



Droughts in the Twentieth Century: Spatial and temporal patterns of Soil moisture variations at large surface scheme

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Land surface models (LSMs) are an integral part of weather and climate forecasting systems which work on ranges from daily to climatic scales. As such they should be able to predict hydrological extremes under current climate conditions as well as in a warmer climate. But we still do not know how well these LSMs are able to represent drought in a changing climate and how complex they need to be in order to reproduce all associated modifications in the hydrological cycle induced by droughts.

The work is based on results from the Water and Global Change (WATCH) project which has brought together the hydrological, water resources and climate communities to analyze, quantify and predict the components of the current and future global water cycles and related water resources states. The work in WATCH provides a new and valuable opportunity to assess components of the water cycle in a consistent and spatially coherent manner in the aim to better assess future extremes.

For our analysis, the land surface model ORCHIDEE forced by global gridded data produced by WATCH at a resolution of 0.5 by 0.5 degree has been used to assess soil moisture and its extremes. The analysis is conducted using monthly time series covering the 20th and 21st centuries. Average drought duration per cell and soil deficit volume is identified in the aim to highlight ORCHIDEE's ability to represent droughts. Different versions of ORCHIDEE will be compared in order to assess the complexity needed to represent droughts.