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Use of conceptual models in explaining non-typical orographic weather

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The paper is dedicated to the study of some unusual behavior of the weather systems associated to midlatitude synoptic disturbances. In order to explain this unusual behavior was analyzed the impact of Romanian specific topography on the development of the weather systems described using Norwegian Cyclone model and Conveyor Belt conceptual models.

Conveyor belt conceptual models are some of the most useful methods of explaining weather. When satellite imagery is used as major ingredient in nowcasting, a very careful interpretation in terms of synoptic and mesoscale phenomena and mechanisms is needed. In this respect, some interaction with topography has to be considered for a good explanation of convective developments in cases of forced ascent of stable air. A good example of forced ascent associated with a conveyor belt is the convective development over Carpathians on 14-th of April 2016, one of the cases studied in this paper.

Multispectral satellite imagery, radar products, convective available potential energy, 850 hPa equivalent potential temperature, geopotential and mean sea level pressure fields were used to make sense of the cloud bands associated to frontal systems and conveyor belts in terms of the dynamical factors that are producing them. The component of motion within the warm conveyor belt being parallel to the cold front and mainly ageostrophic component perpendicular to the front can interact with topography in terms of forced ascent or dissipation of weather systems.

The results of this paper can be used in further developments of nowcasting techniques for areas in which topography is an issue for very short range forecasts.