



The influence of the UV solar irradiance variability on ozone and climate during the first half of the 20th century

E. Rozanov (1,2), A. Fischer (2), S. Brönnimann (2), T. Egorova (1), W. Schmutz (1)
(1) PMOD/WRC, Davos, Switzerland; (2) IAC ETH, Zurich, Switzerland
(e.rozanov@pmodwrc.ch /Fax: +41 81 4175100)

During the first half of the 20th century the solar activity had been continuously increasing. It was suggested that the UV and total solar irradiance had similar behavior. General Circulation models driven solely by the changes in the total solar irradiance underestimated the climate response in comparison with observations. To estimate the influence of the UV solar irradiance variability on the global climate and ozone evolution during the first half of the 20th century we have carried out transient ensemble run with the Chemistry-Climate Model SOCOL covering 1900-1960 driven by the time evolving solar spectral irradiance, sea surface temperature, sea ice, land use, sulfate aerosol loading, greenhouse gases and ozone destroying substances. In the paper we present the solar signal in the atmosphere extracted from these transient runs using multiple regression analysis technique. We also define the contribution of the imposed solar irradiance changes to the time evolution of the simulated quantities and estimate their sensitivity to the long-term and decadal scale solar irradiance variability. The model results are compared with the solar signal obtained from the transient simulation covering 1975-2004 and with the solar signal in the land surface temperature extracted from the observational records.