

## **Title**

Contrasting biophysical and social impacts of hydro-meteorological extremes

## **Authors**

Rene Orth<sup>1\*</sup>, Miguel D. Mahecha<sup>1</sup>, Sungmin O<sup>1</sup>, Jakob Zscheischler<sup>2,3</sup>, Markus Reichstein<sup>1</sup>

## 5 **Affiliations**

<sup>1</sup>Department of Biogeochemical Integration, Max Planck Institute for Biogeochemistry, D-07745 Jena, Germany

<sup>2</sup>Oeschger Centre for Climate Change Research and Climate and Environmental Physics, University of Bern, CH-3012 Bern, Switzerland

10 <sup>3</sup>Department of Computational Hydrosystems, Helmholtz Centre for Environmental Research – UFZ, D-04318 Leipzig, Germany

\*Corresponding author. E-mail: rene.orth@bgc-jena.mpg.de

## **Abstract**

15 Extreme hydrological and meteorological conditions can severely affect ecosystems, economy, and consequently society. These impacts are expected to be aggravated by climate change. Here we analyze and compare the impacts of multiple types of extreme events across several domains in Europe, to reveal corresponding impact signatures. We characterize the distinct impacts of droughts, floods, heat waves, frosts and storms on a  
20 variety of biophysical and social variables at national level and half-monthly time scale. We find strong biophysical impacts of droughts, heat waves and frosts, while public attention and property damage are more affected by storms and floods. We show unexpected impact patterns such as reduced human mortality during floods and storms. Comparing public attention anomalies with impacts across all other considered domains we find that attention  
25 on heat waves and even more for droughts is surprisingly low despite the significant overall impacts. Resolving these impact patterns highlights large-scale vulnerability and supports regional extreme event management to consequently reduce disaster risks.