



Meteorological reconstruction of major floods in early instrumental period in Catalonia (NE Iberian Peninsula)

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Floods are among the most dangerous natural hazards in the Western Mediterranean area. Historically, these types of events have generated many affectations over several fields, such as agriculture or infrastructures, and even hundreds of fatalities. The historical archive data allow for a historical (Barriendos et al. 1993) and for a hydraulical and hydrological reconstruction (Balasch et al., 2010, 2011) of floods. However, there are few studies dealing with the meteorological reconstruction of historical floods.

Within the early instrumental period (1780-1950), the 20 major floods (according to the affected area, peak and overflow magnitudes, high social damages) since 1870 affecting Catalonia (NE Iberian Peninsula) have been chosen with the aim of characterizing them under a meteorological point of view. By doing this, we improve the understanding of their atmospheric dynamics. For this purpose, the NOAA 3/6 Hourly 20thC V2 Reanalysis Data Composites database has been used to obtain the vertical profile of the air temperature from 1000 hPa to 200 hPa. This database allows us to evaluate several parameters related to convection, such as the Convective Available Potential Energy (CAPE), the Lift Index (LI), the K index (KI), the Vertical, Cross and Total Totals (VT, CT, TT respectively), and wind shear between surface and 1, 3 and 6 km levels, among many others. Moreover, the synoptic condition has been also reconstructed for each flood event.

As a preliminary result, the estimated convective parameters as well as the prevailing synoptic conditions that favor convective precipitation have shown a good correspondence with the geographical and hydrological reconstruction. These results will be useful for the synoptic classification of the largest floods occurred in the past, in order to improve their forecasting in the future.