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The influence of synoptic weather patterns in supercell formation in Spain

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Supercells are the most organized and complex type of thunderstorms. Their formation, among other factors, is greatly influenced by general synoptic weather conditions. The goal of the study is to analyze the effect of different circulation weather types (CWT) in supercell formation and their spatiotemporal patterns in Spain. We use 2014-2018 data from the Spanish Supercell Database from the weather online network Tiempo.com (Martín et al., 2019) and compute 12 different CWTs through a Principal Component Analysis (PCA) of the 6-hour average of the 500hPa atmospheric pressure variable from the National Center for Environmental Prediction (NCEP) Reanalysis database. Results indicate that supercells are more common in three CWTs related with short-wave troughs over the Iberian Peninsula, particularly in the period from May to September. In these three CWTs the spatial distribution mainly concentrates in northeastern Spain, particularly in the Middle Ebro Valley (MEV) and the easternmost part of the Iberian System.