Date:	March 5 th
Time:	11:00 AM
Location:	Ames 234
Speaker:	Dr. Andrew Charlton Columbia University
Title:	"Does the Troposphere care about the Stratosphere?"

Abstract

In the past, because the mass of the stratosphere is only around of that of the troposphere, dynamical links between the troposphere and stratosphere have been considered to act in only one direction, with tropospherically generated planetary waves acting to change the stratospheric circulation. However, in recent years a number of studies have suggested that there may be a predictive link between the stratosphere and the troposphere in the opposite sense, that anomalies in the stratospheric flow might be 'harbingers' of long-lived tropospheric climate anomalies.

In this study the predictability of the tropospheric flow that can be gained from knowledge of the state of the stratosphere is examined in a number of ways. Firstly a simple statistical methodology is described in which the autocorrelation of the state of a mode of climate variability in the troposphere (Arctic Oscillation, AO) can be broken down into correlations which do and do not include a stratospheric link. A relationship between the AO in the lower stratosphere and on the 1000hPa surface on a 10-45 day time scale is revealed. The relationship accounts for 5% of the variance of the 1000hPa time series and is statistically significant. Secondly the sensitivity of tropospheric forecasts to stratospheric initial conditions is examined using a complex, operational numerical weather prediction model. Tropospheric forecast ensembles which have identical tropospheric initial conditions but different stratospheric initial conditions are compared. The initial conditions in the stratosphere are shown to have a statistically significant impact on the tropospheric flow of up to 100-200m in 1000hPa geopotential height.