Sea, an increase in ocean acidification and a decrease in primary production. However, findings from multi-model ensembles show the amplitude and spatial pattern of the projected changes in sea level, temperature, salinity and primary production are not consistent among the various regional projections and remain uncertain. Different approaches are used to downscale global climate change impacts, each with advantages and disadvantages. Regardless of the downscaling method employed, the regional studies are ultimately affected by the forcing global climate models. Projecting regional climate change impacts on biogeochemistry and primary production is currently limited by a lack of consistent downscaling approaches for marine and terrestrial impacts. Substantial natural variability in the North Sea region from annual to multi-decadal time scales is a particular challenge for projecting regional climate change impacts. Natural variability dominates long-term trends in wind fields and strongly wind-influenced characteristics like local sea level, storm surges, surface waves, circulation and local transport pattern. Multi-decadal variations bias changes projected for 20- or 30-year time slices. Disentangling natural variations and regional climate change impacts is a remaining challenge for the North Sea and reliable predictions concerning strongly wind-influenced characteristics are impossible.

**Read:** Schrum, C., Lowe, J., Meier, H. M., Grabemann, I., Holt, J., Mathis, M., ... & Wakelin, S. (2016). *Projected Change – North Sea*. In *North Sea Region Climate Change Assessment* (pp. 175-217). Springer International Publishing.

**Online:** [http://link.springer.com/chapter/10.1007/978-3-319-39745-0\\_6](http://link.springer.com/chapter/10.1007/978-3-319-39745-0_6)

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Date issued: 1 September 2016

### Recent Change — North Sea

This chapter discusses past and ongoing change in the following physical variables within the North Sea: temperature, salinity and stratification; currents and circulation; mean sea level; and extreme sea levels. Also considered are carbon dioxide; pH and nutrients; oxygen; suspended particulate matter and turbidity; coastal erosion, sedimentation and morphology; and sea ice. The distinctive character of the Wadden Sea is addressed, with a particular focus on nutrients and sediments. This chapter covers the past 200 years and focuses on the historical development of evidence (measurements, process understanding and models), the form, duration and accuracy of the evidence available, and what the evidence shows in terms of the state and trends in the respective variables. Much work has focused on detecting long-term change in the North Sea region, either from measurements or with models. Attempts to attribute such changes to, for example, anthropogenic forcing are still missing for the North Sea. Studies are urgently needed to assess consistency between observed changes and current expectations, in order to increase the level of confidence in projections of expected future conditions.

**Read:** Huthnance, J., Weisse, R., Wahl, T., Thomas, H., Pietrzak, J., Souza, A. J., ... & Haigh, I. (2016). *Recent Change—North Sea*. In *North Sea Region Climate Change Assessment* (pp. 85-136). Springer International Publishing.

**Online:** [http://link.springer.com/chapter/10.1007/978-3-319-39745-0\\_3](http://link.springer.com/chapter/10.1007/978-3-319-39745-0_3)

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Date issued: 1 September 2016

### Sea-ice transport driving Southern Ocean salinity and its recent trends

Recent salinity changes in the Southern Ocean are among the most prominent signals of climate change in the global ocean, yet their underlying causes have not been firmly established. Here we propose that trends in the northward transport of Antarctic sea ice are a major contributor to these changes. Using satellite observations supplemented by sea-ice reconstructions, we estimate that wind-driven northward freshwater transport by sea ice increased by 20%±10 per cent between 1982 and 2008. We estimate that the additional freshwater for the entire northern sea-ice edge entails a freshening rate of 0.02±0.01 grams per kilogram per decade in the surface and intermediate waters of the open ocean, similar to the observed freshening. The enhanced rejection of salt near the coast of Antarctica associated with stronger sea-ice export counteracts the freshening of both continental shelf and newly formed bottom waters due to increases in glacial meltwater. Our finding that northward sea-ice freshwater transport is also a key determinant of the mean salinity distribution in the Southern Ocean further underpins the importance of the sea-ice-induced freshwater flux. Through its influence on the density structure of the ocean, this process has critical consequences for the global climate by affecting the exchange of heat, carbon and nutrients between the deep ocean and surface waters.

**Read:** Haumann, F. A., Gruber, N., Münnich, M., Frenger, I., & Kern, S. (2016). Sea-ice transport driving Southern Ocean salinity and its recent trends. *Nature*, 537(7618), 89-92. doi:10.1038/nature19101, 2016.

**Online:** <http://www.nature.com/nature/journal/v537/n7618/abs/nature19101.html>

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Date issued: August 2016

#### **Adoption of off-farm diversification income sources in managing agricultural risks among cotton farmers in Punjab Pakistan**

Agriculture is a very risky business and farmers have to deal with various socio-economic and environmental challenges at farm level. Therefore, farmers have to adopt certain management options to cope with those different kinds of risks. Therefore, using cross-sectional data of 210 farm households collected from three cotton districts, this study aims to investigate the effect of perceived risks in farming on farmers' decision to adopt off-farm diversification income sources. This study uses correlation analysis and probit regression model to explore the study objectives. The findings of the study confirms our hypothesis that perception of different kinds of risk leads farmers to diversify their income sources in order to sustain their livelihood in case of losses from agriculture. In addition to perceived risks, the study also found positive association of education, farming experience, risk averse nature of farm household were the other factors that significantly affect the farmers decision to adopt off-farm diversification income sources.

**Read:** Ping, Q., Iqbal, M. A., Abid, M., Ahmed, U. I., Nazir, A., & Rehman, A. (2016). Adoption of Off-farm Diversification Income Sources in Managing Agricultural Risks among Cotton Farmers in Punjab Pakistan. *J. Appl. Environ. Biol. Sci*, 6(8), 47-53.

**Online:**

[https://www.researchgate.net/profile/Muhammad\\_Iqbal234/publication/305476181\\_Adoption\\_of\\_Off-farm\\_Diversification\\_Income\\_Sources\\_in\\_Managing\\_Agricultural\\_Risks\\_Among\\_Cotton\\_Farmers\\_in\\_Punjab\\_Pakistan/links/57a9df7e08ae3765c3b47646.pdf](https://www.researchgate.net/profile/Muhammad_Iqbal234/publication/305476181_Adoption_of_Off-farm_Diversification_Income_Sources_in_Managing_Agricultural_Risks_Among_Cotton_Farmers_in_Punjab_Pakistan/links/57a9df7e08ae3765c3b47646.pdf)

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Date issued: August 2016

#### **Soil temperature and soil moisture patterns in a Himalayan alpine treeline ecotone**

Soil properties in alpine treeline ecotones are insufficiently explored. In particular, an extensive monitoring of soil moisture conditions over a longer period of time is rare, and the effects of soil moisture variability on alpine treelines have not received adequate attention yet. Soil temperature patterns are generally well documented, and soil temperature is considered a key factor in limiting tree growth at both global and local

scales. We performed a 2½-year monitoring in a near-natural treeline ecotone in Rolwaling Himal, Nepal. In this paper, we present new findings on spatiotemporal soil temperature and moisture variability in relation to topographical features and vegetation patterns (variations in stand structures and tree physiognomy). Our results show a growing season mean soil temperature of  $7.5 \pm 0.6$  °C at 10 cm depth at the Rolwaling treeline. Multivariate statistical analyses yield a significant relation between soil temperatures and the variability in tree height, crown length, crown width, and leaf area index (LAI). In turn, soil temperature variability is controlled by the tree physiognomy itself. Soil moisture conditions (available water capacity, 0–10 cm) appear to be less substantial for current stand structures and tree physiognomy. In turn, tree physiognomy patterns control soil moisture, which additionally is affected by snow cover. In Rolwaling, shallow and coarse-grained soils cause low water-holding capacities, and thus a remarkable amount of water percolates from topsoils to subsoils. In the alpine tundra with missing forest canopy, year-round lowest available water capacities are additionally caused by high solar radiation, wind, and thus high evaporation. We assume low soil moisture availability causing largely prevented tree regeneration especially in the alpine tundra. We conclude that soil temperature and moisture patterns reflect tree physiognomy patterns. The latter cause disparities in soil temperature and moisture conditions inside and outside of the closed forest by shading effects and differences in leaf fall.

**Read:** Müller, M., Schwab, N., Schickhoff, U., Böhner, J., & Scholten, T. (2016). Soil temperature and soil moisture patterns in a Himalayan alpine treeline ecotone. *Arctic, Antarctic, and Alpine Research*, 48(3), 501-521.  
**Online:** <http://www.bioone.org/doi/pdf/10.1657/AAAR0016-004>  
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Date issued: 31 August 2016

#### **Rangeland degradation assessment in Kyrgyzstan: Vegetation and soils as indicators of grazing pressure in Naryn Oblast**

Rangelands occupy more than 80% of the agricultural land in Kyrgyzstan. At least 30% of Kyrgyz pasture areas are considered to be subject to vegetation and soil degradation. Since animal husbandry is the economic basis to sustain people's livelihoods, rangeland degradation presents a threat for the majority of the population. We present for the first time an ecological assessment of different pasture types in a remote area of the Naryn Oblast, using vegetation and soils as indicators of rangeland conditions. We analysed the current degree of utilization (grazing pressure), the amount of biomass, soil samples, and vegetation data, using cluster analysis as well as ordination techniques. Winter pastures (kyshtoo) are characterized by higher pH values (average of 7.27) and lower organic matter contents (average of 12.83%) compared to summer pastures (dzailoo) with average pH values of 6.03 and average organic matter contents of 21.05%. Additionally, summer pastures show higher above-ground biomass, and higher species richness and diversity. Our results support the hypothesis that winter pastures, which are located near settlements, suffer from over-utilisation, while the more distant summer pastures are subjected to much lower grazing pressure.

**Read:** Hoppe, F., Kyzy, T. Z., Usupbaev, A., & Schickhoff, U. (2016). Rangeland degradation assessment in Kyrgyzstan: vegetation and soils as indicators of grazing pressure in Naryn Oblast. *Journal of Mountain Science*, 13(9), 1567-1583.

**Online:** <http://link.springer.com/article/10.1007/s11629-016-3915-5>

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Date issued: 30 August 2016

#### **Considering the locals: coastal construction and destruction in times of climate change on Anjouan, Comoros**

The current discussion of anticipated climate change impacts and future sea level rise is particularly relevant to small island states. An increase in natural hazards, such as floods and storm waves, is likely to have a devastating impact on small islands' coastlines, severely affecting targeted sustainable development. Coastal

erosion, notably human induced erosion, has been an ongoing threat to small island biodiversity, resources, infrastructure, and settlements, as well as society at large. In the context of climate change, the problem of coastal erosion and the debate surrounding it is gaining momentum. Before attributing associated impacts to climate change, current human activities need to be analysed, focusing not only on geomorphological and climatological aspects, but also on political and traditional cultural frameworks. The objective of this paper is to demonstrate the importance of the social-political-ecological systems analysis for adaptation strategies, and thus for future sustainable development. Coastal use is based on human constructs of the coast, as well as local perceptions and values ascribed to the coast. We use the case study of Anjouan, Comoros to differentiate between constructive and destructive practices on the coast, from both a mental and technical perspective. Beach erosion is described as more than a resource problem that manifests itself locally rather than nationally. Divergent political scales of interest impact future development as much as local action. Local action is not least framed by mental contribution and attribution of coasts as places for living, recreation and resource use. The present case study demonstrates that mental constructs of coasts as valuable areas can, in some cases, lead to the protection and preservation of beaches by initiatives of collective action. At the same time, local communities see the negative impacts of sand mining as causes of coastal erosion and, therefore, it is difficult to mobilize them to adapt to climate change and sea level rise.

**Read:** Ratter, B., Petzold, J. and Sinane, K. (2016). *Considering the locals: coastal construction and destruction in times of climate change on Anjouan, Comoros*, *Natural Resources Forum*, 40, 112–126 DOI: 10.1111/1477-8947.12102

**Online:** <http://onlinelibrary.wiley.com/doi/10.1111/1477-8947.12102/abstract>

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Date issued: 26 August 2016

### **Future Water Availability from Hindukush-Karakoram-Himalaya upper Indus Basin under Conflicting Climate Change Scenarios**

Future of the crucial Himalayan water supplies has generally been assessed under the anthropogenic warming, typically consistent amid observations and climate model projections. However, conflicting mid-to-late melt-season cooling within the upper Indus basin (UIB) suggests that the future of its melt-dominated hydrological regime and the subsequent water availability under changing climate has yet been understood only indistinctly. Here, the future water availability from the UIB is presented under both observed and projected—though likely but contrasting—climate change scenarios. Continuation of prevailing climatic changes suggests decreased and delayed glacier melt but increased and early snowmelt, leading to reduction in the overall water availability and profound changes in the overall seasonality of the hydrological regime. Hence, initial increases in the water availability due to enhanced glacier melt under typically projected warmer climates, and then abrupt decrease upon vanishing of the glaciers, as reported earlier, is only true given the UIB starts following uniformly the global warming signal. Such discordant future water availability findings caution the impact assessment communities to consider the relevance of likely (near-future) climate change scenarios—consistent to prevalent climatic change patterns—in order to adequately support the water resource planning in Pakistan.

**Read:** Hasson, S. *Future Water Availability from Hindukush-Karakoram-Himalaya upper Indus Basin under Conflicting Climate Change Scenarios*. *Climate* 2016, 4(3), 40. doi:10.3390/cli4030040.

**Online:** <http://www.mdpi.com/2225-1154/4/3/40>

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Date issued: 19 August 2016

### **A novel approach in monitoring land-cover change in the tropics: oil palm cultivation in the Niger Delta, Nigeria**

The increasing demand for palm oil and bioenergy has promoted the expansion of tropical farmland covered with oil palms (*Elaeis guineensis*), resulting in increased competition with food production as well as environmental degradation. Moreover, oil palm cultivation may have increased greenhouse gas (GHG) emissions through deforestation. The overall impact estimation of oil palm related land-use change requires spatiotemporal land-use maps. So far, the Roundtable on Sustainable Palm Oil (RSPO) has not established guidelines on how to measure and evaluate oil palm related land-cover change. While remote sensing methods are suitable in general, the use of Landsat images in the tropics for the monitoring and modeling of land-cover changes has been restricted due to the influence of cloud cover. This study presents a novel approach for mapping tropical land-cover change using the Google Earth Engine (GEE) cloud-based platform and the System for Automated Geoscientific Analysis (SAGA) GIS. Spatiotemporal land-use and land-cover changes in relation to oil palm cultivation are assessed using a median pixel composite mosaic of Landsat 5, 7 and 8 image scenes for the time periods 1999-2005 and 2009-2015. The proposed approach yields an overall accuracy and kappa coefficient of 70.33 % and 0.62 for the first image composite period, and 84.5 % and 0.80 for the second image composite period respectively.

**Read:** Okoro, S.U., Schickhoff, U., Böhner, J. & Schneider, U.A. (2016): A novel approach in monitoring oil palm related land use and land cover change in the Tropics. *Die Erde* 147 (1): 40-52.

**Online:** <http://www.die-erde.org/index.php/die-erde/article/view/254>

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Date issued: 19 August 2016

### **German Bight residual current variability on a daily basis: principal components of multi-decadal barotropic simulations**

Time variability of Eulerian residual currents in the German Bight (North Sea) is studied drawing on existing multi-decadal 2D barotropic simulations (1.6 km resolution) for the period Jan. 1958–Aug. 2015. Residual currents are calculated as 25 h means of velocity fields stored every hour. Principal component analysis (PCA) reveals that daily variations of these residual currents can be reasonably well represented in terms of only 2–3 degrees of freedom, partly linked to wind directions. The daily data refine monthly data already used in the past. Unlike existing classifications based on subjective assessment, numerical principal components (PCs) provide measures of strength and can directly be incorporated into more comprehensive statistical data analyses. Daily resolution in particular fits the time schedule of data sampled at the German Bight long-term monitoring station at Helgoland Roads. An example demonstrates the use of PCs and corresponding empirical orthogonal functions (EOFs) for the interpretation of short-term variations of these local observations. On the other hand, monthly averaging of the daily PCs enables to link up with previous studies on longer timescales.

**Read:** Callies, U., Gaslikova, L., Kapitza, H., & Scharfe, M. (2016). German Bight residual current variability on a daily basis: principal components of multi-decadal barotropic simulations. *Geo-Marine Letters*, 1-12.

**Online:** <http://link.springer.com/article/10.1007/s00367-016-0466-2>

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Date issued: 12 August 2016

### **People-Powered Local Energy Transition: Mitigating Climate Change with Community-Based Renewable Energy in North Frisia**

Climate change has been recognised as a societal challenge demanding transformation in our social and economic systems in order to adapt to expected climatic changes and to mitigate a temperature increase above 2 degrees Celsius. Discussions on mitigating climate change revolve around the question of how to enable low-carbon energy transitions based on renewable-energy technologies such as wind turbines, solar panels, biogas plants or geothermal plants. Such a transition initiates a physical (re)shaping of places and social change in communities. Individual households and communities are increasingly acknowledged as making

important contributions in energy transition, driven by the emergence of community wind farms, energy cooperatives and initiatives etc. This growing recognition has led to the fact that citizen's energy and community renewable energy are high on the political agenda. Although 'community renewable energy' emerged as a grassroots-based innovation concept, the local places of energy transition and their underlying social processes and structures are insufficiently studied and often remain underestimated. What place-based social and geographic aspects enable communities to become the places of local energy transition?

**Read:** *Süsser, D. (2016). People-Powered Local Energy Transition: Mitigating Climate Change with Community-Based Renewable Energy in North Frisia.*

**Online:** <http://ediss.sub.uni-hamburg.de/volltexte/2016/8034/pdf/Dissertation.pdf>

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Date issued: 11 August 2016

### **Handbook on Sustainability Transition and Sustainable Peace**

In this book 60 authors from many disciplines and from 18 countries on five continents examine in ten parts: Moving towards Sustainability Transition; Aiming at Sustainable Peace; Meeting Challenges of the 21st Century: Demographic Imbalances, Temperature Rise and the Climate–Conflict Nexus; Initiating Research on Global Environmental Change, Limits to Growth, Decoupling of Growth and Resource Needs; Developing Theoretical Approaches on Sustainability and Transitions; Analysing National Debates on Sustainability in North America; Preparing Transitions towards a Sustainable Economy and Society, Production and Consumption and Urbanization; Examining Sustainability Transitions in the Water, Food and Health Sectors from Latin American and European Perspectives; Preparing Sustainability Transitions in the Energy Sector; and Relying on Transnational, International, Regional and National Governance for Strategies and Policies Towards Sustainability Transition.

**Read:** *Brauch, H. G., Spring, Ú. O., Grin, J., & Scheffran, J. (Eds.). (2016). Handbook on Sustainability Transition and Sustainable Peace (Vol. 10). Springer.*

**Online:** <http://link.springer.com/book/10.1007%2F978-3-319-43884-9>

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Date issued: 11 August 2016

### **From a Climate of Complexity to Sustainable Peace: Viability Transformations and Adaptive Governance in the Anthropocene**

In an increasingly interconnected climate of complexity, the stabilization of human–environment interactions is a major challenge in international relations and demands the integration of complexity science with global governance. This chapter highlights several cases of complex crises where cascading events affect international stability. Climate change is considered as a risk multiplier which disturbs the balance between natural and social systems and amplifies the consequences through complex impact chains that affect the functioning of critical infrastructures and supply networks; intensify the nexus of water, energy and food; lead to production losses, price increases and financial crises in other regions through global markets; undermine human security, social living conditions and political stability; and trigger or aggravate migration movements and conflict situations. An integrative framework of human–environment interaction is used to analyse destabilizing developments, tipping elements and cascading risks, as well as concepts of resilience, viability and sustainable peace. Whether climate stress fuels a cycle of violence or climate policy drives a transition towards a cycle of cooperation and sustainable peace depends on the human and societal responses. Strategies for viability transformations and adaptive governance range from climate mitigation and adaptation and the building of social networks to new capabilities of disaster management, crisis prevention and conflict resolution. Several examples are presented showing how transition and transformation processes can be analysed with an agent-based model framework.



**Read:** Scheffran, J. (2016). *From a Climate of Complexity to Sustainable Peace: Viability Transformations and Adaptive Governance in the Anthropocene*. In *Handbook on Sustainability Transition and Sustainable Peace* (pp. 305-346). Springer International Publishing.

**Online:** [http://link.springer.com/chapter/10.1007/978-3-319-43884-9\\_13](http://link.springer.com/chapter/10.1007/978-3-319-43884-9_13)

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Date issued: 11 August 2016

### **Sustainability Transition with Sustainable Peace: Key Messages and Scientific Outlook**

This chapter presents the key messages of this *Handbook on Sustainability Transition and Sustainable Peace* found in the previous texts by the sixty authors, arranged into ten parts. They focus on I) moving towards sustainability transition; II) aiming for sustainable peace; III) meeting the challenges of the twenty-first century: demographic imbalances, temperature rise and the climate–conflict nexus; IV) initiating research on global environmental change, the limits to growth, and the decoupling of growth and resource needs; V) developing theoretical approaches to sustainability and transitions; VI) analysing national debates about sustainability in North America; VII) preparing transitions towards a sustainable economy and society, production and consumption and urbanization; VIII) examining sustainability transitions in the water, food and health sectors from Latin American and European perspectives; IX) preparing sustainability transitions in the energy sector; and X) relying on international, regional and national governance for strategies and policies leading towards sustainability transition. This chapter proposes moving from disciplinary perspectives towards a transdisciplinary and anticipatory transformative approach. It points to research deficits and maps future research needs on ‘sustainability transition’, on ‘sustainable peace’, and on the linkages between both discourses, so that we can move from knowledge to action, and towards governance strategies, policies and measures aiming at *Sustainability Transition with Sustainable Peace*. Four examples are used to briefly illustrate this transformative scientific approach towards proactive policies. The first examines the sustainable energy transition achievable by moving from fossil fuels to enhancing energy efficiency and to renewables; this would grant access to energy for up to twelve billion people by 2100, while GHG emissions would be reduced. The second proposes a shift from resource- and carbon-intensive agriculture and a high degree of waste in the food sector to *climate-smart agriculture* with less waste. The third and fourth examples address proposed changes to different lifestyles in industrialized countries, and a shift in values as suggested, for example, by the Kingdom of Bhutan (Gross Happiness Index) and by indigenous people in Bolivia (Pachamama) and Chiapas. These alternatives may not be globally acceptable but they indicate that new viable pathways are needed that will lead towards a sustainable and peaceful world, and enable us to move beyond a continuation of the unsustainable Western way of life based on abundance and waste in consumption and production.

**Read:** Spring, Ú. O., Brauch, H. G., & Scheffran, J. (2016). *Sustainability Transition with Sustainable Peace: Key Messages and Scientific Outlook*. In *Handbook on Sustainability Transition and Sustainable Peace* (pp. 887-927). Springer International Publishing.

**Online:** [http://link.springer.com/chapter/10.1007/978-3-319-43884-9\\_42](http://link.springer.com/chapter/10.1007/978-3-319-43884-9_42)

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Date issued: 11 August 2016

### **The Climate-Conflict Nexus: Pathways, Regional Links, and Case Studies**

The role of climate change as a potential cause of violent conflict has been debated in the scholarly and policy communities for several years. We review the most recent quantitative and qualitative literature and find that research on the issue has produced little consensual findings so far. Further, we discuss major theoretical, conceptual and empirical issues and describe possible pathways linking climate change to violent conflict. To illustrate these issues, we analyse the climate–conflict nexus in different world regions and present three qualitative case studies in north-western Kenya, the Nile Basin, and Israel/Palestine. We find that possible

reasons for the lack of scientific consensus may be the difficulties of existing approaches to adequately capture the complex links between climate change, vulnerability, and violent conflict.

**Read:** Ide, T., Link, P. M., Scheffran, J., & Schilling, J. (2016). *The Climate-Conflict Nexus: Pathways, Regional Links, and Case Studies*. In *Handbook on Sustainability Transition and Sustainable Peace* (pp. 285-304). Springer International Publishing.

**Online:** [http://link.springer.com/chapter/10.1007/978-3-319-43884-9\\_12](http://link.springer.com/chapter/10.1007/978-3-319-43884-9_12)

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Date issued: 10 August 2016

### **Climate Change – Migration – Conflict. What's the Connection?**

Climate change and human migration are often presented as threats to national and international security. But what is the actual link between these phenomena and conflict?

**Author's Note:** This commentary presents key arguments from the articles Christiane J. Fröhlich (2016) *Climate migrants as protestors? Dispelling misconceptions about global environmental change in pre-revolutionary Syria, Contemporary Levant*, 1:1, 38-50, DOI: 10.1080/20581831.2016.1149355 (available online here), and Michael Brzoska & Christiane Fröhlich (2015): *Climate change, migration and violent conflict: vulnerabilities, pathways and adaptation strategies*, *Migration and Development*, DOI: 10.1080/21632324.2015.1022973 ([available online here](#)).

**Read:** Fröhlich, C., *Climate Change – Migration – Conflict. What's the Connection?* [sustainablesecurity.org](http://sustainablesecurity.org), August 10, 2016.

**Online:** <https://sustainablesecurity.org/2016/08/10/climate-change-migration-conflict-whats-the-connection/>

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Date issued: 8 August 2016

### **Comparison of satellite-based evapotranspiration estimates over the Tibetan Plateau**

The Tibetan Plateau plays a major role in regional and global climate. The knowledge of latent heat flux can help to better describe the complex interactions between land and atmosphere. The purpose of this study is to provide a detailed cross-comparison of existing satellite-based latent heat flux products over the TP. The results highlight the recently developed latent heat product--High Resolution Land Surface Parameters from Space (HOLAPS).

**Read:** Peng, J., Loew, A., Chen, X., Ma, Y., and Su, Z. (2016): *Comparison of satellite-based evapotranspiration estimates over the Tibetan Plateau*, *Hydrology and Earth System Sciences*, 20(8):3167-3182.

**Online:** <http://www.hydrol-earth-syst-sci.net/20/3167/2016/>

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Date issued: 03 August 2016

### **Statistical structure of intrinsic climate variability under global warming**

Climate variability is often studied in terms of fluctuations with respect to the mean state, whereas the dependence between the mean and variability is rarely discussed. Here, a new climate metric is proposed to measure the relationship between means and standard deviations of annual surface temperature computed over non overlapping 100-yr segments. This metric is analyzed based on equilibrium simulations of the Max Planck Institute Earth System Model (MPI-ESM): the last-millennium climate (800–1799), the future climate projection following the A1B scenario (2100–99), and the 3100-yr unforced control simulation. A linear relationship is globally observed in the control simulation and is thus termed intrinsic climate variability, which is most pronounced in the tropical region with negative regression slopes over the Pacific warm pool and

positive slopes in the eastern tropical Pacific. It relates to asymmetric changes in temperature extremes and associates fluctuating climate means with increase or decrease in intensity and occurrence of both El Niño and La Niña events. In the future scenario period, the linear regression slopes largely retain their spatial structure with appreciable changes in intensity and geographical locations. Since intrinsic climate variability describes the internal rhythm of the climate system, it may serve as guidance for interpreting climate variability and climate change signals in the past and the future.

**Read:** Zhu, X., Bye, J., Fraedrich, K., & Bordi, I. (2016). *Statistical structure of intrinsic climate variability under global warming*. *Journal of Climate*, (2016).

**Online:** <http://www.atmos-meas-tech.net/9/3467/2016>

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Date issued: 1 August 2016

### **The Moon as a photometric calibration standard for microwave sensors**

The Moon sometimes moves through the field of the deep space view, which microwave sounders employ in their two-point photometric calibration. As its emissivity never changes, the intrusions of the Moon can be used for stability checks and intercalibration. This concept is particularly interesting in combination with dedicated spacecraft maneuvers and for future instruments.

**Read:** Burgdorf, M., Buehler, S. A., Lang, T., Michel, S., & Hans, I. (2016). *The Moon as a photometric calibration standard for microwave sensors*. *Atmospheric Measurement Technique*, 9, 3467-3475.

**Online:** <http://www.atmos-meas-tech.net/9/3467/2016>

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Date issued: July 2016

### **Classification of Local Climate Zones using SAR and multi-spectral data in an arid environment**

There is an urgent need for more detailed spatial information on cities globally that has been acquired using a standard method to facilitate comparison and the transfer of scientific and practical knowledge between places. As part of the world urban database and access portal tools (WUDAPT) initiative, a simple workflow has been developed to perform this task. Using freely available satellite imagery (Landsat) and software (SAGA), WUDAPT characterizes settlements using the local climate zone (LCZ) scheme, which decomposes the city into distinctive neighborhoods (>1 km<sup>2</sup>) based on typical properties (e.g., green proportion and built fraction). In this paper, the methodology is extended to examine the effect of adding synthetic aperture radar (SAR) data, which is now freely available from Sentinel 1, for generating LCZs. Using the city of Khartoum as a case study, the results show that combining multispectral and SAR data improves the overall performance of several classifiers, with random forest (RF) performing the best overall.

**Read:** Bechtel, B., See, L., Mills, G., & Foley, M. (2016). *Classification of Local Climate Zones Using SAR and Multispectral Data in an Arid Environment*.

**Online:** <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=7442773>

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Date issued: July 2016

### **Numerical methods and scientific computing for climate and geosciences**

Studying the climate, weather or other geoscientific phenomena is strongly related to simulation based knowledge gain, since the climate system, for example, is not assessable by laboratory experiments. In these simulations, mathematical models as well as numerical methods play a crucial role in many aspects of the knowledge work-flow. We will describe the general set-up of geoscientific models, and explore some of the

applied mathematical methods involved in solving such models. One of the paramount problems of geoscientific simulation applications is the large span of scales that interact.

**Read:** Behrens, J. (2016). *Numerical methods and scientific computing for climate and geosciences. Mathematics and Society*, 281-293.

**Online:** [http://www.ems-ph.org/books/show\\_abstract.php?proj\\_nr=207&vol=1&rank=15](http://www.ems-ph.org/books/show_abstract.php?proj_nr=207&vol=1&rank=15)

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Date issued: 30 July 2016

#### **Klimawandel in den Medien. CliSAP Working Paper.**

**Read:** Brüggemann, M., Neverla, I., Hoppe, I. & Walter, S. (2016): *Klimawandel in den Medien. CliSAP Working Paper*.

**Online:** [http://www.climatematters.hamburg/wp-content/uploads/2016/08/Working-Paper\\_Klimawandel\\_in\\_den\\_Medien.pdf](http://www.climatematters.hamburg/wp-content/uploads/2016/08/Working-Paper_Klimawandel_in_den_Medien.pdf)

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Date issued: 27 July 2016

#### **High-resolution land surface fluxes from satellite and reanalysis data (HOLAPS v1.0): evaluation and uncertainty assessment**

Surface water and energy fluxes are essential components of the Earth system. Surface latent heat fluxes provide major energy input to the atmosphere. Despite the importance of these fluxes, state-of-the-art data sets of surface energy and water fluxes largely differ. The present paper introduces a new framework for the estimation of surface energy and water fluxes at the land surface, which allows for temporally and spatially high-resolved flux estimates at the quasi-global scale (50° S, 50° N) (High resolution Land Atmosphere Parameters from Space – HOLAPS v1.0). The framework makes use of existing long-term satellite and reanalysis data records and ensures internally consistent estimates of the surface radiation and water fluxes. The manuscript introduces the technical details of the developed framework and provides results of a comprehensive sensitivity and evaluation study. Overall the root mean square difference (RMSD) was found to be 51.2 (30.7) W m<sup>-2</sup> for hourly (daily) latent heat flux, and 84 (38) W m<sup>-2</sup> for sensible heat flux when compared against 48 FLUXNET stations worldwide. The largest uncertainties of latent heat flux and net radiation were found to result from uncertainties in the solar radiation flux obtained from satellite data products.

**Read:** Loew, A., Peng, J., and Borsche, M. (2016). *High-resolution land surface fluxes from satellite and reanalysis data (HOLAPS v1.0): evaluation and uncertainty assessment*, *Geosci. Model Dev.*, 9, 2499-2532.

**Online:** <http://www.geosci-model-dev.net/9/2499/2016/>

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Date issued: 22 July 2016

#### **Statistical Analysis of the Acceleration of Baltic Mean Sea-Level Rise, 1900-2012**

We analyse annual mean sea-level records from tide-gauges located in the Baltic and parts of the North Sea with the aim of detecting an acceleration of sea-level rise over the twentieth and twenty-first centuries. The acceleration is estimated as a (1) fit to a polynomial of order two in time, (2) a long-term linear increase in the rates computed over gliding overlapping decadal time segments, and (3) a long-term increase of the annual increments of sea level. The estimation methods (1) and (2) prove to be more powerful in detecting acceleration when tested with sea-level records produced in global climate model simulations. These methods applied to the Baltic-Sea tide-gauges are, however, not powerful enough to detect a significant acceleration in most of individual records, although most estimated accelerations are positive. This lack of detection of

statistically significant acceleration at the individual tide-gauge level can be due to the high-level of local noise and not necessarily to the absence of acceleration. The estimated accelerations tend to be stronger in the north and east of the Baltic Sea. Two hypothesis to explain this spatial pattern have been explored. One is that this pattern reflects the slow-down of the Glacial Isostatic Adjustment. However, a simple estimation of this effect suggests that this slow-down cannot explain the estimated acceleration. The second hypothesis is related to the diminishing sea-ice cover over the twentieth century. The melting of less saline and colder sea-ice can lead to changes in sea-level. Also, the melting of sea-ice can reduce the number of missing values in the tide-gauge records in winter, potentially influencing the estimated trends and acceleration of seasonal mean sea-level. This hypothesis cannot be ascertained either since the spatial pattern of acceleration computed for winter and summer separately are very similar. The all-station-average-record displays an almost statistically significant acceleration. The very recent decadal rates of sea-level rise are high in the context of the twentieth and twenty-first centuries, but they are not the highest rates observed over this period.

**Read:** Hünicke, B., Zorita, E., *Statistical Analysis of the Acceleration of Baltic Mean Sea-Level Rise, 1900-2012. Frontiers in Marine Science*, <http://dx.doi.org/10.3389/fmars.2016.00125>

**Online:** <http://journal.frontiersin.org/article/10.3389/fmars.2016.00125/full>

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Date issued: 19 July 2016

#### **Cotton Production under Risk: A Simultaneous Adoption of Risk Coping Tools**

Agricultural production explicitly involves dealing with multiple risks, often simultaneously, and applying risk management strategies contemporaneously. However, farmers' behavior of concurrent adoption of multiple risk management tools was ignored in previous studies and formed the rationale for this research. This study was designed to assess the effect of socioeconomic factors, farmers' risk perceptions, the production management technologies, and access to information and credit on the adoption of price, climate, biological, and financial risk management strategies. The potential for simultaneous adoption of these strategies was also hypothesized and evaluated. Allowing for prospective correlation between the risk management strategies, a multivariate probit model was used on 302 randomly selected cotton farmers from Punjab province of Pakistan using multistage random sampling. The research findings established the simultaneous adoption of the four risk management strategies and that the adoption of one strategy encourages the farmer to adopt other strategy(ies). Significant factors in the adoption of various risk management strategies were found to be education, farming experience, land ownership, farmers' risk perceptions, the production management technologies, information access and credit access. The improvements in information access through quality extension services from the government and provision of alternative risk management options, including Crop Loan Insurance Scheme, are crucial to assist farmers in managing risks at farm level.

**Read:** Zulfiqar, F., Ullah, R., Abid, M., & Hussain, A. (2016). *Cotton production under risk: a simultaneous adoption of risk coping tools. Natural Hazards*, 84(2), 959-974.

**Online:** <http://link.springer.com/article/10.1007/s11069-016-2468-9>

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Date issued: 19 July 2016

#### **The climate archive dune - sedimentary record of annual wind intensity**

Active dunes bear a so far unread high-resolution archive of past wind strength. Variations in the grain-size spectrum of an active dune through time are compared with historical time series of wind speed. Annually averaged, sediment-derived wind intensity and instrumental records of wind speed show a correlation of up to 0.75. The potential of eolian dunes to gain long-term data series of wind intensity in areas and for time periods lacking an instrumental record is demonstrated by reconstructing 20th century wind-intensity variations in the

southern North Sea area. The approach can be used in both recent and fossil dune systems. Potential applications include the validation of climate models, the reconstruction of supra-regional wind systems and the monitoring of future shifts in the climate system.

**Read:** Lindhorst, S. & Betzler, C. (2016). *The climate archive dune - sedimentary record of annual wind intensity. Geology, G38093.1.*

**Online:** <http://geology.gsapubs.org/content/early/2016/07/19/G38093.1.abstract>

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Date issued: 16 July 2016

### **The abrupt onset of the modern South Asian Monsoon winds**

The South Asian Monsoon (SAM) is one of the most intense climatic elements yet its initiation and variations are not well established. Dating the deposits of SAM wind-driven currents in cores from IODP Expedition 359 to the Maldives yields an age of 12.9 Ma indicating an abrupt SAM onset, over a short period of 300 kyrs. This coincided with the Indian Ocean Oxygen Minimum Zone expansion as revealed by geochemical tracers and the onset of upwelling reflected by the sediment's content of particulate organic matter. A weaker 'proto-monsoon' existed between 12.9 and 25 Ma, as mirrored by the sedimentary signature of dust influx. Abrupt SAM initiation favors a strong influence of climate in addition to the tectonic control, and we propose that the post Miocene Climate Optimum cooling, together with increased continentalization and establishment of the bipolar ocean circulation, i.e. the beginning of the modern world, shifted the monsoon over a threshold towards the modern system.

**Read:** Betzler, et. al (2016). *The abrupt onset of the modern South Asian Monsoon winds. Sci Rep., 6, 29838.*

**Online:** <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4951686/>

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Date issued: 13 July 2016

### **Factors influencing the organic carbon pools in tidal marsh soils of the Elbe estuary (Germany).**

*Purpose:* Soils of tidal marshes play an important role in regional carbon (C) cycles as they are able to store considerable amounts of organic carbon (OC). However, the C dynamics of marsh soils of the Elbe estuary have not been investigated so far. Therefore, the aim of this study was to identify the sources and distribution of soil organic carbon (SOC) and the factors influencing the SOC pools of tidal marshes of the study region.

*Materials and methods:* In this study, SOC pools were determined in different salinity zones and elevation classes of the estuarine marshes. The amount of initial allochthonous OC was derived from the OC content in fresh sediments. The difference to the recent OC content in the soils was interpreted as autochthonous accumulation or mineralization by microorganisms.

*Results and discussion:* Young, low marshes of the study sites seem to be predominantly influenced by allochthonous OC deposition whereas the older, high marshes show autochthonous OC accumulation in the topsoils (0–30 cm) and mineralization in the subsoils (30–70 cm). SOC pools of the whole profile depth (0–100 cm) did not significantly differ between elevation classes, but decreased significantly with increasing salinity from 28.3 kg m<sup>-2</sup> in the most upstream site of the oligohaline zone to 9.7 kg m<sup>-2</sup> in the most downstream site of the polyhaline zone. Even though the areal extent of the investigated salinity zones was similar, the SOC mass within 100 cm soil depth decreased from 0.62 Tg (1 Tg = 10<sup>12</sup> g) in the oligohaline zone to 0.18 Tg in the polyhaline zone.

*Conclusions:* Elevation was found to be one factor influencing the SOC pools of tidal marshes. However, salinity seems to be an even stronger influencing factor reducing the above-ground biomass and, accordingly, the autochthonous OC input as well as the allochthonous input by enhanced mineralization of OC along the course of the estuary. An upstream shift of the salinity zones by sea level rise could, therefore, lead to a reduction of the SOC storage of the estuarine marshes.



**Read:** Hansen, K., Butzeck, C., Eschenbach, A., Gröngroft, A., Jensen, K., & Pfeiffer, E. M. (2016). Factors influencing the organic carbon pools in tidal marsh soils of the Elbe estuary (Germany). *Journal of Soils and Sediments*, 1-14.

**Online:** <http://link.springer.com/article/10.1007/s11368-016-1500-8>

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Date issued: 8 July 2016

#### **The European Response to the Syrian War. Pathologies Uncovered.**

**Read:** Fröhlich, C. *The European Response to the Syrian War. Pathologies Uncovered. E-International Relations*, July 8, 2016.

**Online:** <http://www.e-ir.info/2016/07/08/the-european-response-to-the-syrian-war-pathologies-uncovered/>

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Date issued: 7 July 2016

#### **Space, Discourse and Environmental Peacebuilding**

The concept of environmental peacebuilding is becoming increasingly prominent among peacebuilding scholars and practitioners. This study provides a brief overview about the various discussions contributing to our understanding of environmental peacebuilding and concludes that questions of space have hardly been explicitly considered in these debates. Drawing on discourse-analytic spatial theory, I discuss how the social construction of scale, place and boundaries are relevant for environmental peacebuilding processes and outcomes. This theoretical approach is then applied to the Good Water Neighbours project, which aims at improving the regional water situation and at building peace between Israelis, Palestinians and Jordanians. The results suggest that discursive constructions of space are important in facilitating, impeding or shaping environmental peacebuilding practices. Analyses of environmental peacebuilding, but also of peacebuilding more general, are therefore encouraged to draw more strongly on the findings of spatial theory.

**Read:** Ide, T. (2016). *Space, discourse and environmental peacebuilding. Third World Quarterly*, 1-19.

**Online:** <http://www.tandfonline.com/doi/abs/10.1080/01436597.2016.1199261>

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Date issued: 04 July 2016 (online)

#### **North Atlantic summer storm tracks over Europe dominated by internal variability over the past millennium**

Certain large, sustained anomalies in European temperatures in the past millennium are probably the result of internal variation. Such internal variations can modulate regional temperatures away from the expected response to greenhouse gas forcing. Here we assess the causes of European summer temperature variability over the past millennium using temperature observations, simulations and reconstructions. We find multidecadal-mean summer temperatures have varied within a span of 1 K, largely controlled by external forcing. By contrast, we find subcontinental variations, described by the temperature contrast between northern and southern Europe (the meridional temperature gradient), vary with a span of 2 K, and are controlled by internal processes. These variations are the result of redistributions of precipitation and cloud cover linked to oscillations in the position of the summer storm track. In contrast to recent twentieth-century winter-time trends, variations of the summer storm track over the past millennium show a weak response to external forcing, and instead are dominated by stochastic internal variability. We argue that the response of European summer temperatures to anthropogenic greenhouse forcing is likely to be spatially modulated by the same stochastic internal processes that have caused periods of cool, wet summers in northern Europe over the last millennium.

**Read:** Gagen, M. H., Zorita, E., McCarroll, D., Zahn, M., Young, G. H., & Robertson, I. (2016). North Atlantic summer storm tracks over Europe dominated by internal variability over the past millennium. *Nature Geoscience*.

**Online:** [www.nature.com/ngeo/journal/vaop/ncurrent/full/ngeo2752.html](http://www.nature.com/ngeo/journal/vaop/ncurrent/full/ngeo2752.html)

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Date issued: June 2016

#### **Access to output market by small farmers: The case of Punjab, Pakistan**

Transport infrastructure in Pakistan is still a problem for rural people to access output markets. This study aims to identify the ways to improve access of small farming households to output markets. To achieve this aim, specific objectives are: to find out the determinants of small farmers' access to output markets; and to assess impact of these factors on farmers' income. For this purpose, primary data from 576 households were collected from twelve districts of the Punjab province. To achieve the first objective, logistic regression was used as the dependent variable is a binary variable. For second objective, the dependent variable was in a continuous variable which guided towards the application of a OLS model. The results of the study revealed that the education, cost of transportation, distance from farm to market and access to market information were the factors which determined the accessibility of farmer to output market. A significant impact of these factors was found on the income of small farmers. The study suggests that the transportation facilities, market infrastructure and flow of market information should be improved.

**Read:** Ahmed, U. I., Ying, L., Bashir, M. K., Abid, M., Elahi, E., & Iqbal, M. A. (2016). Access to output market by small farmers: The case of Punjab, Pakistan. *The Journal of Animal & Plant Sciences*, 26(3): 2016, Page: 787-793.

**Online:**

[https://www.researchgate.net/publication/303719477\\_Access\\_to\\_output\\_market\\_by\\_small\\_farmers\\_The\\_case\\_of\\_Punjab\\_Pakistan](https://www.researchgate.net/publication/303719477_Access_to_output_market_by_small_farmers_The_case_of_Punjab_Pakistan)

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Date issued: June 2016

#### **Menschliche Mobilität im Kontext ökologischer und politischer Krisen. Das Beispiel Syrien.**

**Read:** Fröhlich, C. 2016. *Menschliche Mobilität im Kontext ökologischer und politischer Krisen. Das Beispiel Syrien. Friedensgutachten 2016*, ed. by Margret Johannsen, Bruno Schoch, Max Mutschler et al., Münster: LIT, pp. 89-100. [in German]

**Online:** <http://friedensgutachten.de/index.php/id-2016-302.html>

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Date issued: June 2016

#### **Assessing Risk Perceptions and Attitude among Cotton Farmers: A Case of Punjab Province, Pakistan**

Cotton farmers have to deal with various kind of environmental and production risks. Risk attitude and perceptions play an important role in shaping farmers' decision regarding farm operations and management of exposed risks. Research on various aspects of managing risks in developing countries is few. Hence, keeping in view the research gap, this study aims to investigate the farmers' attitude and perceptions of various kinds of risks to which cotton crop is exposed in Pakistan. This study is based on a farm household survey of 480 farmers in six cotton belt districts of Punjab province, Pakistan. Equally Likely Certainty Equivalent (ELCE) and risk matrix methods are used to determine risk attitude and risk perceptions respectively. In addition, factor affecting farmers' attitude and perceptions are also analyzed by using probit model. The findings of the study revealed that that majority of farmers are risk averse in nature and reported flood, excessive rainfall, increased

incidents of crop diseases and higher input prices as major risks exposed to their cotton crop. Furthermore, study found that age, education, location, off-farm income and access to market information are the factors which significantly (either positively or negatively) affect the farmers' risk perceptions and attitude. Study provides useful firsthand information to researchers and policy makers about the local understanding of risks to cotton crop in a developing country which could be used for research on farmers' adaptation to exposed risks.

**Read:** Iqbal, M. A., Ping, Q., Abid, M., Kazmi, S. M. M., Rizwan, M. (2016). *Assessing risk perceptions and attitude among cotton farmers: A case of Punjab province, Pakistan. International Journal of Disaster Risk Reduction, Volume 16, June 2016, Pages 68-74.*

**Online:** <http://www.sciencedirect.com/science/article/pii/S2212420915301515>

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Date issued: June 2016

### **Comigrants and Friends: Informal Networks and the Transmission of Traditional Ecological Knowledge among Seminomadic Pastoralists of Gujarat, India**

Previous research has shown that social organization may affect the distribution of traditional ecological knowledge (TEK) within local communities of natural resource users in multiple ways. However, in this line of research the potential role of informal relationships has mostly been overlooked. In this article, we contribute toward filling this research gap by studying how two types of informal relationships, namely migration partnership and friendship, affect the distribution of TEK within a community of seminomadic pastoralists from the Kutch area, Gujarat, India. Using social network analysis, we map three networks, migration, men friendship, and women friendship, and compare with similarity-based quantitative approaches the clusters extracted from these networks in relation to four domains of TEK: knowledge about soils, about ethnoveterinary practices, about sheep breeds, and in ethnobotany. Our results show that (1) migration clusters are associated to significant variations in three TEK domains, while (2) friendship clusters are associated to minor variations. We relate these results to the importance of common practical experiences involved by joint migration. Moreover, kin relations are shown to strongly underlie friendship and migration relations, and as such appear as a potential driver of the dynamics of the local TEK system. We conclude by advocating for a better inclusion of such informal relationships in future research on local TEK dynamics, following recent developments in studies on natural resource governance.

**Read:** Salpeteur, M., Patel, H., Molina, J. L., Balbo, A., Rubio-Campillo, X., Reyes-García, V., & Madella, M. (2016). *Comigrants and friends: informal networks and the transmission of traditional ecological knowledge among seminomadic pastoralists of Gujarat, India. Ecology and Society, 21(2).*

**Online:** <http://www.ecologyandsociety.org/vol21/iss2/art20/>

**Contact:** Andrea L Balbo ([balbo@cantab.net](mailto:balbo@cantab.net))

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Date issued: June 2016

### **Exploring climate finance for tourism adaptation development: an overview**

**Purpose:** The purpose of this paper is to provide an overview of the links between climate finance and tourism adaptation development. Besides increasing adaptation and mitigation efforts to limit GHG emissions, climate change remains a major challenge in the 21st century and beyond especially for tourism which is highly climate sensitive. Hence, it is necessary for tourism to adapt in order to survive. The aim of the study is to provide a systematic overview of the topic in order to offer a foundation for better understanding different ways of integrating climate finance initiatives with tourism.

**Design/methodology/approach:** The research focused on the top-ranked, peer reviewed journals of each of the two selected research fields. In order to address this topic an in-depth systematic literature review in the fields of climate change finance and tourism adaptation development was conducted. Furthermore, because it is a

relatively new research topic, conference proceedings were also explored. To guarantee wide coverage of the literature, a query of the following scholarly databases was considered: Elsevier, ScienceDirect, and Web of Science.

**Findings:** Based on the analyses of the literature available on the topic, the paper highlights the main research trends and conclusions. It is argued that there is imbalance of knowledge on climate change finance as it relates to tourism. To-date, there have been relatively few published articles on this topic in the context of tourism. Based on the findings, promising areas for future research were identified, and in particular for small island communities and recommendations for future research are outlined.

**Research limitations/implications:** The paper is limited by the scope of the literature review accessed by the researcher. The results of this review may vary according to the databases used.

**Originality/value:** Currently there is no extensive review of articles on climate finance and tourism adaptation. This paper aims at reviewing climate finance studies published in English language in order to explore knowledge gaps in tourism adaptation. Sets of themes being advanced are also highlighted. Recommendations for future research are provided.

**Read:** *Vieira do Nascimento, D. (2016). Exploring climate finance for tourism adaptation development: an overview. Worldwide Hospitality and Tourism Themes, 8(5). doi:10.1108/whatt-06-2016-0036.*

**Online:** <http://www.emeraldinsight.com/doi/abs/10.1108/WHATT-06-2016-0036>

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Date issued: June 2016

#### **For Better or Worse: Major Developments Affecting Resource and Conflict Dynamics in Northwest Kenya**

The county of Turkana, located in northwest Kenya, has a long history of violent conflicts. These are fought by pastoral groups over scarce water, land, pasture and livestock resources. Now oil has been found in Turkana, fuelling both hopes for a resource blessing and fears of a resource curse. The discovery of oil coincides with four other major developments, namely the process of devolution, the large-scale infrastructure project LAPSET (Lamu Port Southern Sudan-Ethiopia Transport), the discovery of significant aquifers and the Gibe III dam in Ethiopia. The aim of this paper is first to give an overview of these developments, and second to explore their interactions and their effects on existing and potentially new resource and conflict dynamics. The article is based on a review of the academic literature as well as newspaper articles, government records and company publications. Further, we analyze security data and draw on extensive field research conducted in northwest Kenya over the past five years. To illustrate potential pathways, we draft a worst and best case scenario. Our results suggest that the described developments will strongly affect the existing water, land and livestock resources and create new ones in the form of revenues, business opportunities, employment and infrastructure. To decrease the conflict potential and to maximize benefits, it is highly important for any project to closely include the local communities in a fair and transparent manner.

**Read:** *Schilling, J., Weinzierl, T., Lokwang, A. E., & Opiyo, F. (2016). For better or worse: major developments affecting resource and conflict dynamics in northwest Kenya. Zeitschrift für Wirtschaftsgeographie, 60(1-2), 57-71.*

**Online:** <https://www.degruyter.com/view/j/zfw.2016.60.issue-1-2/zfw-2016-0001/zfw-2016-0001.xml>

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Date issued: June 2016

#### **Resilience of Small-Scale Societies. A View from Drylands**

To gain insights on long-term social-ecological resilience, we examined adaptive responses of small-scale societies to dryland-related hazards in different regions and chronological periods, spanning from the mid-Holocene to the present. Based on evidence from Africa (Sahara and Sahel), Asia (south margin of the Thar desert), and Europe (South Spain), we discuss key traits and coping practices of small-scale societies that are

potentially relevant for building resilience. The selected case studies illustrate four main coping mechanisms: mobility and migration, storage, commoning, and collective action driven by religious beliefs. Ultimately, the study of resilience in the context of drylands emphasizes the importance of adaptive traits and practices that are distinctive of small-scale societies: a strong social-ecological coupling, a solid body of traditional ecological knowledge, and a high degree of internal cohesion and self-organization.

**Read:** Balbo, A., Gómez-Baggethun, E., Salpeteur, M., Puy, A., Biagetti, S., & Scheffran, J. (2016). *Resilience of small-scale societies: a view from drylands*. *Ecology and Society*, 21(2).

**Online:** <http://www.ecologyandsociety.org/vol21/iss2/art53/>

**Contact:** Andrea Balbo ([balbo@cantab.net](mailto:balbo@cantab.net))

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Date issued: June 2016

### **Radiocarbon Dating of Agrarian Terraces by Means of Buried Soils**

Soils buried under terrace fills have been widely used to date the construction of ancient agrarian terraces. The reliability of the obtained radiocarbon dates entirely depends on the degree of preservation and isolation of the Ab horizons and on the amount of embedded older carbon. To assess these caveats, we analyzed 14 <sup>14</sup>C dates (11 on charred material and 3 on the bulk organic fraction) obtained from buried soils under Andalusian terrace fills in Ricote, Spain (AD 711–1492). The preservation of Ab horizons was assessed through bulk analyses [particle size distribution (PSD), carbon analyses, magnetic susceptibility (Mag Sus)] and statistics [Welch's ANOVA, MANOVA (Wilk's lambda) and effect size tests]. The effects of older carbon were quantified through the systematic dating of Ab horizons within the earliest terrace cluster of Ricote. Our results show that (1) Ab horizons were not disturbed nor mixed with the terrace fills above; (2) the dates determined from the bulk organic fraction were statistically significantly older than those provided by the charred material, probably due to the higher stability of the microcharcoal fraction; and (3) the earliest dates measured on charcoal clustered reliably around cal AD 989–1210, suggesting that the first Andalusian irrigated terraces of Ricote were built between the end of the 10th and the beginning of the 13th centuries AD.

**Read:** Puy, A., Balbo, A. L., & Bubbenzer, O. (2016). *Radiocarbon Dating of Agrarian Terraces by Means of Buried Soils*. *Radiocarbon*, 58(02), 345-363.

**Online:** <https://www.cambridge.org/core/journals/radiocarbon/article/radiocarbon-dating-of-agrarian-terraces-by-means-of-buried-soils/34A1D783BDA8E7F454CAAD6C794D72F0>

**Contact:** Andrea Balbo ([balbo@cantab.net](mailto:balbo@cantab.net))

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Date issued: 30 June 2016

### **Challenging the current climate change – migration nexus: exploring migrants' perceptions of climate change in the hosting country**

Along with the growing scientific and political concern on global warming, the relationship of climate and migration is framed as cause and consequence. Alarmist numbers of mass migration and related conflicts currently represent the main scientific narratives merging the issue of migration and climate change. This paper takes a different and explorative perspective: it suggests that scientific discourses on migration and climate change should be reframed by taking into consideration the diverse 'knowledges' offered by migrants. Employing an experimentalist approach, we aim at filling this gap in research and introduce an empirical perspective on climate framings among Italian and Chinese citizens in the local context of the city of Hamburg (Germany). Qualitatively analysing semi-structured interviews, the paper conveys an in-depth analysis of how Italian and Chinese migrants frame climate change and, furthermore, explores philosophical backgrounds informing them. We start with a theoretical and methodological outline on undertaking research with migrants and then turn to an empirical analysis in which we examine and discuss four prevailing categories found in the course of our investigation. The final section summarises the results and reflects upon the methodological and

theoretical approach applied which refers to the relevance of migrants as active actors in local adaptation and mitigation processes of the hosting country.

**Read:** *de Guttery, C., Döring, M., & Ratter, B. (2016). Challenging the current climate change–migration nexus: exploring migrants' perceptions of climate change in the hosting country. DIE ERDE–Journal of the Geographical Society of Berlin, 147(2), 109-118.*

**Online:** <http://www.die-erde.org/index.php/die-erde/article/viewFile/288/129>

**Contact:** Beate Ratter ([beate.ratter@uni-hamburg.de](mailto:beate.ratter@uni-hamburg.de))

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Date issued: 28 June 2016

### **Reforestation in a high-CO2 world - Higher mitigation potential than expected, lower adaptation potential than hoped for**

We assess the potential and possible consequences for the global climate of a strong reforestation scenario for this century. We perform model experiments using the Max Planck Institute Earth System Model (MPI-ESM), forced by fossil-fuel CO<sub>2</sub> emissions according to the high-emission scenario Representative Concentration Pathway (RCP) 8.5, but using land use transitions according to RCP4.5, which assumes strong reforestation. Thereby, we isolate the land use change effects of the RCPs from those of other anthropogenic forcings. We find that by 2100 atmospheric CO<sub>2</sub> is reduced by 85 ppm in the reforestation model experiment compared to the reference RCP8.5 model experiment. This reduction is higher than previous estimates and is due to increased forest cover in combination with climate and CO<sub>2</sub> feedbacks. We find that reforestation leads to global annual mean temperatures being lower by 0.27 K in 2100. We find large annual mean warming reductions in sparsely populated areas, whereas reductions in temperature extremes are also large in densely populated areas.

**Read:** *Sonntag, S., Pongratz, J., Reick, C. H., & Schmidt, H. (2016). Reforestation in a high-CO<sub>2</sub> world—Higher mitigation potential than expected, lower adaptation potential than hoped for. Geophysical Research Letters, 43(12), 6546-6553.*

**Online:** <http://onlinelibrary.wiley.com/doi/10.1002/2016GL068824/epdf>

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Date issued: 27 June 2016

### **Air-sea fluxes in a climate model using hourly coupling between the atmospheric and the oceanic components**

We analyse the changes in the air–sea fluxes of momentum, heat and fresh water flux caused by increasing the ocean–atmosphere coupling frequency from once per day to once per hour in the Max Planck Institute Earth System Model. We diagnose the relative influences of daily averaging and high-frequency feedbacks on the basic statistics of the air–sea fluxes at grid point level and quantify feedback modes responsible for large scale changes in fluxes over the Southern Ocean and the Equatorial Pacific. Coupling once per hour instead of once per day reduces the mean of the momentum-flux magnitude by up to 7 % in the tropics and increases it by up to 10 % in the Southern Ocean. These changes result solely from feedbacks between atmosphere and ocean occurring on time scales shorter than 1 day . The variance and extremes of all the fluxes are increased in most parts of the oceans. Exceptions are found for the momentum and fresh water fluxes in the tropics. The increases result mainly from the daily averaging, while the decreases in the tropics are caused by the high-frequency feedbacks. The variance increases are substantial, reaching up to 50 % for the momentum flux, 100 % for the fresh water flux, and a factor of 15 for the net heat flux. These diurnal and intra-diurnal variations account for up to 50–90 % of the total variances and exhibit distinct seasonality. The high-frequency coupling can influence the large-scale feedback modes that lead to large-scale changes in the magnitude of wind stress over the Southern Ocean and Equatorial Pacific. In the Southern Ocean, the dependence of the SST-wind-stress feedback on the mean state of SST, which is colder in the experiment with hourly coupling than in the



experiment with daily coupling, leads to an increase of westerlies. In the Equatorial Pacific, Bjerknes feedback in the hourly coupled experiment reveals a diurnal cycle during the El Niño events, with the feedback being stronger in the nighttime than in the daytime and no clear diurnal cycle during the La Niña events. This asymmetry might lead to the decrease of wind stress in the Equatorial Pacific in the hourly coupled experiment.

**Read:** Tian, F., von Storch, J. S., & Hertwig, E. (2016). *Air-sea fluxes in a climate model using hourly coupling between the atmospheric and oceanic components*. *Climate Dynamics*.

**Online:** <http://link.springer.com/article/10.1007/s00382-016-3228-y>

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Date issued: 23 June 2016

### **The importance of external climate forcing for the variability and trends of coastal upwelling in past and future climate**

The eastern boundary upwelling systems, located in the subtropics at the eastern boundary of the Atlantic and Pacific oceans and mainly driven by the trade winds, are the major coastal upwelling regions. Previous studies have suggested that the intensity of upwelling in these areas in the past centuries may have been influenced by the external radiative forcing, for instance by changes in solar irradiance, and it will also be influenced in the future by the increasing atmospheric greenhouse gases. Here, we analyse the impact of the external climate forcing on these upwelling systems in ensembles of simulations of two Earth system models. The ensembles contain three simulations for each period covering the past millennium (900–1849) and the 20th century (1850–2005). One of these Earth system models additionally includes the near future (2006–2100). Using a set of simulations, differing only in their initial conditions, enables us to test whether the observed variability and trends are driven by the external radiative forcing. Our analysis shows that the variability of the simulated upwelling is largely not affected by the external forcing and that, generally, there are no significant trends in the periods covering the past and future. Only in future simulations with the strongest increase of greenhouse gas concentrations the upwelling trends are significant and appear in all members of the ensemble.

**Read:** Tim, N., Zorita, E., Hünicke, B., Yi, X., & Emeis, K. C. (2016). *The importance of external climate forcing for the variability and trends of coastal upwelling in past and future climate*. *Ocean Science*, 12(3), 807-823.

**Online:** <http://www.ocean-sci.net/12/807/2016/>

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Date issued: 20 June 2016

### **Modelling climate change effects on benthos: Distributional shifts in the North Sea from 2001 to 2099**

In the marine realm, climate change can affect a variety of physico-chemical properties with wide-ranging biological effects, but the knowledge of how climate change affects benthic distributions is limited and mainly restricted to coastal environments. To project the response of benthic species of a shelf sea (North Sea) to the expected climate change, the distributions of 75 marine benthic species were modelled and the spatial changes in distribution were projected for 2099 based on modelled bottom temperature and salinity changes using the IPCC scenario A1B. Mean bottom temperature was projected to increase between 0.15 and 5.4 °C, while mean bottom salinity was projected to moderately increase by 1.7. The spatial changes in species distribution were modelled with Maxent and the direction and extent of these changes were assessed. The results showed a latitudinal northward shift for 64% of the species (maximum 109 km; brittle star *Ophiothrix fragilis*) and a southward shift for 36% (maximum 101 km; hermit crab *Pagurus prideaux* and the associated cloak anemone *Adamsia carciniopados*; 105 km). The relatively low rates of distributional shifts compared to fish or plankton species were probably influenced by the regional topography. The environmental gradients in the central North Sea along the 50 m depth contour might act as a 'barrier', possibly resulting in a compression of distribution range and hampering further shifts to the north. For 49 species this resulted in a habitat loss up to 100%, while only 11 species could benefit from the warming in terms of habitat gain. Particularly the benthic communities

of the southern North Sea, where the strongest temperature increase was projected, would be strongly affected by the distributional changes, since key species showed northward shifts and high rates of habitat loss, with potential ramifications for the functioning of the ecosystem.

**Read:** Weinert, M., Mathis, M., Kröncke, I., Neumann, H., Pohlmann, T., & Reiss, H. (2016). *Modelling climate change effects on benthos: Distributional shifts in the North Sea from 2001 to 2099. Estuarine, Coastal and Shelf Science*, 175, 157-168.

**Online:** <http://www.sciencedirect.com/science/article/pii/S0272771416300932>

**Contact:** Moritz Mathis ([Moritz.Mathis@mpimet.mpg.de](mailto:Moritz.Mathis@mpimet.mpg.de))

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Date issued: 16 June 2016

### **Soil carbon response to land-use change: Evaluation of a global vegetation model using meta-data.**

Global model estimates of soil carbon changes from past land-use changes remain uncertain. We develop an approach for evaluating dynamic global vegetation models (DGVMs) against existing observational meta-data on soil carbon changes following land-use change. Using the DGVM JSBACH, we perform idealized simulations where the entire globe is covered by one vegetation type, which then undergoes a land-use change to another vegetation type. We select the grid cells that represent the climatic conditions of the meta-data and compare the mean simulated soil carbon changes to the meta-data. Our simulated results show model agreement with the meta-data on the direction of changes in soil carbon for some, but not all land-use changes, while the magnitude of simulated changes is smaller than in the meta-data. The conversion of crop to forest results in soil carbon gain of 10% and that of forest to crop to a loss of -15% compared to a gain of 42% and loss of -40%, respectively, in the meta-data. However, the conversion of crop to grass results in a small soil carbon loss (-4%), while the meta-data indicate a gain in soil carbon of 38%. These model deviations from the meta-data are substantially reduced by explicitly accounting for crop harvesting and switching off burning in grasslands in the model. We conclude that our idealized simulation approach provides an appropriate framework for evaluating DGVMs against meta-data and that this evaluation helps to identify the causes of deviation of simulated soil carbon changes from the meta-data.

**Read:** Nyawira, S. S., Nabel, J. E., Don, A., Brovkin, V., & Pongratz, J. *Soil carbon response to land-use change: Evaluation of a global vegetation model using meta-data.*

**Online:** <http://www.biogeosciences-discuss.net/bg-2016-161/bg-2016-161.pdf>

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Date issued: 7 June 2016

### **The total energy flux leaving the ocean's mixed layer**

The total energy flux leaving the ocean's spatially and seasonally varying mixed layer is estimated using a global  $1/10^\circ$  ocean general circulation model. From the total wind-power input of 3.33 TW into near-inertial waves (0.35 TW), subinertial fluctuations (0.87 TW), and the time-mean circulation (2.11 TW), 0.92 TW leave the mixed layer, with 0.04 TW (11.4%) due to near-inertial motions, 0.07 TW (8.04%) due to subinertial fluctuations, and 0.81 TW (38.4%) due to time-mean motions. Of the 0.81 TW from the time-mean motions, 0.5 TW result from the projection of the horizontal flux onto the sloped bottom of the mixed layer. This projection is negligible for the transient fluxes. The spatial structure of the vertical flux is determined principally by the wind stress curl. The mean and subinertial fluxes leaving the mixed layer are approximately 40%–50% smaller than the respective fluxes across the Ekman layer according to the method proposed by Stern. The fraction related to transient fluctuations tends to decrease with increasing depth of the mixed layer and with increasing strength of wind stress variability.

**Read:** Rimac, A., Storch, J. S. V., & Eden, C. (2016). *The Total Energy Flux Leaving the Ocean's Mixed Layer. Journal of Physical Oceanography*, 46(6), 1885-1900.

**Online:** <http://journals.ametsoc.org/doi/pdf/10.1175/JPO-D-15-0115.1>

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Date issued: 7 June 2016

### **Analytic comparison of temperature lapse rates and precipitation gradients in a Himalayan treeline environment – Implications for statistical downscaling**

High mountain regions have been identified as a major hotspot of climate change during recent decades, resulting in a rapid change of local geo- and ecosystems. The ecosystem response to changes of near-surface temperatures and precipitation is often analyzed and simulated by means of statistical or process-based modeling applications. However, these models require high-quality climate input data. Based on the assumption that freely available gridded climate data sets are often not suitable for climate change impact investigation due to their low spatial resolution and a lack of accuracy, this paper aims to suggest adequate statistical downscaling routines in order to facilitate the cooperation of climate and climate impact research. We firstly summarize the requirements of ecological climate impact studies and identify the deficiencies of freely available climate reanalysis and regionalization products. Based on a network of seven recently installed weather stations in the highly structured target area, the seasonal, diurnal, and spatial heterogeneity of near-surface temperatures and precipitation amounts is analyzed, and the major large-scale atmospheric and local-scale topographic forcing are specified. The analysis of observations highly suggests that local-scale climatic conditions are influenced by both large-scale atmospheric parameters and topographic characteristics. Based on related studies in similar environments, we eventually suggest a statistical downscaling approach integrating large-scale atmospheric fields (derived from reanalysis products or large-scale climate models) and GIS-based terrain parameterization in order to generate fully distributed fields of ecologically relevant climate parameters with high spatial resolution.

**Read:** Gerlitz, L., Bechtel, B., Böhner, J., Bobrowski, M., Bürzle, B., Müller, M., ... & Weidinger, J. (2016). *Analytic Comparison of Temperature Lapse Rates and Precipitation Gradients in a Himalayan Treeline Environment: Implications for Statistical Downscaling*. In *Climate Change, Glacier Response, and Vegetation Dynamics in the Himalaya* (pp. 49-64). Springer International Publishing.

**Online:** [http://link.springer.com/chapter/10.1007/978-3-319-28977-9\\_3](http://link.springer.com/chapter/10.1007/978-3-319-28977-9_3)

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Date issued: 7 June 2016

### **Climate change and dynamics of glaciers and vegetation in the Himalaya: An overview**

Mountains are globally significant as 'water towers' of the Earth, as core areas of biodiversity and as source regions for important natural resources and ecosystem services. The ecological integrity of mountain environments is increasingly threatened by global environmental changes including climate change to which physical and ecological systems in mountains are highly vulnerable. Global warming rates have been higher in mountain regions compared to the global mean and have strongly affected the cryosphere, mountain biota and ecosystem processes.

Temperature trends in most Himalayan regions substantially exceed the global mean trend of 0.85 °C between 1880 and 2012, with winter season temperature trends being generally higher than those of other seasons. Precipitation patterns are spatio-temporally differentiated, but show rather decreasing than increasing trends, in particular during summer. On average, glacier mass budgets have been negative for the past five decades, with glaciers in the Himalaya and in the Hindu Kush showing distinct mass losses, while those in the Karakoram are close to balance. Shrinking rates are regionally variable, but often accelerating, corresponding approximately to a W-E gradient of increasing glacier retreat. Biotic responses to current climate change include elevational range shifts of species, intense recruitment of tree species in treeline ecotones and shifts in phenology, resulting in modified structure, composition and functioning of Himalayan ecosystems.

**Read:** Schickhoff, U., Singh, R. B., & Mal, S. (2016). *Climate Change and Dynamics of Glaciers and Vegetation in the Himalaya: An Overview*. In *Climate Change, Glacier Response, and Vegetation Dynamics in the Himalaya* (pp. 1-26). Springer International Publishing.

**Online:** [http://link.springer.com/chapter/10.1007/978-3-319-28977-9\\_1](http://link.springer.com/chapter/10.1007/978-3-319-28977-9_1)

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Date issued: 7 June 2016

### **Climate change and treeline dynamics in the Himalaya**

Treelines are sensitive to changing climatic conditions, in particular to temperature increases, and the majority of global alpine treelines has shown a response to recent climate change. High temperature trends in the Himalaya suggest a treeline advance to higher elevations; it is largely unknown, however, how broader-scale climate inputs interact with local-scale factors and processes to govern treeline response patterns. This paper reviews and synthesizes the current state of knowledge regarding sensitivity and response of Himalayan treelines to climate warming, based on extensive field observations, published results in the widely scattered literature and novel data from ongoing research of the present authors.

Palaeoecological studies indicate that the position of Himalayan treeline ecotones has been sensitive to Holocene climate change. After the Pleistocene-Holocene transition, treelines advanced in elevation to a position several hundred metres higher than today under warm-humid conditions and reached uppermost limits in the early Holocene. Decreasing temperatures below early and mid-Holocene levels induced a downward shift of treelines after c. 5.0 kyr BP. The decline of subalpine forests and treeline elevation in the more recent millennia was coincident with weakening monsoonal influence and increasing anthropogenic interferences.

To assess current treeline dynamics, treeline type, treeline form, seed-based regeneration and growth patterns are evaluated as sensitivity indicators. Anthropogenic treelines are predominant in the Himalaya; upslope movement of these treelines is related to the effects of land-use change. Near-natural treelines, rare nowadays, are usually developed as krummholz treelines which are relatively unresponsive. Strong competition within the krummholz belt and dense dwarf scrub heaths further upslope largely prevents the upward migration of tree species and retards treeline advance to higher elevation. However, intense recruitment of treeline trees within the treeline ecotone and beyond indicates beneficial preconditions for future treeline ascent. Growth patterns of treeline trees are particularly sensitive to higher winter and pre-monsoon temperatures, suggesting that moisture supply in the pre-monsoon season might be an effective control of future treeline dynamics. Modelled upslope range expansions of treeline trees point to potentially favourable bioclimatic conditions for an upward shift of treelines.

**Read:** Schickhoff, U., Bobrowski, M., Böhner, J., Bürzle, B., Chaudhary, R. P., Gerlitz, L., ... & Schwab, N. (2016). *Climate change and treeline dynamics in the Himalaya*. In *Climate Change, Glacier Response, and Vegetation Dynamics in the Himalaya* (pp. 271-306). Springer International Publishing.

**Online:** [http://link.springer.com/chapter/10.1007/978-3-319-28977-9\\_15](http://link.springer.com/chapter/10.1007/978-3-319-28977-9_15)

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Date issued: 7 June 2016

### **Estimating recent glacier changes in Central Himalaya, India, using remote sensing data**

Changing glacier snout positions, surface area, and mass balance are considered as important indicators of climate change. Climatic warming and cooling are reflected through shrinkage and expansion of glaciers, often without significant time lags. Glaciers are important sources of water supply for lowlands and thus have significant influence on ecosystem services, agriculture, and socioeconomic conditions. The economy of the Indo-Gangetic Plain is particularly vulnerable in this respect. Therefore, the present study assesses recent changes (2001–2013) of glaciers in central Himalayan region using remote sensing data. A total of 31 glaciers

were mapped on Landsat ETM+ (2001) and OLI (2013) and compared to estimate the changes in snout positions. The study reveals that there are significant variations in glacier retreat. The retreat rate varies between 5.6 m<sup>-1</sup> (Lawan Glacier) and about 35.6 m<sup>-1</sup> (Pachu Glacier). A total of 6 glaciers retreated with less than 10 m<sup>-1</sup>, 16 between 10 and 20 m<sup>-1</sup>, 6 between 20 and 30 m<sup>-1</sup>, and 3 more than 30 m<sup>-1</sup>. An attempt has also been made to assess underlying driving forces of the varying retreat rate of glaciers. The elevation of snouts, the area, and the length of glaciers have implications on snout retreat rate. There are, however, some other important factors, e.g., accumulation area ratio, slope angles of accumulation and ablation, amount of rainfall and snowfall, temperature conditions, and debris cover, that have significant bearings on glacier retreat.

**Read:** Mal, S., Singh, R. B., & Schickhoff, U. (2016). Estimating recent glacier changes in Central Himalaya, India, using remote sensing data. In *Climate Change, Glacier Response, and Vegetation Dynamics in the Himalaya* (pp. 205-218). Springer International Publishing.

**Online:** [http://link.springer.com/chapter/10.1007/978-3-319-28977-9\\_11](http://link.springer.com/chapter/10.1007/978-3-319-28977-9_11)

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Date issued: 7 June 2016

### **Recent Climate Change over High Asia**

Though elevated regions have generally been spotted as climate change hotspots due to amplified signal of change observed over recent decades, such evidence for the Tibetan Plateau and its neighboring regions is supported only by a sparse observational network, less representative for the high-altitude regions. Using a larger database of widely used gridded observations (CRU and UDEL) and reanalysis datasets (NCEP-CFSR, ERA-Interim, and its downscaled variant ERA-WRF) along with high-quality homogeneous station observations, we report recent changes in mainly the mean monthly near-surface air temperature and its elevation dependence, as well as changes in precipitation over the Tibetan Plateau, its neighboring mountain ranges, and the basins of major rivers originating from them....

**Read:** ul Hasson, S., Gerlitz, L., Schickhoff, U., Scholten, T., & Böhner, J. *Recent Climate Change over High Asia. Book chapter in: Climate Change, Glacier Response, and Vegetation Dynamics in the Himalaya* (pp. 29-48). Springer International Publishing, 2016.

**Online:** [http://link.springer.com/chapter/10.1007/978-3-319-28977-9\\_2](http://link.springer.com/chapter/10.1007/978-3-319-28977-9_2)

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Date issued: 7 June 2016

### **Treeline responsiveness to climate warming: Insights from a krummholz treeline in Rolwaling Himal, Nepal**

At a global scale, the elevational position of natural upper treelines is determined by low temperatures during growing season. Thus, climate warming is expected to induce treelines to advance to higher elevations. Empirical studies in diverse mountain ranges, however, give evidence of both advancing alpine treelines as well as rather insignificant responses. Himalayan treeline ecotones show considerable differences in altitudinal position as well as in physiognomy and species composition. To assess the sensitivity of a near-natural treeline to climate warming at local scale, we analysed the relations between changes of growth parameters and temperature gradients along the elevational gradient in the treeline ecotone in Rolwaling valley, Nepal, by a multispecies approach. We observed species-specific transition patterns (diameter at breast height, height, tree and recruit densities) and varying degrees of abruptness of these transitions across the treeline ecotone resulting in a complex stand structure. Soil temperatures are associated with physiognomic transitions, treeline position and spatial regeneration patterns. In conclusion, treeline tree species have the potential to migrate upslope in future. Upslope migration, however, is controlled by a dense krummholz belt of *Rhododendron campanulatum*. Currently, the treeline is rather stable; however we found a prolific regeneration as well as signs of stand densification. Given the spatial heterogeneity of Himalayan treeline ecotones, further studies are

needed to fully understand the complex conditions for the establishment and development of tree seedlings and the responsiveness of Himalayan treeline ecotones to climate change.

**Read:** Schwab, N., Schickhoff, U., Müller, M., Gerlitz, L., Bürzle, B., Böhner, J., ... & Scholten, T. (2016). *Treeline responsiveness to climate warming: insights from a krummholz treeline in Rolwaling Himal, Nepal*. In *Climate Change, Glacier Response, and Vegetation Dynamics in the Himalaya* (pp. 307-345). Springer International Publishing.

**Online:** [http://link.springer.com/chapter/10.1007/978-3-319-28977-9\\_16](http://link.springer.com/chapter/10.1007/978-3-319-28977-9_16)

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Date issued: 2 June 2016

### **Multi-risk, multi-scale and multi-stakeholder – the contribution of a bow-tie analysis for risk management in the trilateral Wadden Sea Region**

Risk management processes increasingly call for enhanced stakeholder participation, and aim to integrate different risk perceptions, concerns and interests. Frequently, this goal is driven by the increased complexity of risk management processes, as risk management processes continuously have to deal with multi-risk situations including impacts resulting from risks of natural hazards and risks caused by misguided social or economic development. Although stakeholder participation is required by different policies, major challenges still arise from the question of how to perform multi-stakeholder participation in practice. In order to find answers, we tested the so-called 'bow-tie analysis' as a potential tool to facilitate multi-stakeholder participation with a major effort on integrating stakeholders risk perceptions and interest in the risk management processes. The bow-tie analysis is a commonly used risk assessment technique (IEC 2009) to analyse cause-and-effect pathways of risks, but its application in multi-stakeholder processes in risk management of natural hazards, especially in a European context, is rather new. Using practical experiences from the trilateral Wadden Sea Region we demonstrate the bow-tie analysis' contribution to coastal risk management processes in this coastal area by facilitating collaborative identification, comprehension and analysis of the management system. The use of a modified bow-tie analysis in collaboration with stakeholders from the Wadden Sea Region proved to be an appropriate framework for enhancing the understanding of risk management processes and fostered disclosure of different perceptions and concerns of multi-risk problematics. The bow-tie can be beneficial as a communication and co-construction tool in risk management processes in a multi-risk context.

**Read:** Gerkenmeier, B., & Ratter, B. M. (2016). *Multi-risk, multi-scale and multi-stakeholder—the contribution of a bow-tie analysis for risk management in the trilateral Wadden Sea Region*. *Journal of Coastal Conservation*, 1-12.

**Online:** <http://link.springer.com/article/10.1007/s11852-016-0454-8>

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Date issued: 1 June 2016

### **Temperature dependence of basalt weathering**

The homeostatic balance of Earth's long-term carbon cycle and the equable state of Earth's climate are maintained by negative feedbacks between the levels of atmospheric CO<sub>2</sub> and the chemical weathering rate of silicate rocks. Though clearly demonstrated by well-controlled laboratory dissolution experiments, the temperature dependence of silicate weathering rates, hypothesized to play a central role in these weathering feedbacks, has been difficult to quantify clearly in natural settings at landscape scale. By compiling data from basaltic catchments worldwide and considering only inactive volcanic fields (IVFs), here we show that the rate of CO<sub>2</sub> consumption associated with the weathering of basaltic rocks is strongly correlated with mean annual temperature (MAT) as predicted by chemical kinetics. Relations between temperature and CO<sub>2</sub> consumption rate for active volcanic fields (AVFs) are complicated by other factors such as eruption age, hydrothermal activity, and hydrological complexities. On the basis of this updated data compilation we are not able to



distinguish whether or not there is a significant runoff control on basalt weathering rates. Nonetheless, the simple temperature control as observed in this global dataset implies that basalt weathering could be an effective mechanism for Earth to modulate long-term carbon cycle perturbations.

**Read:** Li, G., Hartmann, J., Derry, L. A., West, A. J., You, C. F., Long, X., ... & Li, T. (2016). *Temperature dependence of basalt weathering. Earth and Planetary Science Letters, 443, 59-69.*

**Online:** <http://www.sciencedirect.com/science/article/pii/S0012821X16301029>

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Date issued: 26 May 2016

### **Change in Environmental Benefits of Urban Land Use and Its Drivers in Chinese Cities, 2000–2010**

Driven by rising income and urban population growth, China has experienced rapid urban expansion since the 1980s. Urbanization can have positive effects on the urban environment; however, improvement of urban environment quality, especially its divergence between relatively developed and undeveloped cities in China, is currently a rather rudimentary and subjective issue. This study analyzed urban environmental benefits among China's prefectural cities based on their structure of urban land use in 2000 and 2010. First, we divided 347 prefectural cities into two groups, 81 coastal and capital cities in the relatively developed group (RD) and 266 other prefectural cities in the undeveloped group (RP). Then, we defined three areas of urban environmental benefits, including green infrastructure, industrial upgrade, and environmental management, and developed an assessment index system. Results showed that all prefectural cities saw improvement in urban environmental quality in 2000–2010. Although the RD cities had higher income and more population growth, they had less improvement than the RP cities during the same period. We also found that demographic and urban land agglomeration among RD cities restrained green infrastructure expansion, making green infrastructure unsuitable as a permanent solution to environmental improvement. It is therefore urgent for China to promote balanced improvement among the three areas of urban environmental benefits and between the RD and RP cities through regional differentiation policies.

**Read:** Song, X., Chang, K. T., Yang, L., & Scheffran, J. (2016). *Change in Environmental Benefits of Urban Land Use and Its Drivers in Chinese Cities, 2000–2010. International journal of environmental research and public health, 13(6), 535.*

**Online:** <http://www.mdpi.com/1660-4601/13/6/535/htm>

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Date issued: 26 May 2016

### **Comparing peasants' perceptions of precipitation change with precipitation records in the tropical Callejón de Huaylas, Peru**

Pronounced hygric seasonality determines the regional climate and, thus, the characteristics of rain-fed agriculture in the Peruvian Callejón de Huaylas (Cordillera Blanca). Peasants in the Cuenca Auqui on the eastern slopes above the city of Huaraz attribute recently experienced challenges in agricultural production mainly to perceived changes in precipitation patterns. Statistical analyses of daily precipitation records at nearby Recuay (1964 to 2013) and Huaraz (1996 to 2013) stations do not corroborate the perceived changes. Either insufficient temporal resolution of available precipitation records or other environmental and sociopolitical factors impacting traditional farming methods may be the reason for the lack of concordance between the two information sources investigated in this study.

**Read:** Gurgiser, W., Juen, I., Singer, K., Neuburger, M., Schauwecker, S., Hofer, M., and Kaser, G. (2016). *Comparing peasants' perceptions of precipitation change with precipitation records in the tropical Callejón de Huaylas, Peru, Earth Syst. Dynam., 7, 499-515. doi:10.5194/esd-7-499-2016.*

**Online:** <http://www.earth-syst-dynam.net/7/499/2016/>

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