Performance of waterspout forecasting method using high resolution numerical weather model

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Waterspouts are quite common in Adriatic Sea and they can pose threat to people and property particularly if they move onshore. Forecasting tornadoes, especially non-mesocyclonic ones, is quite difficult and present great challenge in operational meteorology. In this study Szilagyi's waterspout forecasting method (SWI) is tested on ten waterspout events which occurrences were collected from the weather stations, an online survey at the official web site of the Meteorological and Hydrological Service of Croatia and eyewitness reports from newspapers and the internet. Vertical atmospheric profiles provided by the high resolution (500 m) mesoscale numerical weather model are used to determine the lifted condensation level, equilibrium level and temperature at 850 hPa level which are then used for SWI calculation. SWI successfully forecasted almost all waterspout events. The exception was one winter case characterized by quite small cloud depth (ΔZ=EL-LCL=2.5 km), but quite high 0 -1 bulk shear (16 ms-1) as well as big 850 hPa temperature and SST difference (ΔT=14.5 °C). Also, synoptic and mesoscale analysis, with the focus on thermodynamic instability indices was preformed. The SWI method together with recognition of common surface setup and all ingredients supportive of non-mesocyclone tornadoes can significantly improve forecasting skill.