11-year solar cycle: Mechanisms and Modelling in the Stratosphere and Troposphere

A short overview will be provided of a recent review paper on Solar Influences on Climate (Gray et al. 2010, Rev. Geophys. , in press). A summary will be given of current understanding of mechanisms for solar influence via UV changes in the stratosphere that influence temperatures, ozone and planetary wave propagation through small perturbations to the zonal winds in the upper stratosphere. Comparisons of various temperature dataset analyses will be made, including a regression analysis of ERA-40 data and SSU satellite data and an interpretation of the differences between them. A summary of mechanisms for propagation of the stratospheric signal down into the lower stratosphere and the troposphere will be given, including discussion of both polar and equatorial routes and the interaction of the solar cycle signal and the quasi biennial oscillation (QBO). A summary of how well current coupled chemistry models are able to capture the observed signals in temperature and ozone will be given. Finally, some initial model results that assess the impact of the changed spectral distributions measured by the SIM instrument will be discussed.