

Close-range observations of tornado activities made with a dual-polarization, X-Band, mobile Doppler radar in urban area of Athens, Greece

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Recent studies revealed that convective weather favours the development of tornadoes, waterspouts and funnel clouds mainly over the western Greece. Besides the western Greece, the Athens city and its suburbs revealed to be another favour area for the development of less severe phenomena, too. The goal of this study is to detail the analyses of the polarimetric Doppler radar collected during two tornadoes over Athens, Greece. A mobile, dual-polarization, X-band, Doppler radar, positioned in the centre of Athens city, scanned storms at close range in the convective weather environment on October 25 and November 10, 2009, detected tornado characteristics. The former tornado formed NW over Aegina island and close to the coast of Athens, while the latter tornado developed as the storm propagated and intensified over the western suburban areas and a hook echo signature was detected. The peak wind speeds, which were recorded by the radar in the area of the tornado, reached 100 km/hr. There are indications that the local topography contributed to the increase of wind shear and the development of the observed tornado structures. It is the first time that tornado characteristics, derived from a dual-polarization X-Band, mobile Doppler radar, were detected over Athens, Greece. A synoptic discussion based on the European Centre for Medium-Range Weather Forecasts of middle and lower atmosphere accompanied with numerous dataset from weather observations (meteorological ground stations) and remote sensing data (satellite images and lightning data), fulfil the study.