Hydrol. Earth Syst. Sci. Discuss., 9, C6829–C6831, 2013
www.hydrol-earth-syst-sci-discuss.net/9/C6829/2013/

Hydrology and Earth System Sciences Discussions

Interactive comment on "Elusive drought: uncertainty in observed trends and short- and long-term CMIP5 projections" *by* B. Orlowsky and S. I. Seneviratne

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Received and published: 20 February 2013

Elusive drought: uncertainty in observed trends and short- and long-term CMIP5 projections B. Orlowsky and S. I. Seneviratne Hydrol. Earth Syst. Sci. Discuss., 9, 13773–13803, 2012

The paper deals with historic and future meteorological and soil moisture droughts on a regional and global scale, which are obtained from three observation-based gridded precipitation datasets and multi-GCM and scenario simulations. First the paper describes the used indicators (mainly the Standardized Precipitation Index, SPI, and

the Soil Moisture Anomaly, SMA), and it identifies drought hot spots across the globe considering drought vulnerability and drought projections. Then past droughts are presented by: (i) testing the consistency in drought trends on a global scale among the models and against the observation-based datasets, and (ii) investigating the trends (magnitude and frequency) in meteorological drought for the identified hot spots (both in the observation-based products and GCM simulations) and soil moisture drought (only GCM simulations). Next, future meteorological and soil moisture droughts are presented for both wetting and drying hotspots in the 21st century. Eventually the evolution of three uncertainty sources over the 21st century for the hot spots is evaluated and compared with a heat index.

I believe that the quantification of different drought types (reconstruction of the past and projections) with an adequate description of current limitations, incl. a measure for uncertainty, is of crucial importance for the further development of our knowledge on hydrological extremes and to the contribution of realistic water management planning that considers potential water scarcity and drought. Hence the paper deals with relevant scientific questions within the scope of HESS. The work mainly presents an analysis of drought using comprehensive new data (AR5: 32-39 GCMs and three GHG scenarios), i.e. CMIP5 simulations. The tools are more or less conventional. Substantial conclusions are achieved (e.g. drought signal-to-noise ratios for the two different drought types using the new dataset).

I found the paper to be well-written and presented and it is potentially a very useful contribution to HESS. However, it needs additional elaboration (see major and minor points in supplement).

Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/9/C6829/2013/hessd-9-C6829-2013-supplement.pdf

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9, C6829–C6831, 2013

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 13773, 2012.

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