



Investigating an extraordinary mesocyclonic tornado in the coastline of Mediterranean, Turkey

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Turkey is a country surrounded by seas on three sides, located in a region of severe and various types of meteorological events can be seen frequently. Especially in the city of Antalya, which is the coastline of the Mediterranean Sea, many convective storms, waterspouts and landspouts, mesocyclonic and non-mesocyclonic tornadoes occur during the fall and winter seasons. Comparisons to previously published tornado climatology for European countries as well as plots of tornadoes that are recorded in the ESWD (European Severe Weather Database) suggest that this stretch of Turkish coastline is among the most tornado-prone regions of Europe, though many of these vortices remain offshore as waterspouts (Kahraman and Markowski, 2013). A hazardous mesocyclonic tornado occurred at the Antalya Airport on 26 January 2019 and took about 3 minutes. It caused millions of dollar loss and 25 people were injured. A state-of-the-art C-band polarimetric weather radar is located at 962 m above MSL and 78 km away from Antalya Airport. Since the minimum height of visibility from the radar above Antalya Airport is 821 m AMSL and the attenuation during the event, there is no tornado sign in the radar. However, another instrument called Low-level Wind Shear Alert System (LLWAS) containing a LIDAR and X-band radar installed in Antalya Airport is detected gate-to-gate shear. Nevertheless, LLWAS did not issue any alert for tornado. Looking at the polarimetric products of X-band radar, Tornado Debris Signature (TDS) is clearly seen. It is an extraordinary example as this mesocyclonic tornado is formed immediately after the passage of the storm cell and located at far from the hooked echo region. This study also investigates the possible reasons why LLWAS did not issue alert and C-band has no tornado sign.