Non linear displacement of a stretched vortex in a beta plane

Ludivine Oruba
with G. Lapeyre & G. Riviere

We use a two-layer quasigeostrophic model to study the effect of a large-scale deformation field on the displacement
of a cyclonic eddy. This displacement is primarily due to the nonlinear effect of the large-scale potential vorticity (PV) gradient (called β-drift).

It is shown that the deformation reinforces the anticyclonic eddy created by the Rossby wave radiation due
to the PV gradient. Its interaction with the cyclonic eddy leads to an acceleration of the latter.
This mechanism accounts for the crossing of the high-level atmospheric jet-stream from its equatorial
to its poleward side by mid-latitude storms.