

Project Details

ROSES ID: NRA-03-OSS-01

Selection Year: 2004

Program Element: Independent Investigation: LWS

Project Title:

Investigating the Influence of the 11-Year Solar Cycle on Dynamics Using a High Vertical Resolution Zonally Averaged Photochemical-Dynamical Model of the Middle Atmosphere

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Summary:

This is a proposal to examine the influence of the 11-year cycle in solar ultraviolet irradiance on the dynamics of the middle atmosphere over the altitude region extending from the lower stratosphere to the mesopause. Recent results from a low-vertical resolution (~2.5km) version of the NRL CHEM2D model indicate the 11-year solar cycle can influence the quasi- biennial oscillation in stratospheric winds, but the effect is smaller than observations indicate. In addition, there are considerable uncertainties in the observed solar cycle effect on temperature near the mesopause. In both cases, current state-of-the-art interactive photochemical models may not have sufficient vertical resolution to adequately capture interactions between photochemical and dynamical processes that may help to explain the observed variations. The objective of this proposal is to perform detailed model simulations of the 11-year solar cycle with increased (0.5 km) vertical resolution to better represent the momentum deposition by breaking gravity waves that governs the dynamical variability of the middle atmosphere over seasonal and interannual time scales.

Publication References:

Summary: "

Reference: John McCormack / US Naval Research Laboratory - Investigating the Influence of the 11-Year Solar Cycle on Dynamics Using a High Vertical Resolution Zonally Averaged Photochemical-Dynamical Model of the Middle Atmosphere