



Analysis of 10 severe convective storm cases over Kars and surroundings, Turkey

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Kars and its surroundings have a very distinct thunderstorm climatology, with a convective season extending whole summer, unlike rest of Turkey. Tornado and large hail records in the region is also unusually numerous, despite the very low population density.

As a first dedicated study on the curious convective climate of the region, meteorological processes leading to the occurrence of 10 severe thunderstorm cases between 2005 and 2018 are investigated. 3 of the cases include large hail observations, and 7 of them have tornadoes. The environmental conditions regarding the ingredients for deep moist convection, and critical parameters for associated severe weather are analyzed using ECMWF's brand new ERA5 dataset.

Results indicate that the moisture source for the storm environments vary seasonally. Steep lapse rates (up to 9 K/km) in mid-levels are observed in each case, usually advected from the continental (and semi-arid) south. With a polar jet passing over the region in each, all the large hail environments, and 2 of tornadic environments indicate high 0-6 km bulk shear in addition to high values of MUCAPE. Up to 45 m/s deep layer shear and more than 2500 J/kg MUCAPE values are observed in some cases. The deep layer and low level shear in 3 of the 7 tornado environments are quite minimal, which makes a non-mesocyclonic attribution possible. 2 of the likely mesocyclonic cases are associated with high shear, low cape environments, both of which are occurred in March.