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Polar Stratospheric Clouds in ICON-ART

Michael Weimer (1), Oliver Kirner (1), Roland Ruhnke (2), and Peter Braesicke (2)

(1) Steinbuch Centre for Computing, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany, (2) Institute of Meteorology and Climate Research, Karlsruhe Institute of Technology, Eggenstein-Leopoldshafen, Germany

We present first results of the new scheme for Polar Stratospheric Clouds (PSCs) in the atmospheric chemistry model ICON-ART. ICON (ICOsahedral Nonhydrostatic modelling framework) is a joint development of the Max Planck Institute for Meteorology and the German Weather Service, where ICON is used operationally for numerical weather forecasts. It gives the possibility of local grid refinement with two-way interaction: variables computed on the refined grid feed back to the global grid within the same simulation.
The extension for Aerosols and Reactive Trace gases (ART) computes chemical reactions with the MECCA mechanism and emissions with a module described by Weimer et al., GMD (2017). The Cloud-J module is used to calculate photolysis rates. ICON-ART also includes a flexible tracer concept that allows the model to be applied to the variety of experiments in weather and climate in an easy way (Schröter et al., GMDD, 2018).
The PSC scheme in ICON-ART forms STS, NAT and ice PSCs according to thermodynamic equilibrium. The growth of NAT particles is integrated over defined size bins. Size distributions of NAT PSCs can be varied easily by taking advantage of the flexible tracer concept. We evaluate the PSC scheme and the chemistry on the PSC surfaces with satellite data for specific Arctic and Antarctic winters and show first results of the two-way interaction in the chemistry part of ICON-ART.