



The effect on Arctic climate of atmospheric meridional energy-transport changes studied based on the CESM climate model

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The Arctic amplification of global warming and the pronounced Arctic sea-ice retreat constitute some of the most alarming signs of global climate change. These Arctic changes are likely a consequence of a combination of several processes, for instance enhanced uptake of solar radiation in the Arctic due to a lowering of the planetary albedo, and increase in the local Arctic greenhouse effect due to enhanced moisture flux from lower latitudes. Many of the proposed processes appear to be dependent on each other, for instance an increase in water-vapour advection to the Arctic enhances the greenhouse effect in the Arctic and the longwave radiation to the surface which melts the sea ice and causes an increase in absorption of solar radiation.

The effects of albedo changes have been investigated in earlier studies based on model experiments designed to examine these effects specifically. Here we instead focus on the effects of meridional transport changes into the Arctic, both of water vapour and dry-static energy. Hence we here present results of model experiments with the CESM climate model designed specifically to extract the effects of the changes of the two transport components.