Talk Title:

Stratospheric winds and waves and their role in long-range weather and climate prediction

Abstract:

Research in the last decade has uncovered important roles for stratospheric processes in climate and weather forecasting. To represent the relevant processes, global modeling centers have responded by raising their model lids and adding vertical levels in the stratosphere. Realistic representation of stratospheric processes in models has been shown to affect regional patterns of variability across a broad range of timescales ranging from intraseasonal to decadal. The seminar will summarize some of these developments and the mechanisms behind the stratosphere-troposphere dynamical coupling. A key element of the relevant stratospheric processes involves atmospheric waves and their interactions with the larger-scale general circulation. Common wind biases in global models influence these interactions, limiting predictability. In the upper troposphere and stratosphere, parameterization of gravity wave drag is a key process used to tune model winds to reduce biases. Our most recent observational and high-resolution modeling studies highlight some of the common errors in the representation of gravity waves and suggests some simple methods for improving the representation of gravity wave drag to reduce stratospheric wind biases and improve long-range weather forecasting and climate prediction modeling tools.