AOGS 2005

The upper stratosphere and mesosphere ozone variability: ground-based millimeter wave observation and modeling as a test bed for the MAOAM chemistry-transport module

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Ground-based 142 GHz observations of upper stratospheric and mesosphere ozone performed over several years from MPS (51.660 N, 10.130 E) show some pronounced features. Some of them appear almost regularly and are mainly related for instance to annual changes in the atmospheric flow patterns and the solar insolation, others appear only under certain boundary conditions related to the background water vapor and temperature. Recent progress in numerical mathematics and computer power helps to provide an improved quantitative description and interpretation of the observed phenomena. Since there are several similarities between the dynamics and chemistry in the atmospheres of Mars and the Earth middle and upper atmosphere, we believe that an improved, data-based understanding of our Earth general circulation model will directly translate into a better description of the Martian atmosphere by our advanced three dimensional model of the dynamics and chemistry of the Martian atmosphere (MAOAM). In this paper we will present some recent progress in modeling the ozone features mentioned above and first results derived by the MAOAM chemistry-transport module.

Keywords: millimeter wave observations; general circulation model; ozone; water vapor; Mars; atmospheric chemistry; middle atmosphere;