European Conference on Severe Storms 2015
14–18 September 2015, Wiener Neustadt, Austria
ECSS2015-1

An analysis of the meteorological parameters related to the waterspout development in the southern Adriatic Sea

Tanja Renko (1), Nataša Strelec Mahović (1), and Hela Irha (2)
(1) Meteorological and Hydrological Service, Croatia, (2) b.sc.; hela2525@gmail.com

The aim of this study is to examine the behavior of several meteorological parameters that are considered to be correlated with waterspout occurrence. For that purpose nine waterspout events in the southern Adriatic between 2010 and 2012 are chosen. Although waterspouts occur along the whole Croatian coastline, the southern Adriatic is selected, because of the high frequency of waterspout occurrence throughout the year. Also, the data about waterspout events recorded in that area were more reliable and collected mostly from eyewitnesses reports. In the cases when the cyclone accompanied with the cold front moves over the Adriatic, favorable conditions which include wind shear, vorticity and cold advection are present. Most of all, the change of wind direction and intensity from SE wind to NE (bora) and NW wind produces a convergence zone that can trigger multi-waterspout events. The sea-surface temperature (SST) is above 15 °C trough almost the whole all year, which enhances the possibility for waterspout development

Several parameters were investigated as possible correlators to waterspout formation: wind (at 1000, 850 and 700 hPa), wind shear (925 - 850 hPa and 850 – 700 hPa), ΔT (850 – 700 hPa, SST – 925 hPa, SST – 850 hPa), potential and absolute vorticity (850 and 300 hPa). Except for SST values, obtained from METEOSAT satellite data, all other parameters were calculated using ALADIN numerical model. ALADIN model is an operational model at the National Meteorological and Hydrological Service of Croatia. The statistical analyses of meteorological parameters have been studied for all selected cases at the hour of waterspout occurrence, around its approximate location. For studied parameters a temporal distribution is anaylized and discussed in order to compare their values prior and after the event. The results show that the strongest correlators to waterspout formation are wind speed at 700 hPa, 925-850 hPa and 850-700 hPa wind speed difference, 925-850 hPa wind direction difference, 850 hPa potential vorticity and SST – 850 hPa temperature difference. The shear distribution at the low levels (925 – 850 hPa) reveals that waterspouts are mostly weaker non-mesocyclonic tornadoes.