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## How does the rise of atmospheric water demand affect flash drought development in Spain?

Iván Noguera<sup>1</sup>, Fernando Domínguez-Castro<sup>2,3</sup>, and Sergio M. Vicente-Serrano<sup>1</sup>

<sup>1</sup>Instituto Pirenaico de Ecología, Procesos Geoambientales y Cambio Global, Spain (i.nogueracorrall@gmail.com)

<sup>2</sup>Department of Geography, University of Zaragoza

<sup>3</sup>ARAID Foundation

Flash droughts are distinguished by a rapid development and intensification, which increase the potential drought impacts on natural and socio-economic systems. In recent years, a great effort has been made to identify and quantify this type of events in different regions of the world using different metrics. We developed a methodology to analyze the flash droughts based on SPEI at short-time scale (1-month) and high-frequency data (weekly). Thus, we characterized the occurrence of flash drought in Spain over the period 1961-2018 and showed that flash drought is a frequent phenomenon (40% of all droughts were characterized by rapid development), which exhibit a great spatiotemporal variability. The northern regions, where a higher frequency of flash droughts was found, showed negative trends in the frequency of flash droughts, while the central and southern regions subject to fewer flash drought events showed generally positive trends. Usually, the flash drought is associated with severe precipitation deficits and/or anomalous increases in atmospheric evaporative demand (AED), but while the role of precipitation seems obvious and essential, the role played by AED in triggering or reinforcing flash drought episodes is much more complex and exhibits important spatial and temporal contrasts. In Spain, the effect of AED is mainly restricted to water-limited regions and the warm season, but its role is minimal in energy-limited regions and in cold periods in which precipitation deficits are the main cause of flash drought development. However, the contribution of the AED on the development of flash droughts has increased notably over the last six decades, thus becoming a decisive driver in explaining the occurrence of the latest flash droughts in some regions of Spain. These findings have strong implications for proper understanding of the recent spatiotemporal behavior of flash droughts in Spain and illustrate how this type of event can be related to global warming processes.