

Ionization caused by proton activity of the sun during 23d solar maximum and its response in ozonosphere at high latitudes

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The observations of solar proton fluxes in different canals from the boards of "Meteor", GOES-8 and GOES-10 satellites has been used to investigate proton activity of the sun during current solar maximum. The maximum of intensity occurred in 2001. At the same rather strong solar proton even was found also in July 2000. So, really two peaks in the activity of the sun were observed: in 1998 and in 2001 with a minima in 1999. 1-D photochemical model was used to calculate the response of ozone and other minor species after several (strongest for each year) solar proton events. It was assumed in calculations that each pair of ions produce approximately one molecular of NO and two molecular of OH. The ionization rates induced by solar proton fluxes in the atmosphere has been calculated for mentioned solar proton events. Then the differences in minor chemical compounds (first of all ozone) in the middle atmosphere. It was shown that calculated ozone depletion is very strong in the mesosphere after SPEs in July 2000 and November 2001 (ozone was practically destroyed in this region). The analysis of ozone profiles measured by HALOE instrument placed on board of UARS revealed ozone depletion in the mesosphere and stratosphere similar to model simulations.