Session: C7 Poster: M05B

SPARC SOLARIS & HEPPA intercomparison activities: Coordinated model runs to investigate aliasing of different factors in the tropical lower stratosphere

Anne Kubin[†]; Katja Matthes; Kiyotaka Shibata; Ulrike Langematz; Kunihiko Kodera
[†] Freie Universitaet Berlin, Germany
Leading author: anne.kubin@met.fu-berlin.de

It is currently a matter of debate whether the observed double peak structure of the 11-year solar signal in tropical ozone and temperature is due to nonlinear interactions or aliasing between the 11-year solar cycle, the El Niño Southern Oscillation (ENSO) and/or the Quasi-Biennial Oscillation (QBO). We present results from coordinated model simulations within the SPARC-SOLARIS initiative from three interactive CCMs: EMAC-FUB, WACCM and the MRI model. The models participated in the SPARC-CCMVal initiative and performed the so-called REF-B1 simulations of the recent past from 1960 to 2005. They used spectrally resolved solar irradiance data and observed sea surface temperatures as boundary conditions as well as prescribed observed greenhouse gases and ozone depleting substances. EMAC-FUB and WACCM prescribed an observed QBO whereas the MRI model generates a self-consistent QBO. In order to eliminate possible aliasing of the different factors, the SST and QBO time series have been filtered such that the SST time series retains periods from 0 to 2 years and from 3 to 7 years, and the observed QBO time series periods between 9 and 48 months. Thus, decadal oscillations as well as possible mutual influences between the QBO and the SSTs are excluded. The CCMVal REF-B1 simulations were repeated with these filtered forcings. The results from the filtered and unfiltered REF-B1 simulations are analysed by means of a state-of-the-art multiple linear regression model and a correlation analysis. Special emphasis is laid on the response of ozone volume mixing ratio and related radiative heating and temperature to the 11-year solar cycle and implied circulation changes to discover possible aliasing effects in the three CCMs.