



The influence of ozone forcing on blocking in the Southern Hemisphere

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We investigate the influence of ozone depletion and recovery on blocking in the Southern Hemisphere. Blocking events are identified using a persistent positive anomaly method applied to 500hPa geopotential height. Using the NIWA-UKCA chemistry-climate model, we compare reference runs including forcing due to greenhouse gases and ozone depleting substances to sensitivity simulations in which ozone depleting substances are fixed at their 1960 abundances and other sensitivity simulations with greenhouse gases fixed at their 1960 abundances. We find that during summer ozone depletion leads to an increased frequency of blocking in the South Atlantic while having little effect in the South Pacific. Blocking events in the South Atlantic are shown to follow positive anomalies in the stratospheric Southern Annular Mode (SAM) index; this is not the case for South Pacific blocking events. This difference would seem to explain the change in blocking frequency as during summer, in the model and in reality ozone depletion pushes the SAM towards its positive polarity. Similarly, ozone recovery, having the opposite influence on the SAM, leads to a reduction in blocking frequency in the South Atlantic, although this is somewhat counteracted by the effect of increasing greenhouse gases