

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

P. Berg, P. Thejll, and B. Christiansen

Climate Division, Danish Meteorological Institute, Lyngbyvej 100,
DK-2100 Copenhagen Ø , Denmark (pbe@dmi.dk)

Poster

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. We use a fixed climatological ocean, so there are no internal variability on decadal scales. The experiments with an increased irradiance is done both with ozone levels typical of solar minimum and of solar maximum.

Preliminary results of an increased solar irradiance, with ozone in minimum levels, show a southward displacement of both polar jets during boreal winter. Results are evaluated using Monte Carlo techniques, based on a 30 year reference model run.