

Values of the ozone entrainment flux for simple box photochemical model

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The flux of tropospheric ozone has been determined on boundaries of the troposphere. It is estimated on the tropopause where the transition of air takes place from the stratosphere, and it is measured on the ground. The flux is unknown along the main heights of the troposphere. The ozone flux determines the effect of ozone exchange between the tropospheric reservoirs, in particularly between the free troposphere and mixing layer. That flux is formed from two components: the flux flowing from the stratosphere, and the flux generating in local photochemical reactions. The average ozone entrainment flux between the free troposphere and boundary layer has been determined using a simple box model of photochemical transformations of trace components of air by means of working hypothesis about equality of average surface ozone concentrations at 0 and 24 hours. The model used is a mixed layer box model with exchange at the upper boundary, representing fluxes to and from the free troposphere. The working hypothesis gives the additional condition for finding of the flux and is confirmed with high precision by observations. Results of numerical modeling have been compared with experimental data processing at different seasons in middle latitudes. It is shown that the entrainment flux of ozone in middle latitudes is near equal to the ozone flux from the stratosphere. This result confirms appropriateness of using simple box model for this aim. Calculations of the ozone entrainment flux in the high-latitude troposphere have shown that the flux is several times more than the flux in middle latitudes in spring, summer and autumn.