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# Predictability of the cold drops in the European area, study based on ECMWF deterministic and ensemble models

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Upper-Level Lows (ULL-s) are closed; cyclonically circulating eddies isolated from the main western stream in the middle and upper troposphere. They are also sometimes called „cold drops" because the air within an Upper Level low is colder than in its surroundings. The cold air within usually does not show up on the surface, meaning the vertical temperature gradient is high, which in turn causes instability and heavy storms, especially during the summer. An ULL-s diameter is about a couple hundred km-s, so it looks like a miniature cyclone.
Our former studies focused mainly on the cold drops' statistics and meteorology, as well as a few case studies. Since ULL's occur rarely, we developed a new ULL-recognition process to increase the number of samples available.
In our current studies first of all, we gathered 150 days when cold drops occurred in the past 15 years. 6 different meteorological parameters – 500 hPa height, 500 hPa temperature, temperature advection, 300 hPa wind speed, potential temperature of the 2 potential vorticity unit and isentropic potential vorticity of 315 K potential temperature level were investigated in our studied. Interactions of these variables were deeply investigated. In all cases of above mentioned ULLs. Predictability of the intensity and geographical position of the ULLs were made both in deterministic and ensemble models. For supporting operational activity in the Hungarian Meteorological Service a new ensemble plume containing 500 hPa temperature, potential temperature of 300 hPa, potential isentropic temperature at 315 K level and 300 hPa windspeed was developed.