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## Sensitivity of the WRF – HAILCAST model to microphysics and PBL parameterization schemes

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Hail is a significant convective storm hazard in Croatia, often causing property and crop damage. The existing analysis, based on hailpad network data, shows that western and central regions of Croatia have a significant frequency of high-intensity hail events.

Advances in computational power and recent developments in atmospheric modeling have enabled the use of convection-permitting models (CPM) that can partially resolve deep convective events such as thunderstorms and rain showers. However, hail remains a difficult phenomenon to model or forecast since CPMs are still not able to fully resolve processes involved in producing hail. One way to address this issue is by embedding a physically-based one-dimensional hail model called HAILCAST within a CPM. Here, the HAILCAST model is embedded within the Weather Research and Forecasting (WRF) model.

The selected hail event is analyzed using WRF-HAILCAST model simulations. HAILCAST forecasts the maximum expected hail diameter using a profile of the vertical updraft, temperature, liquid and ice water content from a given WRF timestep and grid columns. Here, a set of numerical convection-permitting experiments are performed to assess the sensitivity of the results to different microphysics and planetary boundary layer (PBL) parameterization schemes and to provide guidance for WRF-HAILCAST tuning. The results are verified by observational (hailpad, hail observations) data as well as with radar, lightning and satellite measurements where available.