



Early detection of severe thunderstorms in the Alpine region: the dynamical approach of COALITION.

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The basic physical mechanisms governing thunderstorms are fairly well understood and these rely on the analysis of temperature and humidity profiles at upper and lower layers. Furthermore, the topography, particularly important in the Alpine region, specifically drives the conditions at boundary layer, where convection elements can be initiated, focused, oriented, reactivated or inhibited.

The accurate observation of specific features, e.g. retrieved by remote sensing methods, and appearing at different phases of the thunderstorm lifecycle (pre-convective, convective, deep, mature stage), can lead to significant improvements of the forecast-skills. The challenge is how to build up a methodology for integrating physical and heuristic information into one appropriate, consistent Nowcasting model for complex terrains.

The here presented heuristic model (Context and Scale Oriented Thunderstorm Satellite Predictors Development - COALITION) collects and assimilates the information from different data sources and applications (e.g. Meteosat Second Generation, MetOp/IASI, Weather Radar, Numerical Weather Prediction, Topography) into a simplified model, where thunderstorm predictors (e.g. instability indices, moisture convergence) are merged with evolving thunderstorm properties. The storm evolution results then as solution of particular motion equations, governed by couplings between convective signatures (objects) and environments (pseudo potential fields).

The improved time-linkage between different features and phases, will be basis for the early prediction of the storm.