



Response in surface climate to longitude-dependent distribution of stratospheric ozone in an AOGCM

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The radiative forcing in the middle and upper atmosphere is controlled by ozone. In climate models the ozone forcing is often used in zonal means ignoring the observed zonal asymmetries. Here the influence of the observed wave one structure in stratospheric ozone on surface climate is investigated in a sensitivity study using a coupled stratosphere-troposphere-ocean model.

Two 80-years-long simulations with the coupled atmosphere-ocean general circulation model COSMOS under present day conditions are analyzed. The first simulation is forced with a zonally symmetric ozone climatology. The second simulation runs with longitude dependent ozone climatology from reanalysis superimposed.

Changes due to non-linear stratosphere-troposphere coupling indicate an intensification of the tropospheric Aleutian low but a weakening of the Iceland low, i.e. a shift of tropospheric circulation towards negative phase of North Atlantic Oscillation (NAO). In extension to the published results for January we present the response to zonally asymmetric ozone in surface variables, like snow cover, sea ice fraction, and ocean heat flux for other seasons and months.