



Are runoff trends in Europe attributable to anthropogenic climate change?

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Changes in terrestrial water availability can have pronounced consequences for ecosystem processes, land-atmosphere interactions and water resources planning. Although previous studies have found changes in European streamflow with increasing drought in the south and wetting conditions in the north, there is to date no formal assessment of the significance of these changes. Similarly, the effect of anthropogenic climate change on these patterns has not been assessed. This leaves many pending questions regarding the significance and causes of changes in terrestrial water availability in Europe. Here we investigate regional patterns in changes of water availability in Europe, using a newly assembled collection of homogeneous streamflow observations that combines data from the European Water Archive (EWA), the Global Runoff Data Centre (GRDC) and national authorities. Using detection and attribution techniques, emerging patterns of change are compared to patterns derived from comprehensive Earth System Model simulations driven with natural forcing only, and to simulations forced with historical changes in anthropogenic greenhouse gas emissions. The results, consequently, allow clarifying whether regional water availability in Europe has changed significantly over the past decades and if detected changes are attributable to anthropogenic greenhouse gas emissions.