

## Quantifying future changes affecting dry and wet states of soil moisture

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Soil moisture is at the heart of many processes connected to water cycle, climate, ecosystem and societal conditions. The study we present investigates the impact of future climate change scenarios from the Coupled Model Intercomparison Project phase 5 (CMIP5) for the 21st century on soil moisture intra- and inter- annual patterns, and for both wet and dry conditions. From a relatively simple analytical soil-moisture model we explore the temporal dynamics in long-term projected data series within and across 81 large catchments worldwide. We quantify changes in mean seasonal soil moisture and its inter-annual variability, as well as in the frequency of dry and wet events. Results show large changes in the intra-annual variability of the mean soil moisture, especially for the dry season. Also, in some parts of the globe, the frequency of dry events increases to nearly double by the end of the century. Finally, this study shows that both the direction of change in soil moisture conditions and its magnitude for mainly the dry conditions depend greatly on climate scenario (representative concentration pathway) assumed for the future.