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Identification of hailstorms conductive environments in Europe for climate research purpose

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There is a lack of consistent observations relative to small-scale severe weather events (thunderstorms, tornadoes, hail) at regional and global scales for climate research purpose. So-called "proximity soundings", i.e., rawinsonde launches near to severe weather events, have been used to determine relationships between large-scale environmental conditions and severe local weather. These investigations, mainly performed in United States, aimed to find a set of parameters derived from large-scale environmental conditions in order to discriminate between severe (i.e., tornado, hail) and non severe thunderstorms. Given that the period of available observations is usually longer for large-scale than for small-scale meteorological phenomena, the identification of the hailstorms conductive environments may hold the key to produce "pseudo-climatologies" of these events, so allowing the analysis of potential changes in their spatial and temporal distribution, in relation with climate change. Following the approach described earlier, this work aims to determine a set of convective indices that allow diagnosing hailstorms in Europe. The NCEP-NCAR reanalysis are used to describe the large scale environment conditions, and hailstorms data for Switzerland and France are investigated in order to evaluate the diagnosing scheme. Once it will be validated, the scheme will be applied to the study of the occurrence of hailstorm events in past and future climates in Europe through numerical modelling.