NOY PARTITIONING AND BUDGET IN THE ARCTIC WINTER 2001: MIPAS-B OBSERVATIONS AND KASIMA SIMULATIONS

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The abundance of reactive nitrogen species and its partitioning plays an important role in the understanding of stratospheric ozone chemistry. On January 11, 2001, a flight of the MIPAS-B (Michelson Interferometer for Passive Atmospheric Sounding, Balloon-borne version) instrument was performed well inside the Arctic vortex. Two sequences of nocturnal limb emission spectra, measured near 65°N and 70°N, were analysed with respect to the partitioning and budget of nitrogen species (NOy = NO2 + HNO3 + ClONO2 + 2 N2O5 + HO2NO2) together with its source gas N2O. While for the southern limb scan no prominent features of polar stratospheric clouds (PSCs) could be recognised in the spectra, the northern data show spectral signatures due to the occurrence of PSCs inside the deep and cold polar vortex. These clouds influence, e.g., the partitioning within the NOy family because HNO3 is sequestered into the PSC particles. This is obvious when comparing the retrieved HNO3 volume mixing ratios measured at the two different locations inside the polar vortex. Very low ClONO2 values between 19 and 24 km (northern profile) denote extensive chlorine activation. Limited chlorine activation around 20 km is also visible in the southern ClONO2 profile. The measured data are compared to calculations carried out with the 3-D chemistry transport model KASIMA (Karlsruhe Simulation Model of the middle Atmosphere).