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The Influence of Topographic Gradients on the Antarctic Circumpolar Current

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The Antarctic Circumpolar Current (ACC) has no meridional barriers allowing its unique, almost uninterrupted, zonal path. The lack of barriers mean that momentum sinks play an important role in setting the volume transport of the ACC. The westerly winds that occur over the Southern Ocean impart a zonal stress on the ocean surface that forces an eastward current, the ACC. This eastward momentum is balanced to leading order by form stress. Form stress arises from differences in pressure across topography. Using numerical, barotropic channel models we evaluate flow regimes that occur over various meridional ridge geometries. We endeavour to investigate the dynamical controls that topographic gradients have over zonal transport in the Southern Ocean by the mechanisms of form stress.