Geophysical Research Abstracts, Vol. 7, 03143, 2005
SRef-ID: 1607-7962/gra/EGU05-A-03143

The Climate Response to an Increased Solar Constant: A GCM study

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Recent studies of reanalysis data have shown significant correlations between solar activity and the major observables of the atmosphere. We try to use an advanced GCM, with a well-resolved stratosphere, to reproduce the observed changes. Two experiments are made: The first with a typical solar constant of 1370 W/m^2 and the second with an increase of 1% to 1384 W/m^2. The size of the increase is chosen so that an effect can be seen in a reasonably short run of 30 model years. Solar induced changes to the atmosphere are studied by taking the difference between the temporal means of the two experiments. The observables studied are temperature, geo-potential height and winds. A study of the storm tracks and the sun's influence on their path in the model runs is compared to analysis results from the NCEP data. Results are evaluated using Monte Carlo techniques, based on a 30 year reference model run.