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# Chemistry and dynamics of the Arctic winter 2015/2016: Simulations with the Chemistry-Climate Model EMAC

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Model simulations of the Arctic winter 2015/2016 were performed with the atmospheric chemistry-climate model ECHAM5/MESSy Atmospheric Chemistry (EMAC) for the POLSTRACC (Polar Stratosphere in a Changing Climate) project. The POLSTRACC project is a HALO mission (High Altitude and LOng Range Research Aircraft) that aims to investigate the structure, composition and evolution of the Arctic Upper Troposphere Lower Stratosphere (UTLS) in a changing climate. Especially, the chemical and physical processes involved in Arctic stratospheric ozone depletion, transport and mixing processes in the UTLS at high latitudes, polar stratospheric clouds as well as cirrus clouds are investigated. The model simulations were performed with a resolution of T42L90, corresponding to a quadratic Gaussian grid of approximately $2.8^\circ \times 2.8^\circ$ degrees in latitude and longitude, and 90 vertical layers from the surface up to 0.01 hPa (approx. 80 km). A Newtonian relaxation technique of the prognostic variables temperature, vorticity, divergence and surface pressure towards ECMWF data was applied above the boundary layer and below 10 hPa, in order to nudge the model dynamics towards the observed meteorology. During the Arctic winter 2015/2016 a stable vortex formed in early December, with a cold pool where temperatures reached below the Nitric Acid Trihydrate (NAT) existence temperature of 195 K, thus allowing Polar Stratospheric Clouds (PSCs) to form. The early winter has been exceptionally cold and satellite observations indicate that sedimenting PSC particles have lead to denitrification as well as dehydration of stratospheric layers. In this presentation an overview of the chemistry and dynamics of the Arctic winter 2015/2016 as simulated with EMAC will be given and comparisons to satellite observations such as e.g. Aura/MLS and Odin/SMR will be shown.