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## Supercell interactions with surface baroclinic zones in the Carpathian Basin

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Several previous studies have shown that near-surface thermal or outflow boundaries might have a significant impact on supercell development – especially low-level mesocyclone intensification. Supercells that cross surface boundaries at an acute angle usually produce rapid and intense tornadoes on the cool side, even local tornado outbreaks, and in some cases, large hail and damaging wind gusts can occur as well. Similar interactions can be present in the Carpathian Basin as well, however, the investigation of these processes in this region is more difficult due to the complex terrain. This complexity can lead to processes on a much more localized scale. Based on observations, these local thermal baroclinic zones are typically associated with shallow surface lows over Hungary. The surface confluent flow and the equivalent potential temperature gradient zone created by preceding precipitation bears substantial horizontal vorticity near the ground that might be favorable for the low-level intensification of mesocyclones in supercells.

In this research, we investigate these local baroclinic zones and their influence on supercell intensification using non-hydrostatic WRF (Weather Research and Forecasting) real and idealized simulations. We inspect how the presence of the surface baroclinic zone affected the dynamics of the simulated thunderstorm. The gained results may add significant contributions to our understanding of these processes, and support the early recognition of their patterns in the operational routine.