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Ocean storm tracks

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Energetic eddies on the scale of the internal Rossby deformation radius are prevalant in both the atmosphere and ocean, mainly formed through baroclinic instability. In the atmosphere the largest time-mean eddy variability is confined to zonally-extended mid-latitude regions called 'storm tracks'. Given that ocean eddies are similar to those in the atmosphere, might they be organised into storm tracks and behave in a similar dynamical way?

We compare atmospheric storm tracks and their oceanic analogues for the same period, 1992-2002, using ERA-40, altimetric and surface drifter datasets. Surface drifters provide information about the mean flow and we study the eddy-mean flow interaction in both systems within the vorticity budget.

We recover the usual observation that atmospheric storm track eddies act to accelerate the mean flow eastward along the core of the storm track, but bring new emphasis to the comparative role of advection of planetary vorticity.

In contrast to their atmospheric counterparts, ocean storm track eddies may act to accelerate, decelerate or steer the flow.

There are localised regions in the Southern Ocean where the eddies accelerate the flow eastward, but at Drake Passage they decelerate the flow and south of New Zealand they provide torques to steer the flow. In the northern basins, the eddies act predominantly to steer the flow off the shelf break.