



Rapid Adjustment across scales: From global to local.

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An important, yet uncertain, component of the climate's total response to an increase in CO₂ concentrations are rapid adjustments. Rapid adjustments to CO₂ forcings vary considerably amongst general circulation models due to the fact clouds, turbulence, their coupling, and the resulting dynamical response are not calculated reliably by general circulation models [Gregory and Webb, 2008 & Sherwood et al., 2015]. This motivates the use of a cloud resolving model, which resolves clouds and turbulence, to better understand rapid adjustments. Cloud resolving models, however, can only be run over a limited area and so one must select an area which has the same magnitude of variability found in rapid adjustments globally. In this work, we ask "Are rapid adjustment to CO₂ forcings over Central Europe in the ICON-GCM and ICON-LEM representative of global adjustment variability?"

Using the newly developed ICON (Icosahedral non-hydrostatic) general circulation model (GCM) and large-eddy model (LEM) developed by the Max-Planck Institute for Meteorology (MPI) and Deutsche Wetterdienst (DWD), a study of rapid adjustments is performed across scales.