Geophysical Research Abstracts
Vol. 16, EGU2014-3914, 2014
EGU General Assembly 2014

The 'dry gets drier, wet gets wetter 'paradigm revisited

Peter Greve (1,2), Boris Orlowsky (1), Brigitte Müller (1), Justin Sheffield (3), Markus Reichstein (4), and Sonia I. Seneviratne (1)

(1) ETH Zürich, Institute for Atmospheric and Climate Science, Umweltwissenschaften, Zürich, Switzerland (peter.greve@env.ethz.ch), (2) Center for Climate Systems Modeling (C2SM), ETH Zurich, Zürich, Switzerland, (3) Department of Civil and Environmental Engineering, Princeton University, Princeton, New Jersey, USA, (4) Max Planck Institute for Biogeochemistry, Jena, Germany

The 'dry gets drier, wet gets wetter' (DDWW) paradigm has become common place in studies and assessments of future climate change. Many studies extrapolate the DDWW paradigm to assess historic changes over land, although analyses of continental dryness trends yield contradicting results and the DDWW evidence is mostly substantiated with oceanic data. So far, long-term land-based studies on dryness trends have only relied on a few datasets and single indices, thereby not accounting for data and methodological uncertainties. Here we provide for the first time a comprehensive and robust assessment of historic land dryness changes by analyzing more than 300 combinations of precipitation, evapotranspiration and potential evaporation datasets. The realism of each combination is benchmarked against the Budyko curve and those combinations performing well are used for trend analysis. Our results confirm previously identified hot spots of changing dryness (e.g. drying trends in the Mediterranean and East Asia and wetting in the eastern U.S.), but also highlight that over large extents of global land area (86.4%) robust dryness changes cannot be detected. Within the 13.6% land area fraction with robust changes, only the minority (5.7%) confirms the DDWW paradigm. Of the remaining regions 4.8% display opposite changes (i.e. wettening dry areas and drying wet areas) and another 3.1% display drying/wetting in transitional climate regions. In particular, some humid regions have experienced increasing dryness (and vice versa) with potential consequences for a wide range of socio-economic sectors.