



Variability of Antarctic circumpolar transport and the southern annular mode associated with the Madden-Julian oscillation

A. J. Matthews and M. P. Meredith

(1) University of East Anglia, (2) British Antarctic Survey

The variability of oceanic Antarctic circumpolar transport and the atmospheric Southern Annular Mode (SAM) on intraseasonal (30–70-day) time scales is shown to be related to the tropical atmospheric Madden-Julian oscillation (MJO) during southern winter. Approximately 7 days after anomalous MJO convection in the equatorial Indian Ocean peaks, an atmospheric extratropical response is set up with anomalous surface westerlies around almost the entire latitude circle at 60S. This pattern projects strongly onto the Southern Annular Mode and leads to an acceleration of the eastward circumpolar transport around Antarctica, as measured by tide gauges and bottom pressure recorders. This ocean response is confirmed by a global ocean model, which shows a maximum in the transport through Drake Passage 3 days after the atmospheric extratropical response.