



Diagnoses of severe convection during the cold season in France

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In France, during the cold season (e.g. from november to march), severe convection often occurs in an environment of high shear, low CAPE (HSLC). While high shear is most of the time a necessary ingredient for severe convection, high CAPE is not. During the cold season, wind gusts exceeding 50 kt or tornadoes generally develop along squall-lines or cold fronts in an environment with CAPE that does not exceed 400 J/kg. This is clearly lower than the amount of CAPE typically found in the environment of a severe thunderstorm occurring in summer months (typically > 1000 J/kg).

At Météo-France, to detect severe convection in all seasons, forecasters currently use the Supercell Composite Parameter (SCP) and the Significant Tornado Parameter (STP) as guidance tools. Those latter parameters that include CAPE as a constituent are rather skillful during the warm season, but less skillful during the cold season. A new parameter called the MODified Severe Hazards in environments with reduced buoyancy – effective version (MOSHE) - has recently been developed in the USA to detect severe convection in HSLC environments. This new parameter, based on the following ingredients, low-level lapse rate, low-level shear, effective shear and synoptic-scale forcing, does not include a CAPE constituent. Therefore, MOSHE and its componements is computed on french global model ARPEGE and french convection-permitting model AROME.

The goal of the present study is to compare the skill of the MOSHE parameter with that of the classical parameters (i.e. SCP, STP) over the cold season in France. Preliminary results will be presented: cases studies and a new formulation more suitable for Europe.