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Observation of ozone depletion and related minor species from the ILAS-II onboard the ADEOS-II satellite

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The Improved Limb Atmospheric Spectrometer-II (ILAS-II) onboard the Advanced Earth Observing Satellite-II (ADEOS-II) was successfully launched on 14 December, 2002 from Japan Aerospace Exploration Agency (JAXA)'s Tanegashima Space Center. ILAS-II is a solar-occultation atmospheric sensor which measures vertical profiles of O_3, HNO_3, NO_2, N_2O, CH_4, H_2O, $ClONO_2$, aerosol extinction coefficients etc. with four grating spectrometers. After the initial checkout period, ILAS-II successfully made routine measurements for about 7 months from 2 April 2003 to 24 October 2003, when the ADEOS-II stopped its operation due to an unknown problem. In the winter of 2003 in Antarctic, lower stratospheric temperature was the coldest since 1980s when Antarctic ozone hole started to appear. Subsequently, large amount of polar stratospheric clouds are observed by ILAS-II. We estimated the chemical ozone loss by using the correlation with N_2O, which is considered as dynamical tracer. As a result, it was revealed that the ozone loss rate in the 2003 Antarctic winter was one of the highest in history. Measurements of nitrogen species such as HNO_3, NO_2, and $ClONO_2$ showed that there were substantial removal of nitrogen oxides during the winter, which are regarded as the 'denitrification'. Change of partitioning among these nitrogen species and its effect on ozone change is also presented at the meeting.

Keywords: ILAS-II; ADEOS-II; satellite; remote-sensing; ozone hole; stratosphere; solar-occultation.

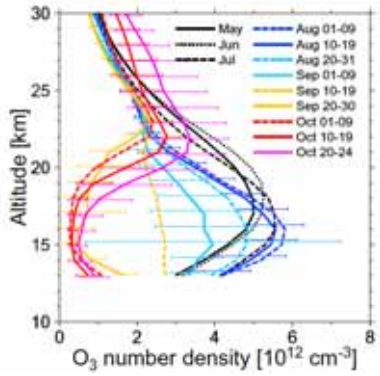

Figure 1. Change of mean vertical profiles of ozone in the Antarctica measured by ILAS-II.