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Cold season tornadoes in Bulgaria

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Tornadoes are naturally associated with convective storms and therefore they occur in the context of large scale atmospheric conditions favoring deep convection. Statistically tornadoes in Bulgaria occur mainly over mountainous terrain or over large water surfaces (lakes, water dams, and sea). These severe events may often remain unreported when they occur in remote and weakly populated mountainous regions of the country or if they leave no significant damage behind. The number of reports of tornado events in Bulgarian from the beginning of 21-century however has significantly increased thanks to the revolutionary development of the information technology. There exist even amateur websites where one can find up-to-date summary of suspect tornado cases in the country given either by description of the damage or by photos of the object. While some of them were indeed tornadoes others were rather downbursts or funnel clouds not touching the ground.
In the list of documented tornadoes there are 5 “winter” cases, all after 2001 year, which occurred within the cold half of year 4 of which in southern Bulgaria and 1 - in northeastern Bulgaria. They were associated with strong thunderstorms which developed along rapid and intense cold fronts introducing cold and moist air masses in Bulgaria after a prolonged period of unseasonably warm and dry weather. Detailed analysis of synoptic situation caused such type of severe events have been done. The newly detected “winter” tornadoes in the recent years can be due to the overall global warming trend or it can be the result of the development of the information networks and technologies. For better understanding the large-scale atmospheric patterns the thermodynamic parameters and stability indices of the environment associated with the occurrence of cold season tornado in Bulgaria have also been given.