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Aerosol impact on atmospheric meso-scale circulation over the Baltic region: A HARMONIE model case study and verification versus radar data

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An important goal in operational weather forecasting is an accurate prediction of precipitation on meso-scales. This demands, among the others, detailed representation of aerosol impact on the troposphere. Various direct, semi-direct and indirect effects of aerosols lead to significant changes in amount and distribution of precipitation, especially for weak patterns.

Features of the atmosphere sensitivity to aerosols is studied employing the HARMONIE (Hirlam Aladin Regional/Meso-scale Operational NWP In Europe) model. Numerical experiments are performed for the Baltic region during the BaltRad experiment (August 2010). The focus of the study is the life-time of convective cells along with feedbacks from aerosols toward meteorological parameters, physical and dynamical mechanisms responsible for developing of precipitation forecast features, direct and indirect aerosol effects. Numerical results are verified by comparing model microphysics fields versus radar reflectivity.