



Indirect methods of retrieval of important mesospheric gas constituents from available measurements data

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Observation of minor gas constituents is traditionally considered as one of the fundamental problems in investigations of the Earth's mesosphere and mesopause region. Since direct and regular measurements are still rather scanty, indirect methods are a useful tool. Based on a priori assumptions about possible relationships between measured and retrieved characteristics (for example, photochemical models), they allow one to obtain additional information about the important constituents from available experimental data.

In this presentation we discuss, firstly, the restrictions on the use of the ozone steady state equilibrium condition for the retrieval of atomic oxygen and hydrogen concentrations from O_2 and OH airglow emissions ratios and O_3 concentration measurements. Secondly, we present a statistical Bayesian procedure of retrieving the concentrations of important constituents in mesosphere from available satellite and ground based experimental data. The technique is based on the application of the so-called basic dynamic model of mesospheric photochemistry, which is simplified mathematically correctly in a special manner and describes the most significant reactions between components of the families of odd hydrogen and oxygen.

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