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Future severe convective storms in Euro-Mediterranean region based on simulated environmental conditions

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Severe convective storms (i.e. storms with hazardous phenomena such as tornadoes, large hail, excessive precipitation, severe straight-line winds) in Europe and Mediterranean region are widely studied in the last two decades. Most of the studies cover climatologies of these phenomena, which include statistics on the annual, diurnal, intensity, and geographical distributions. Some of them analyze their environmental characteristics with a meteorological framework. Although most of these phenomena ocur in smaller scales, the larger scale environmental conditions play a crucial role in favouring them. Knowledge of the synoptic scale thermodynamics and kinematics prior to and during these severe convective storms permit usage of coarser-scale model output to be used for their evolution in a possible future climate. For example supercells, which are responsible from virtually all of the 5+ cm size hail and mesocyclonic tornadoes, occur in environments with enough convective available potential energy (CAPE) and high deep layer shear together, given the convective initiation took place. Without enough deep layer shear, they are very rare no matter how high the CAPE is. Spesific severe weather phenomena will basicly require spesific environmental conditions, which can be tracked with the so-called “proxy parameters” in a coarse-scale simulation. Frequency of co-existing thermodynamic and kinematic features favouring spesific weather phenomena over a long period of time will provide insight for the frequency of the investigated weather phenomena. This study will cover environmental conditions for severe convective storms extracted from RegCM simulations forced by RCP8.5 scenario over the Med-CORDEX domain. Favourable environments in future simulation for the periods of 2021-2050 and 2071-2100 will be compared to the reference simulation (1981-2005).