

Reconstructing meso- and submesoscale dynamics in ocean eddies from current observations

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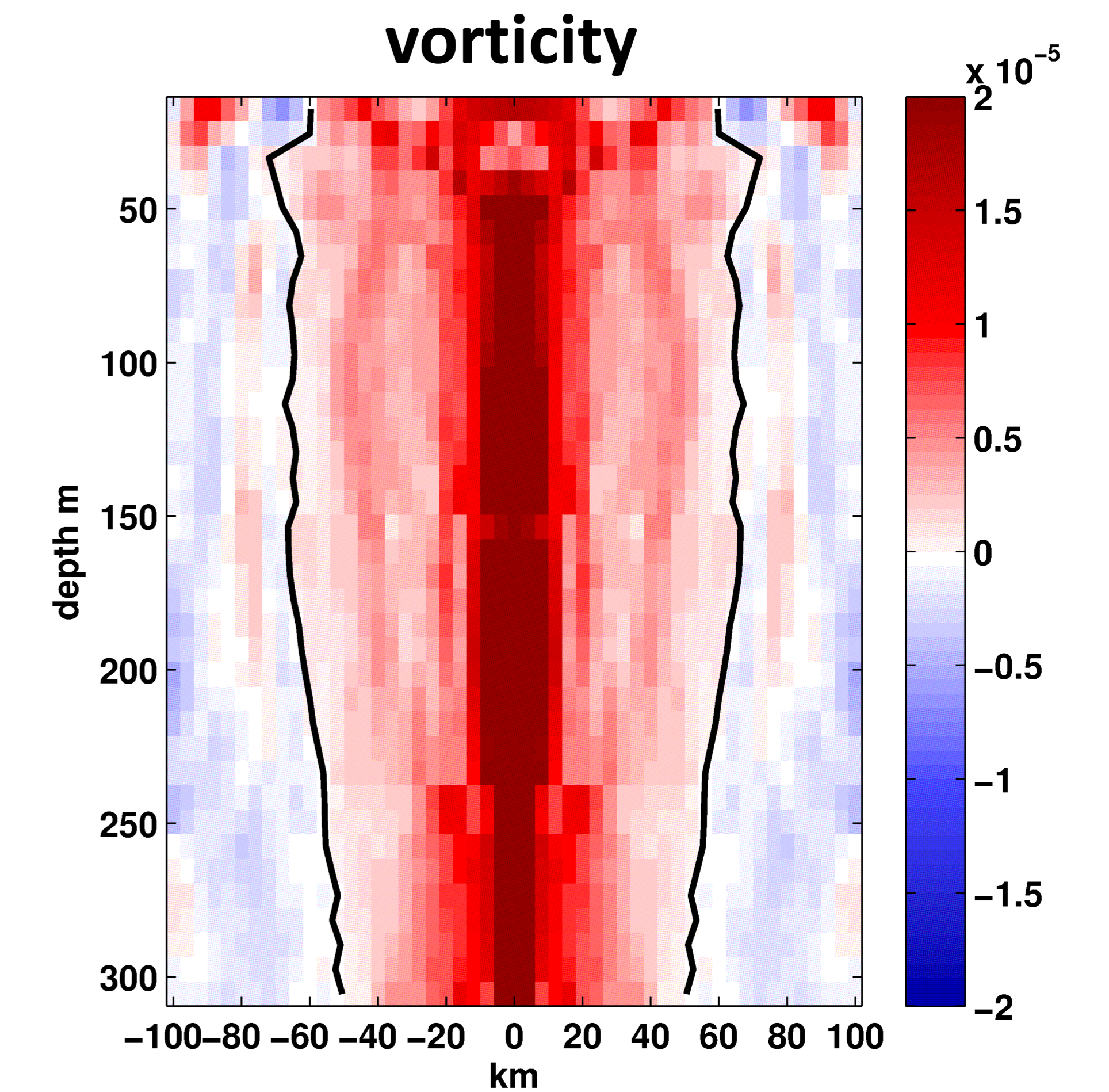
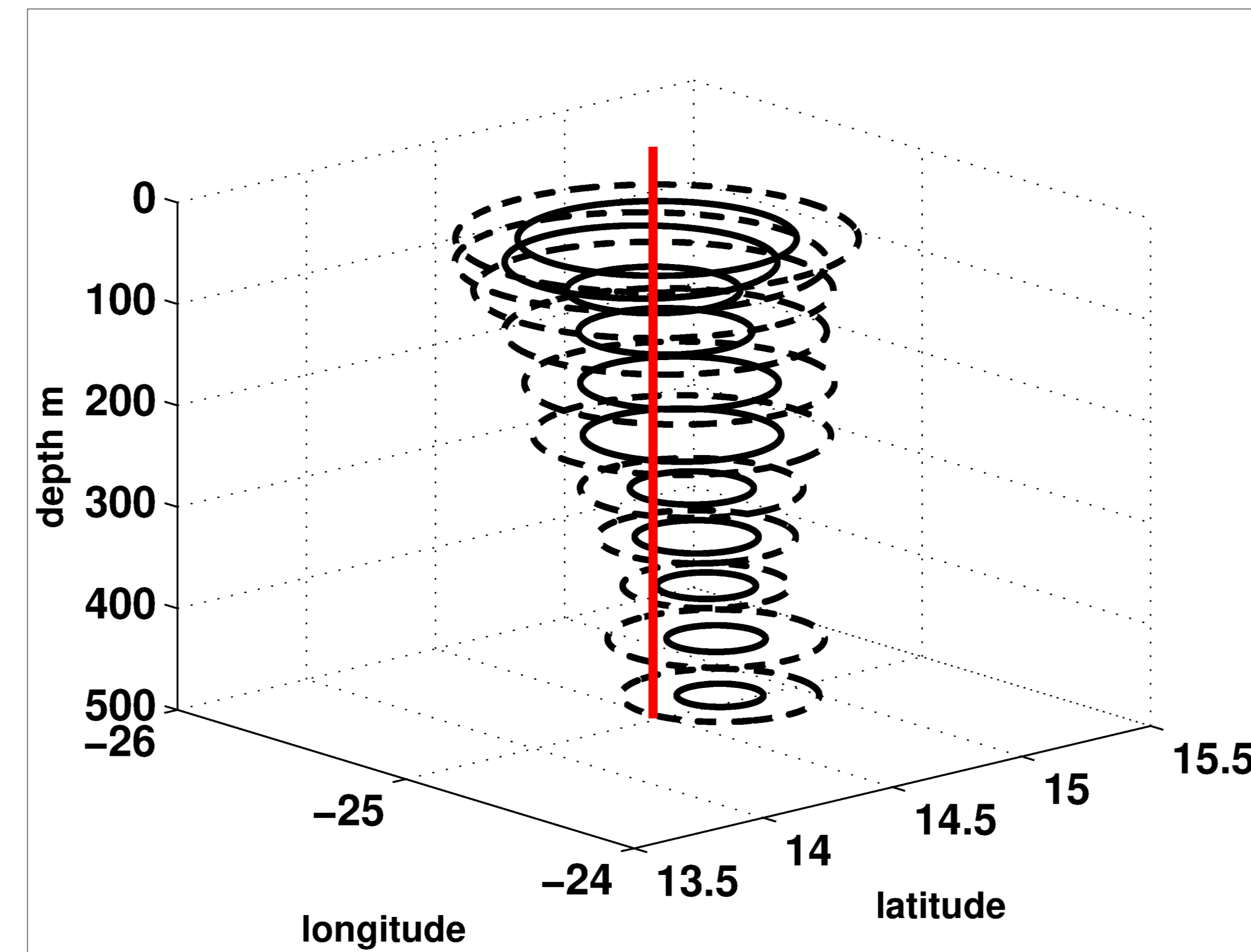
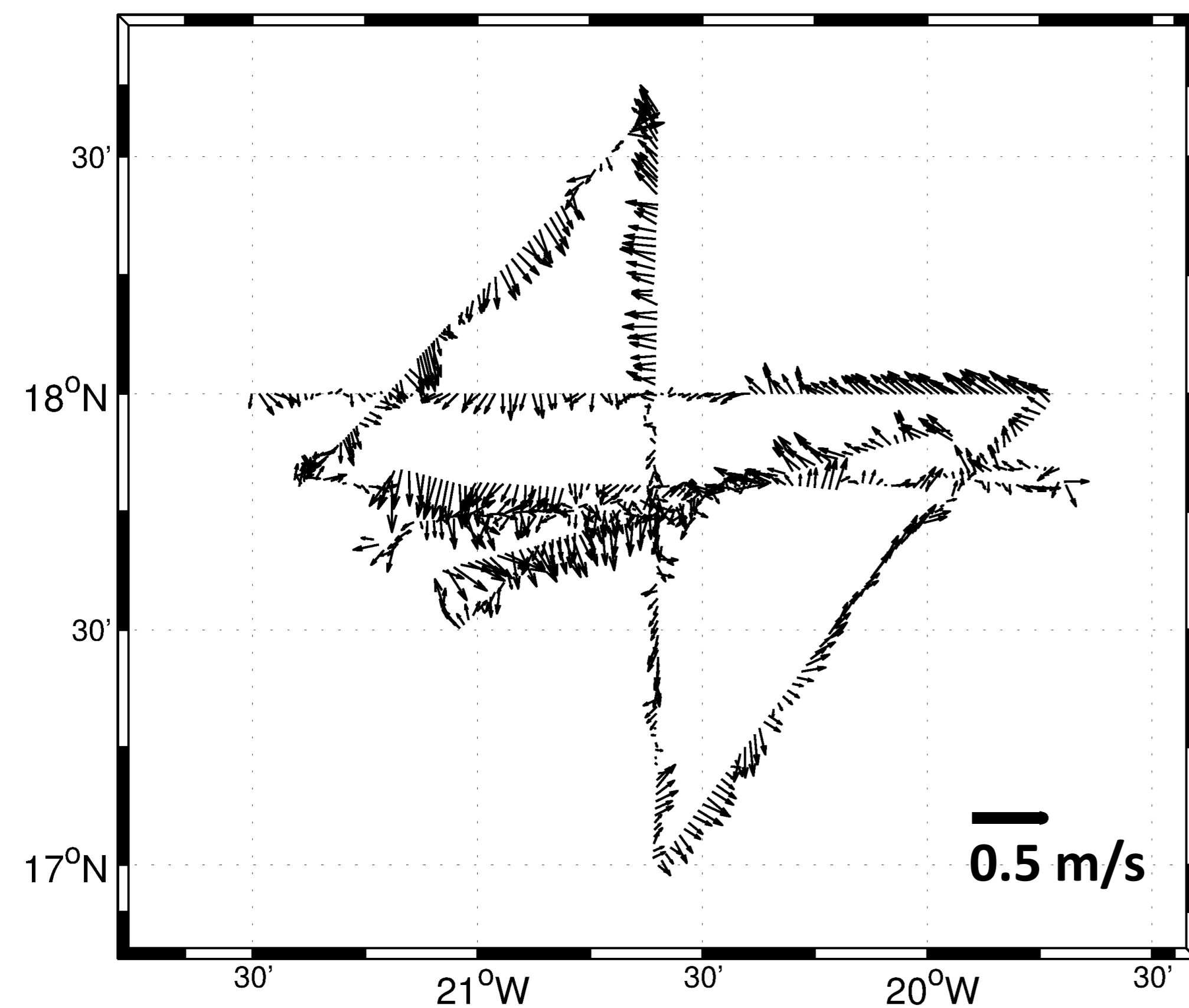
From observed currents

to

eddy localization

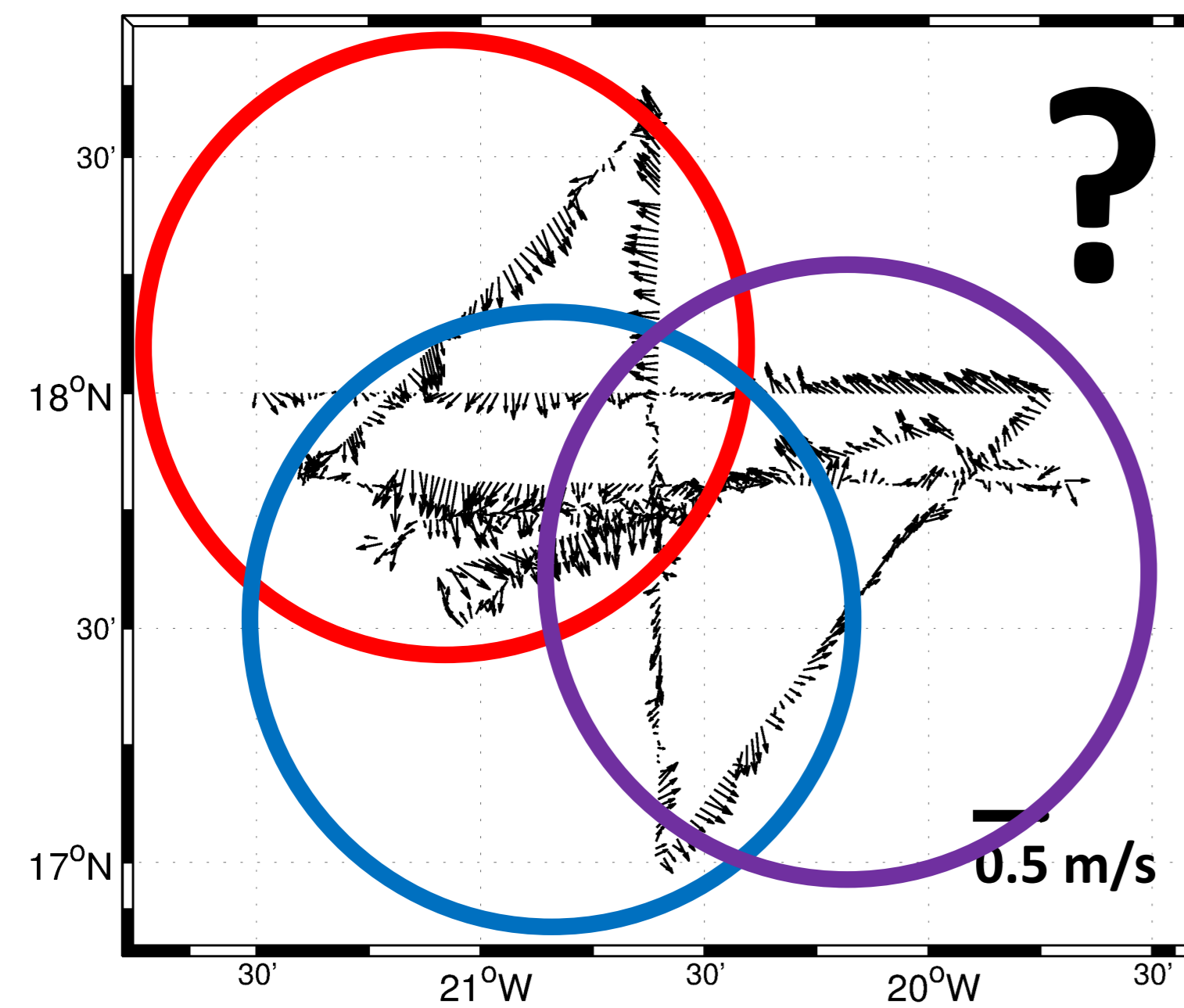
to

3-D-dynamics

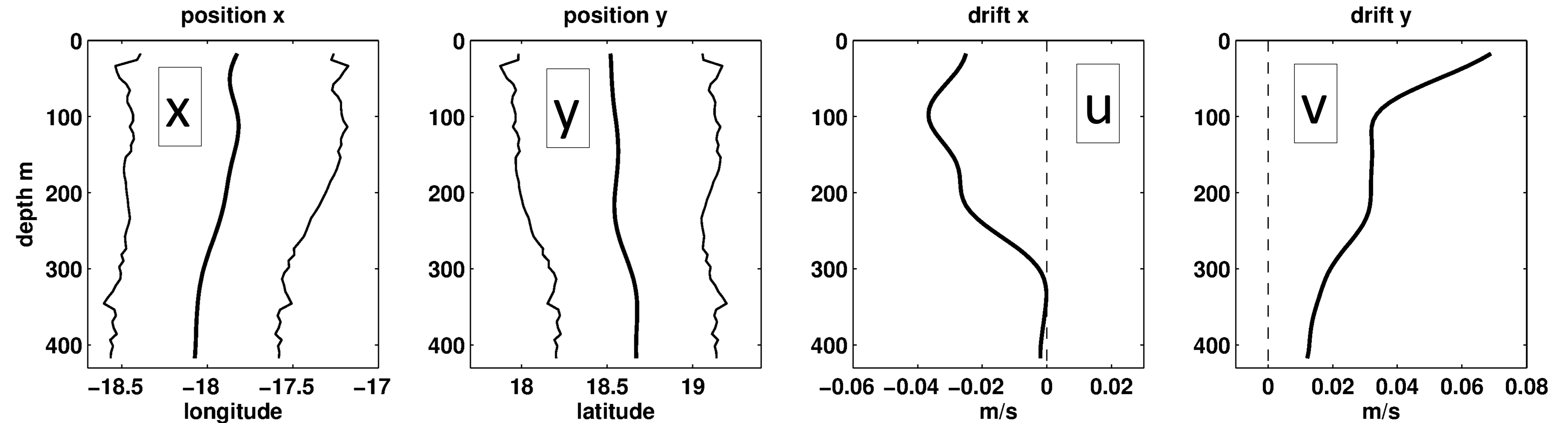


Method: assume eddies as a circular symmetric structure of mesoscale size

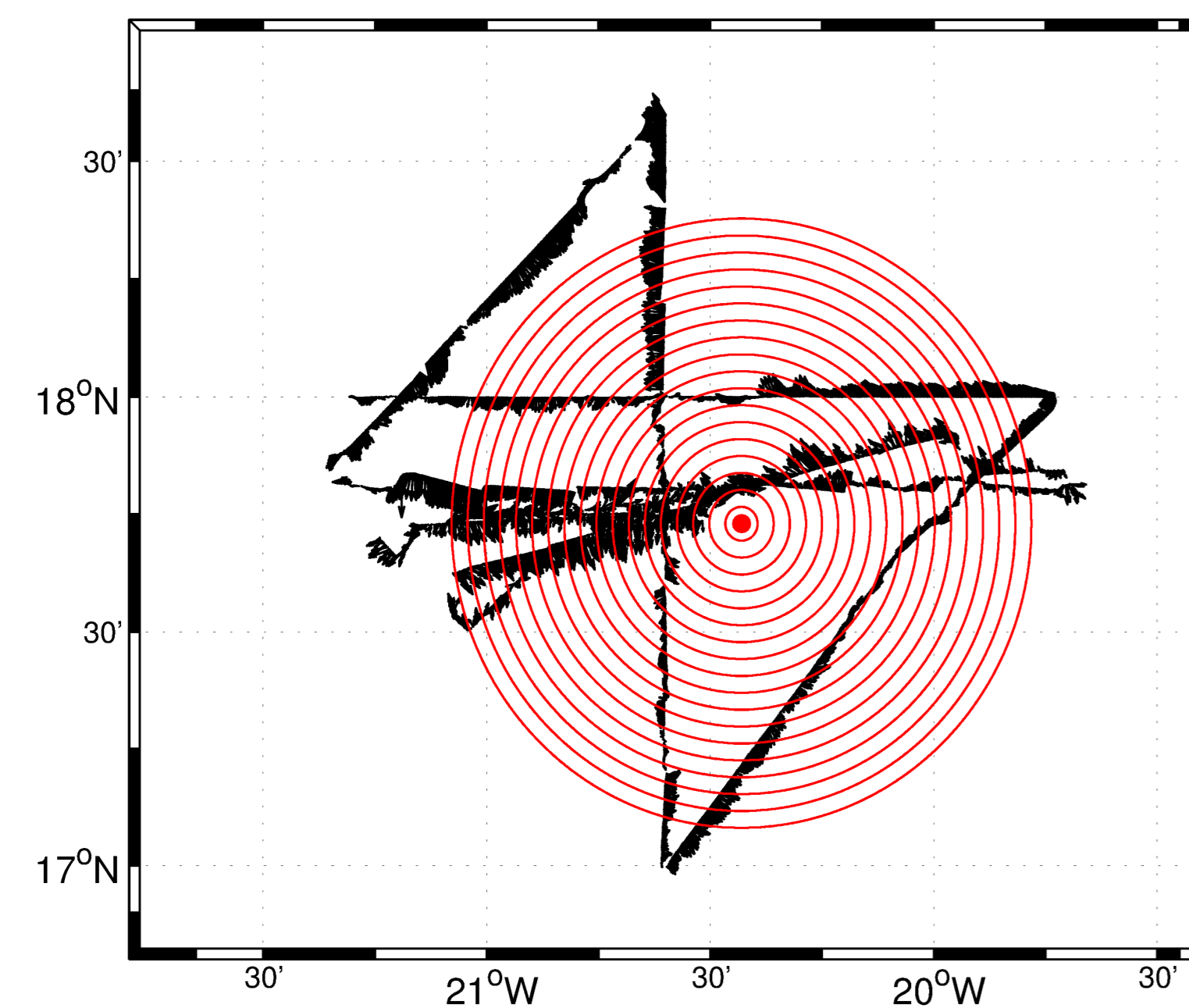
1 Optimum fit for each layer



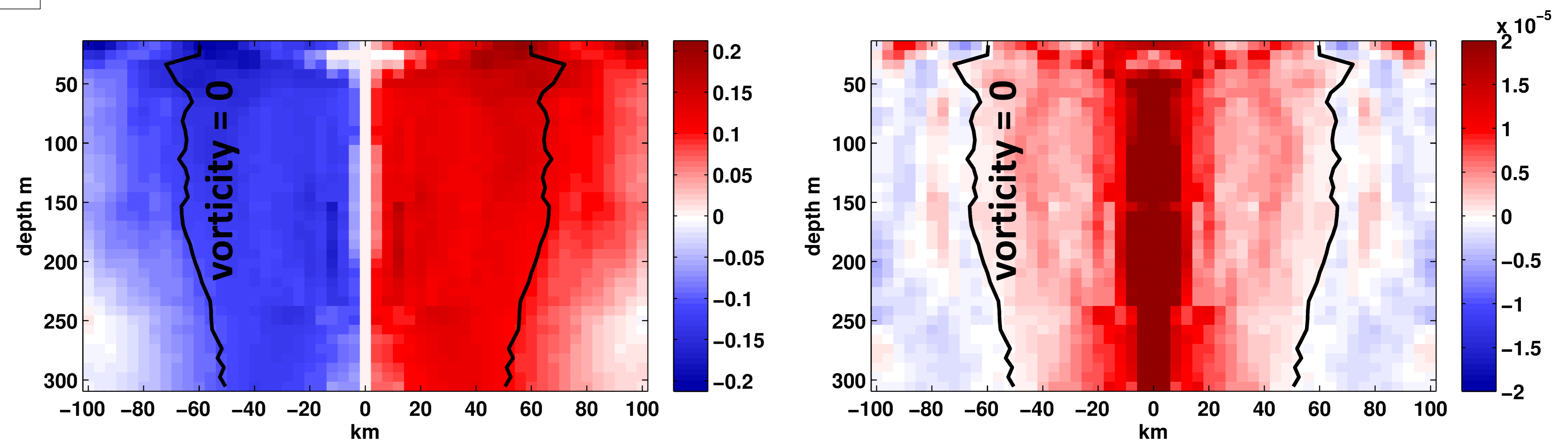
2 Localization in 4 dimensions



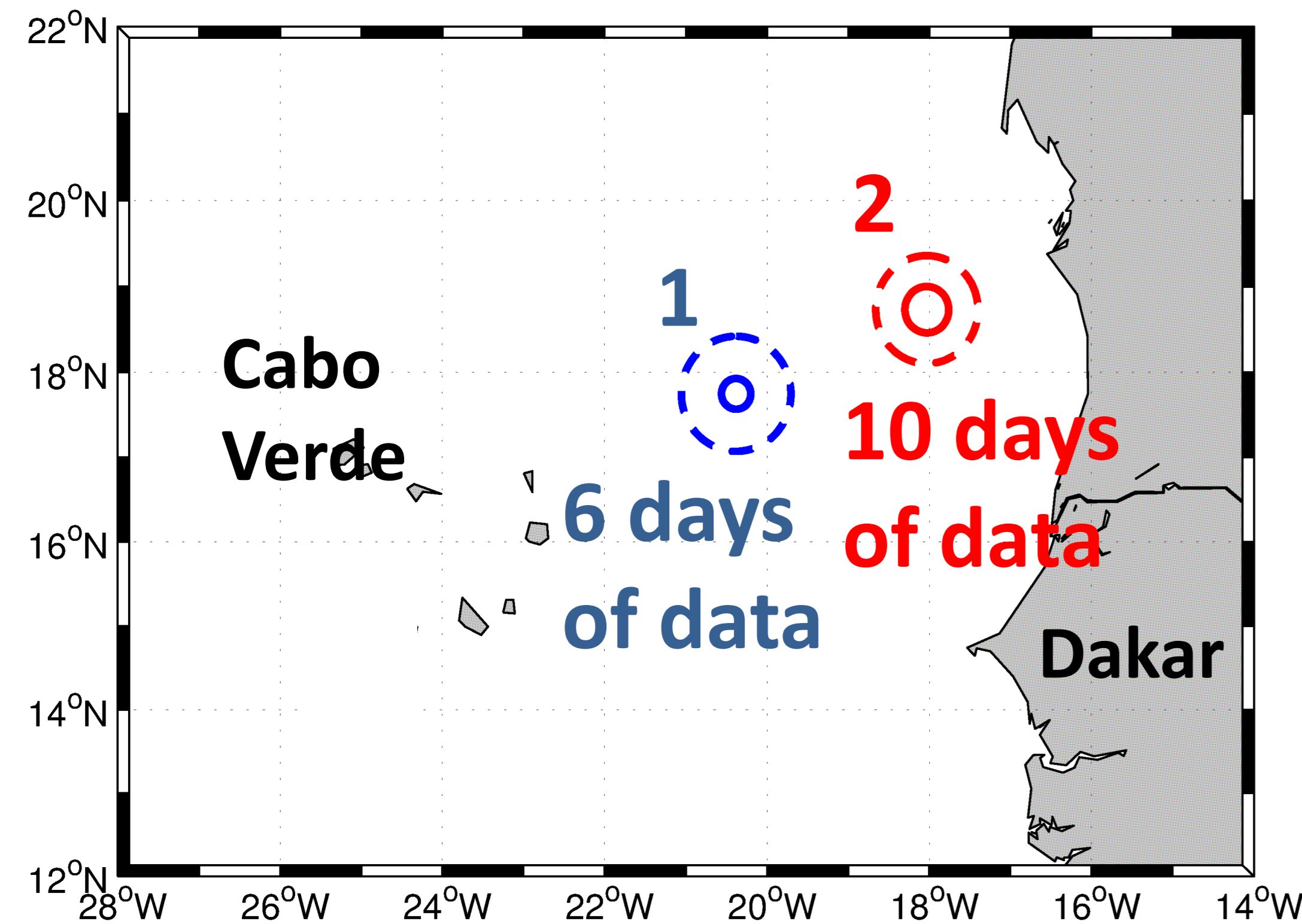
3 Velocity components are collected and averaged along circles



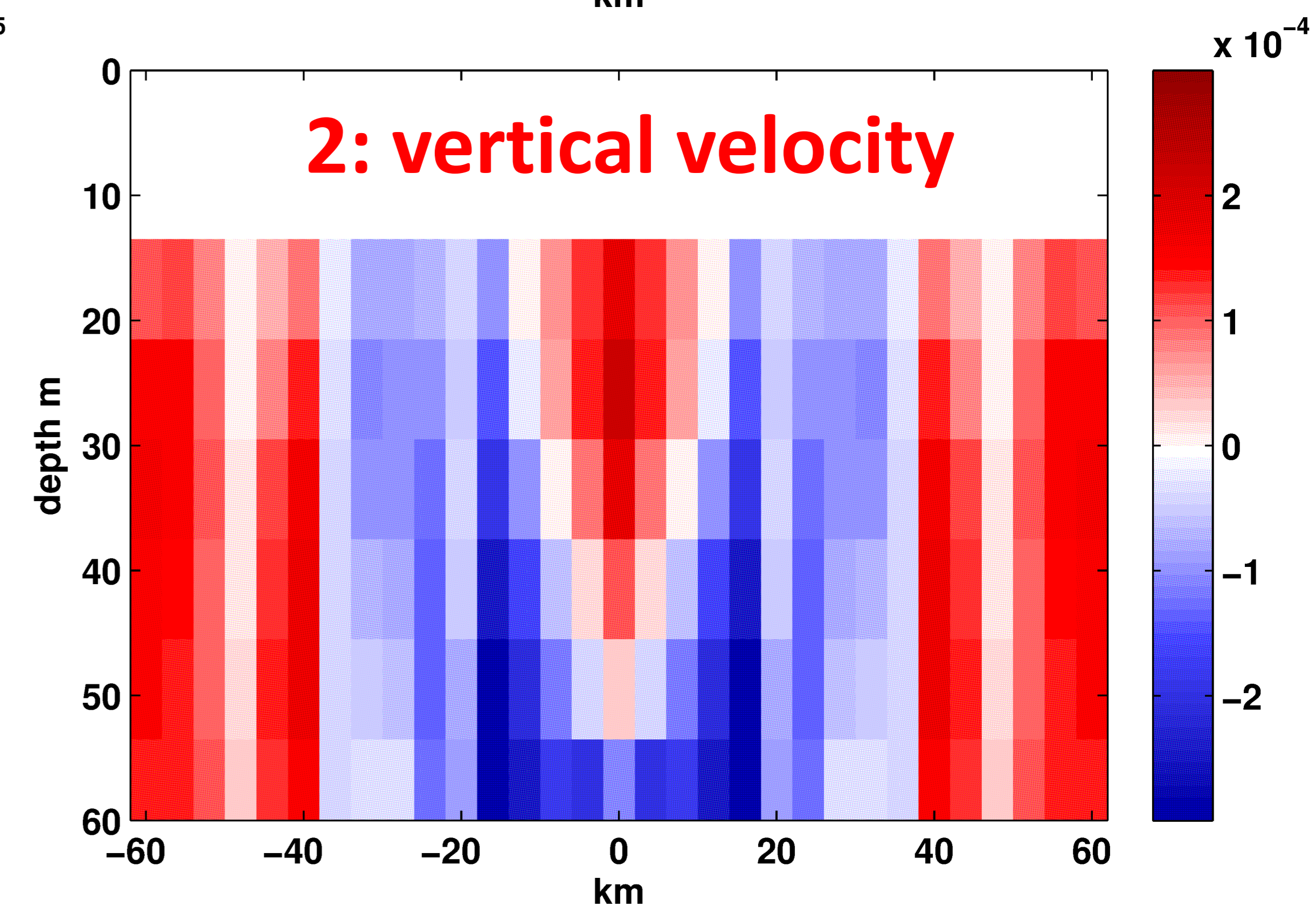
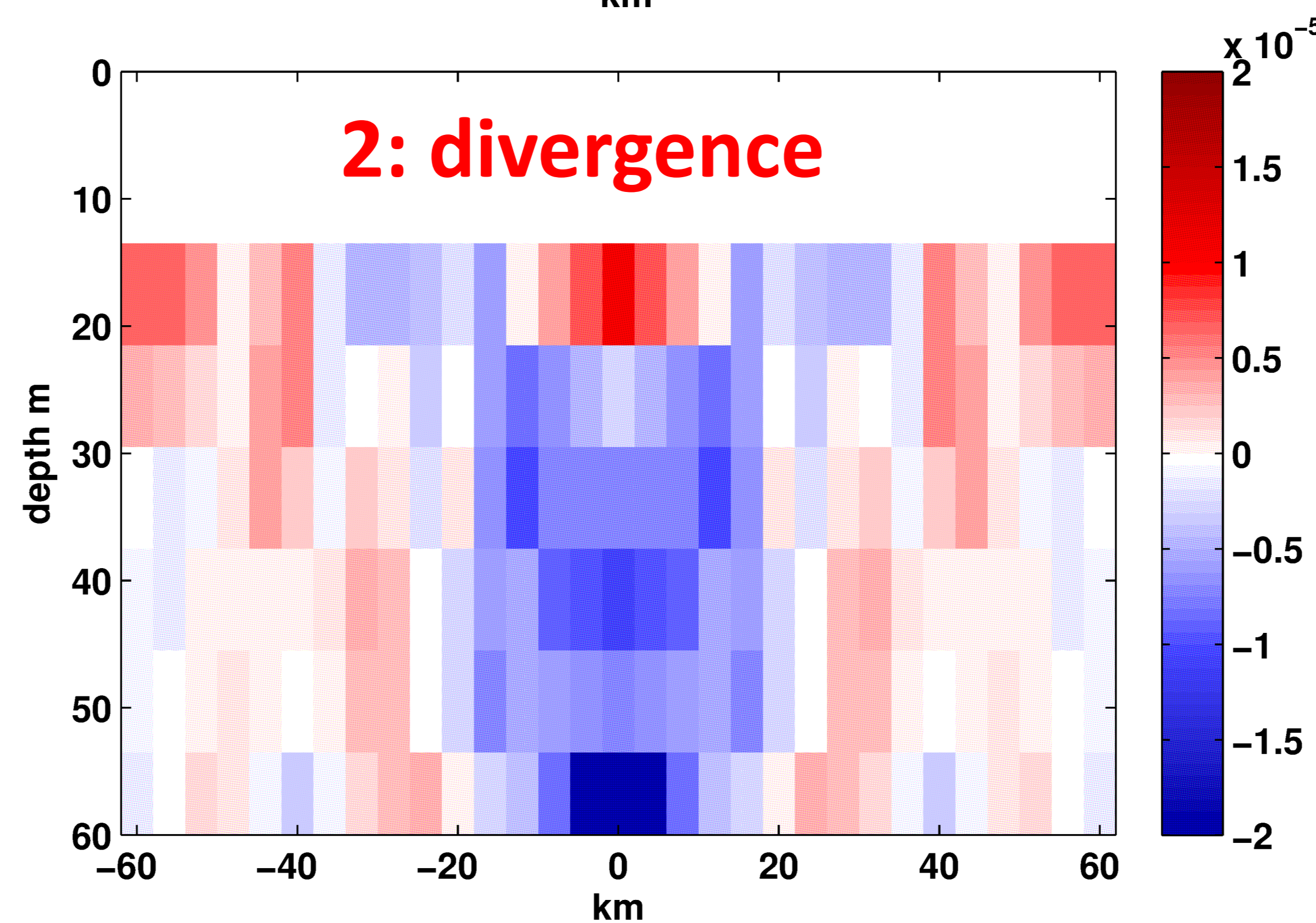
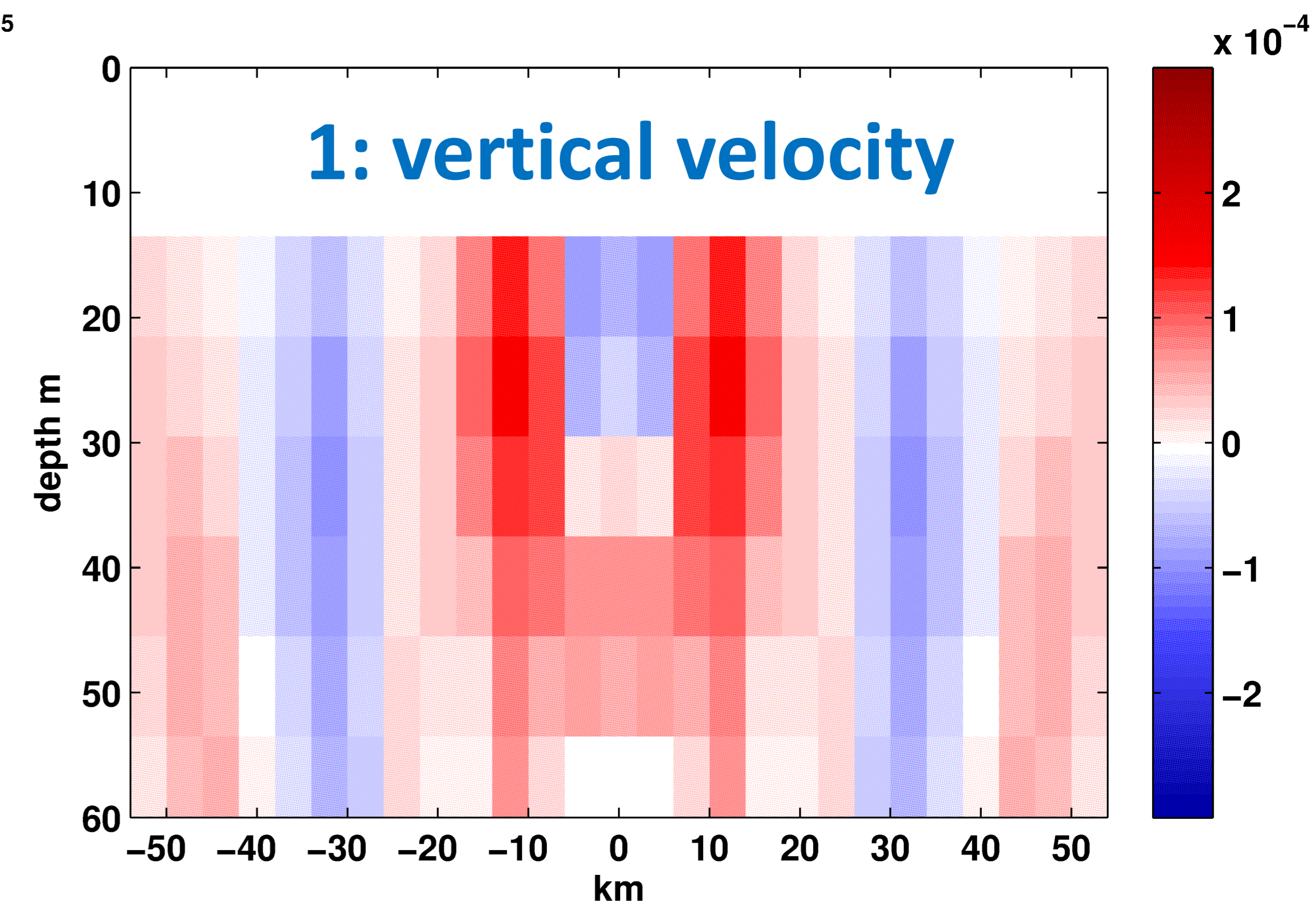
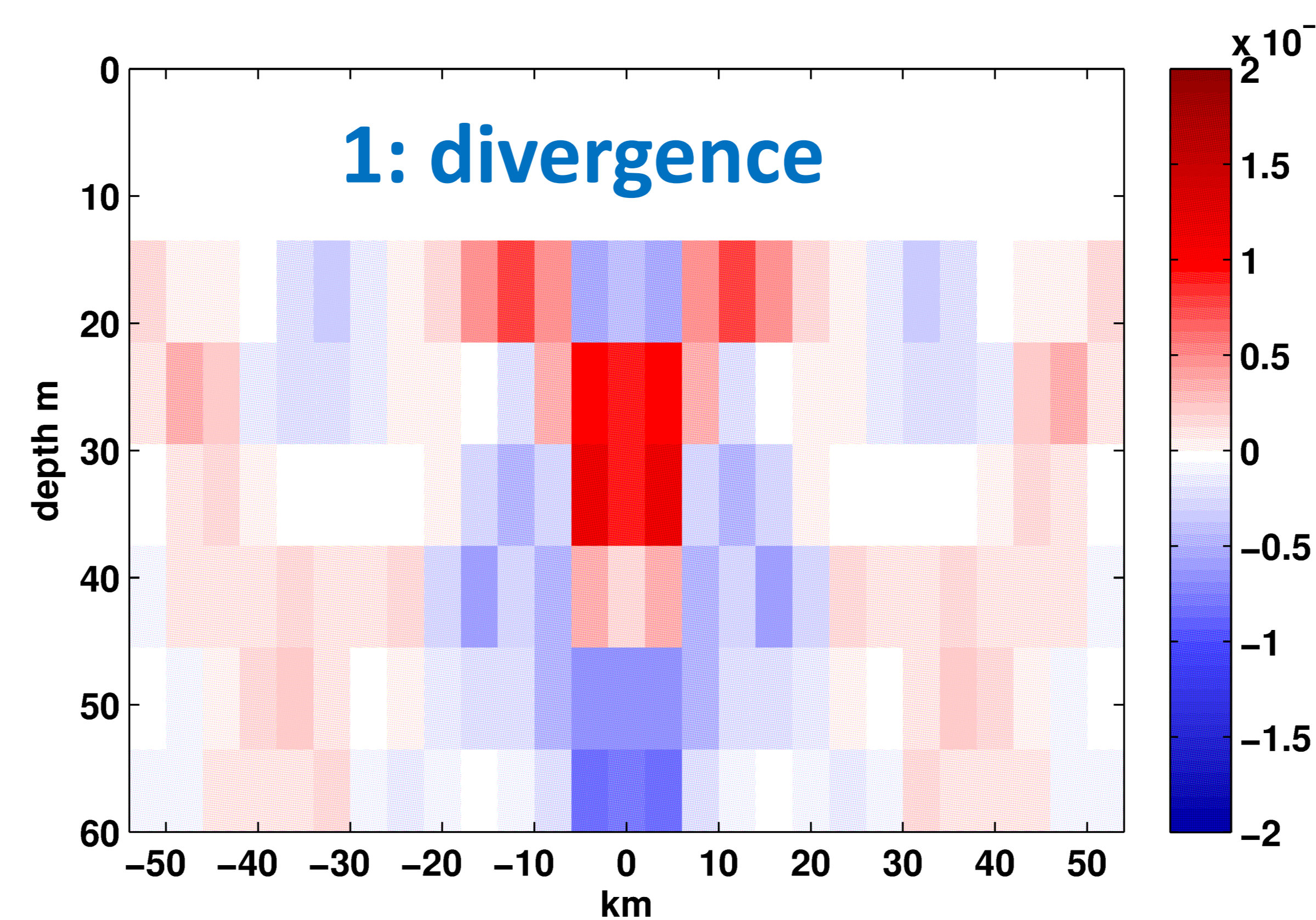
4 Velocity structure, vorticity, divergence can be derived on 10km-scale



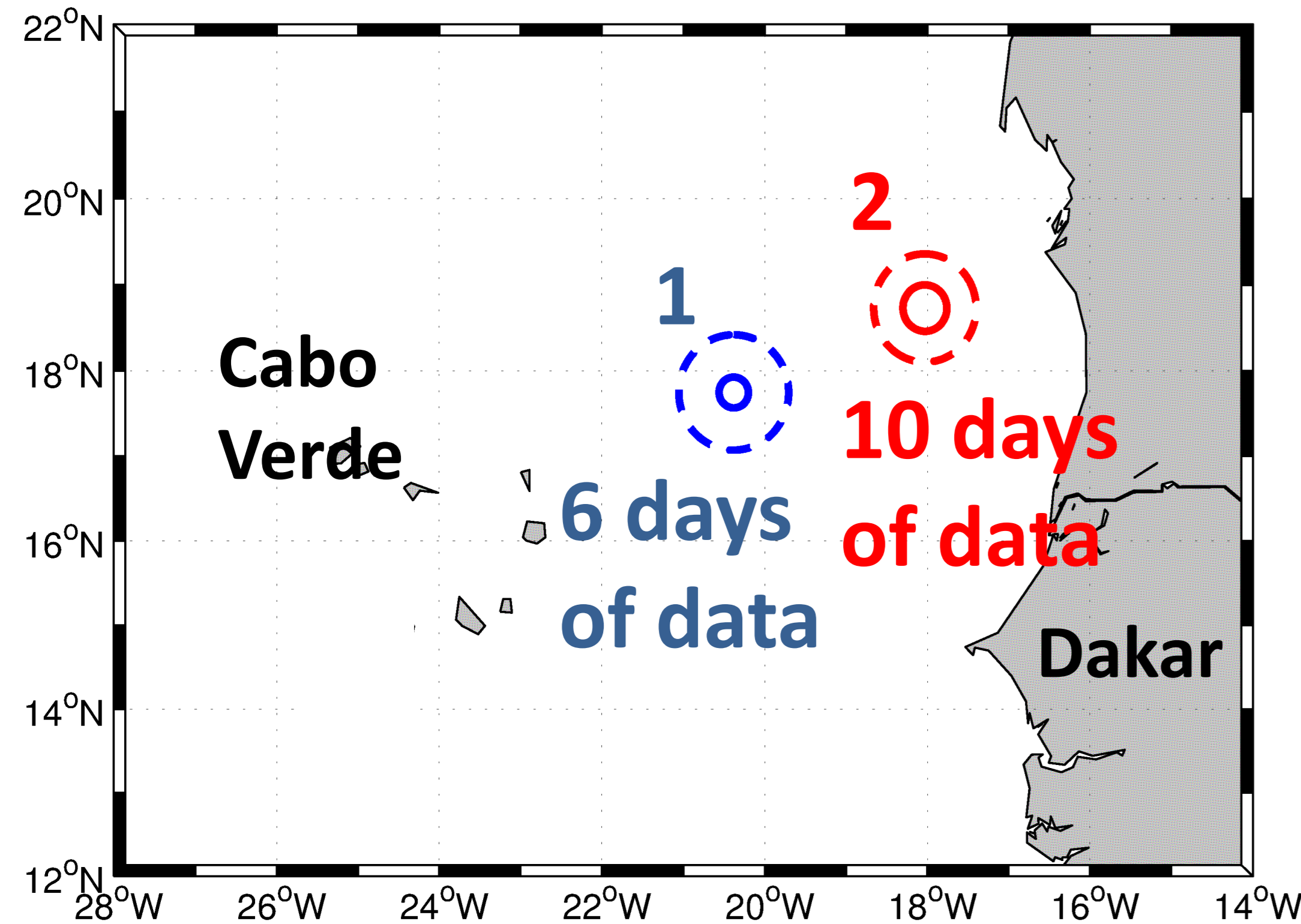
Near-surface structures - divergence and vertical velocity



2 cyclonic ocean eddies were intensely surveyed as part of the REEBUS project

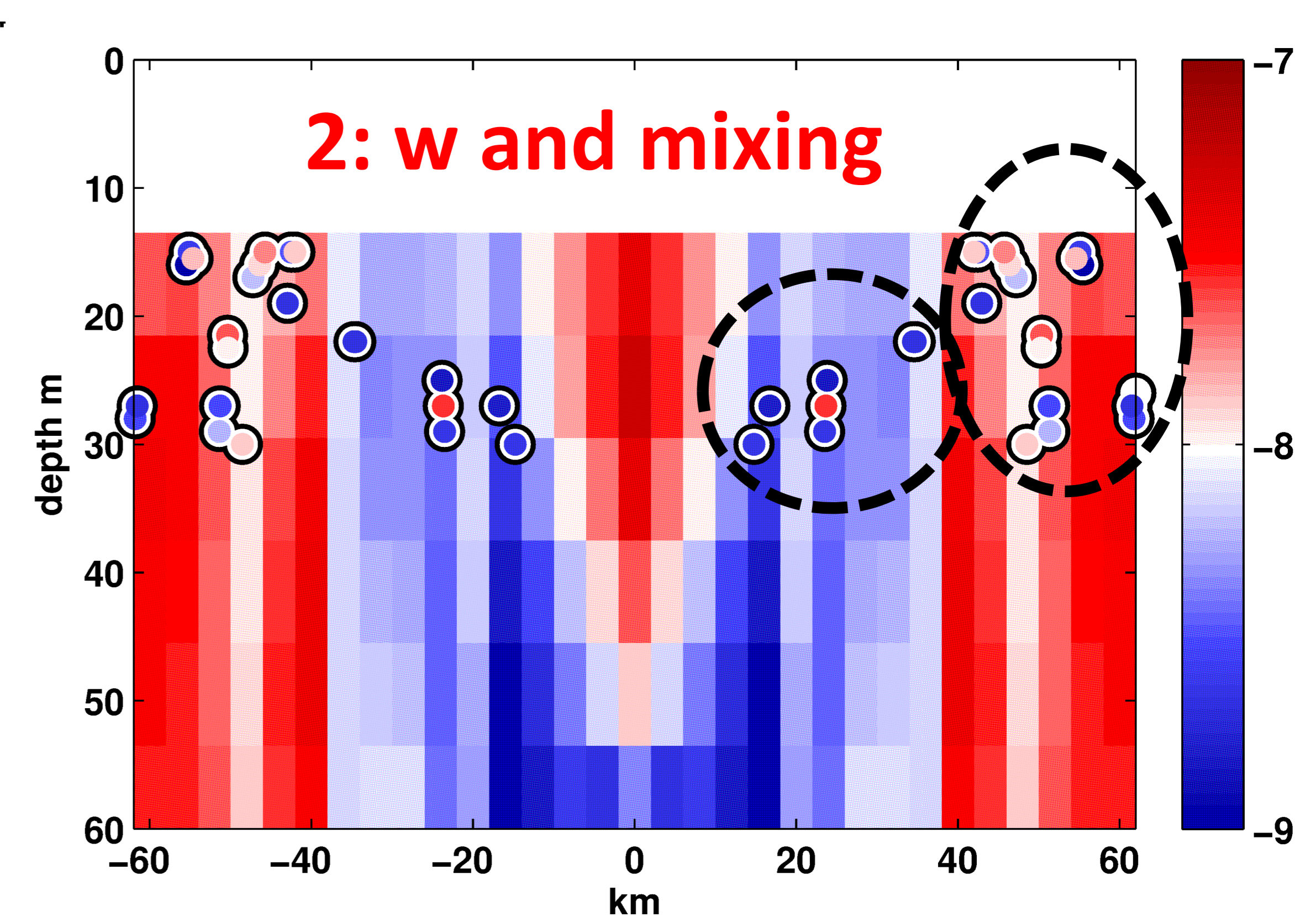
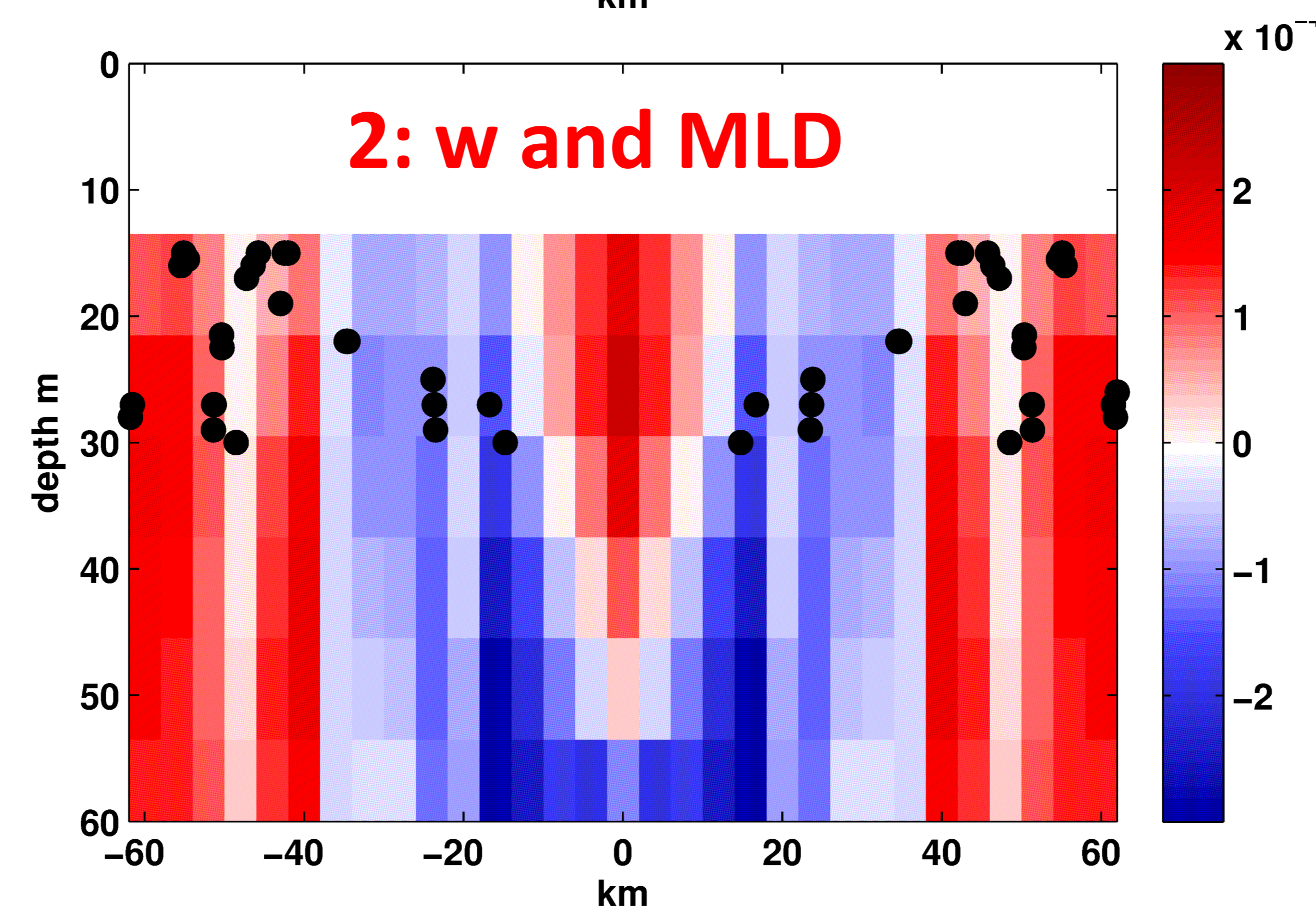
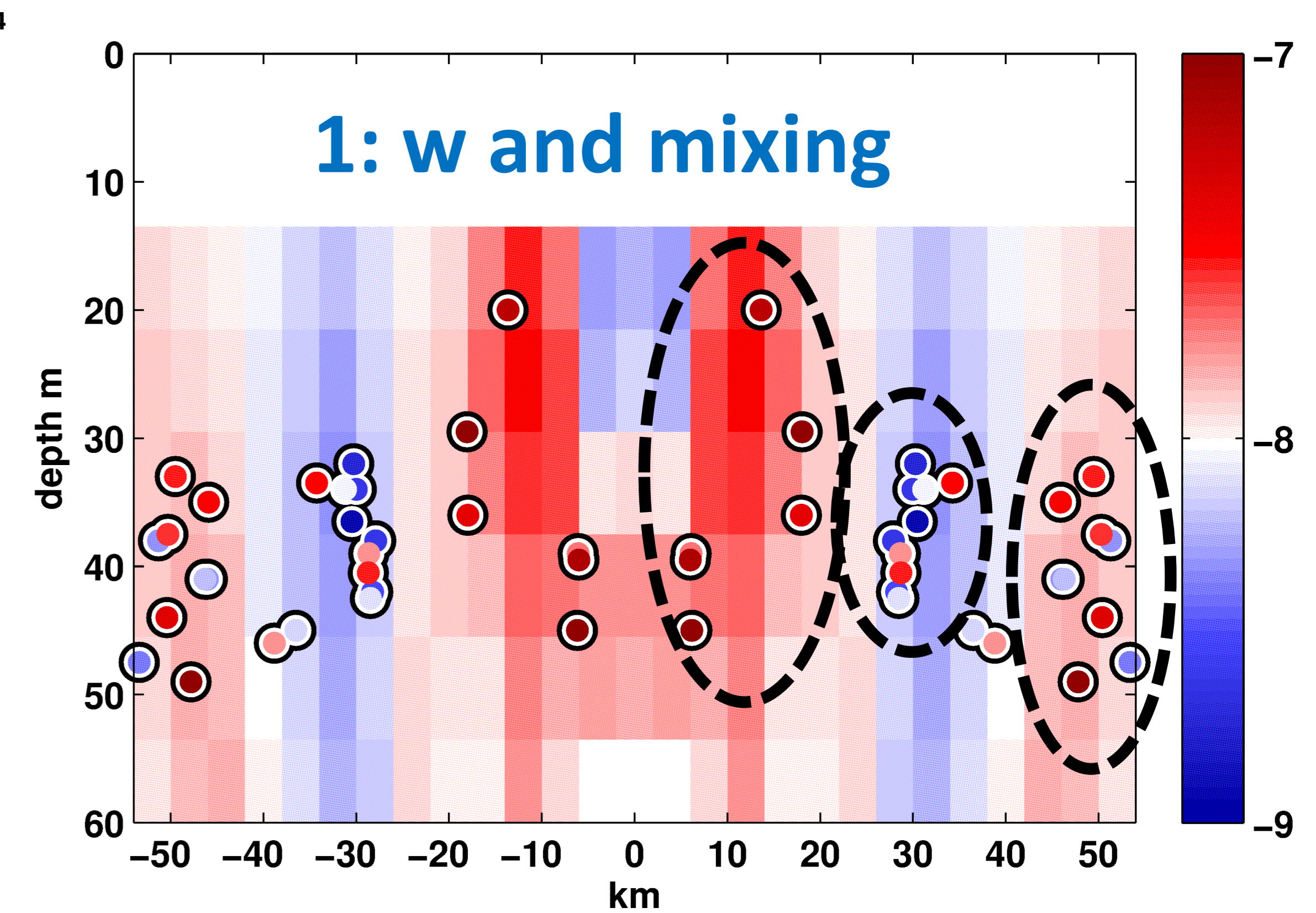
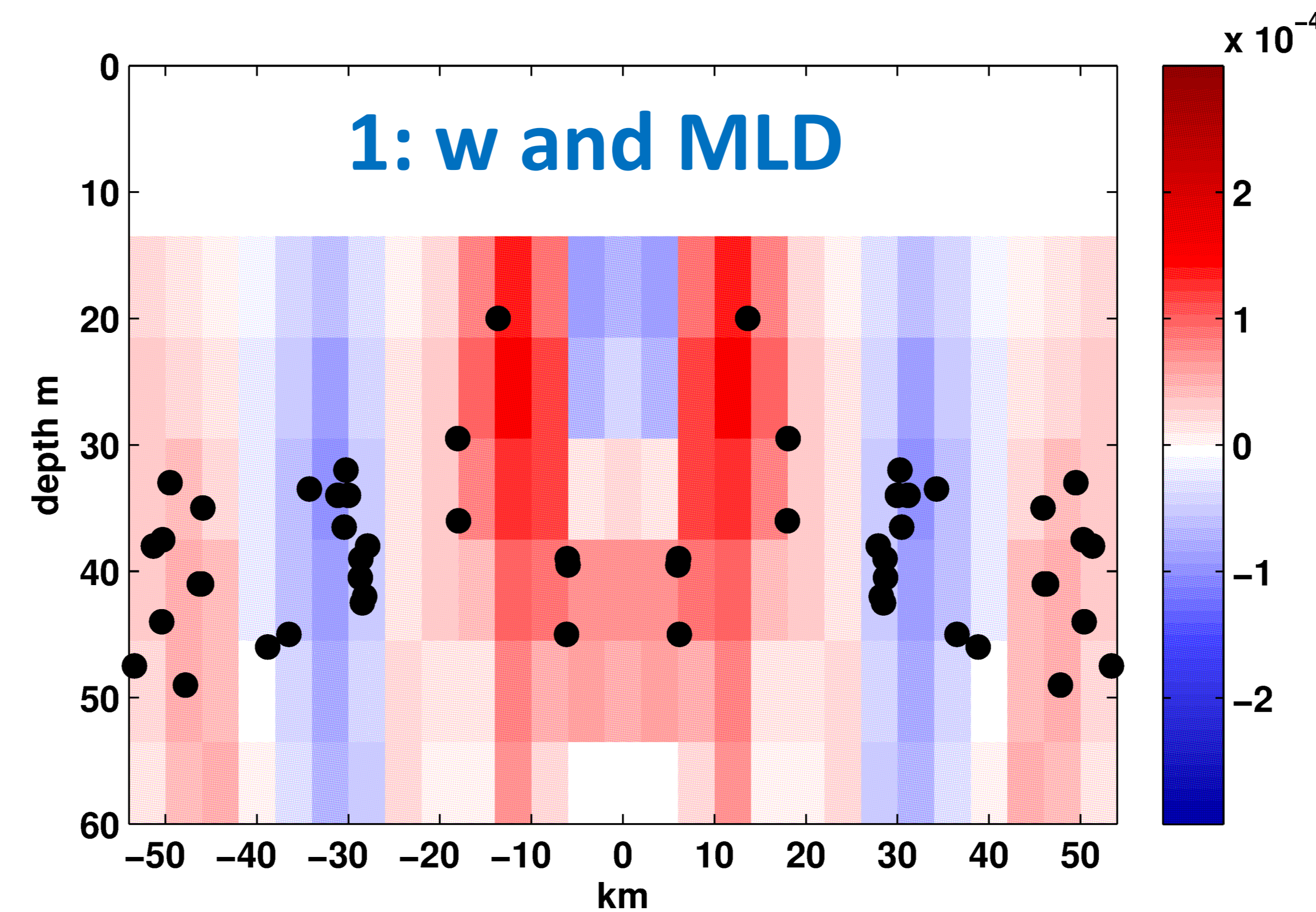


Near-surface structures - mixed layer depth and turbulent mixing below MLD

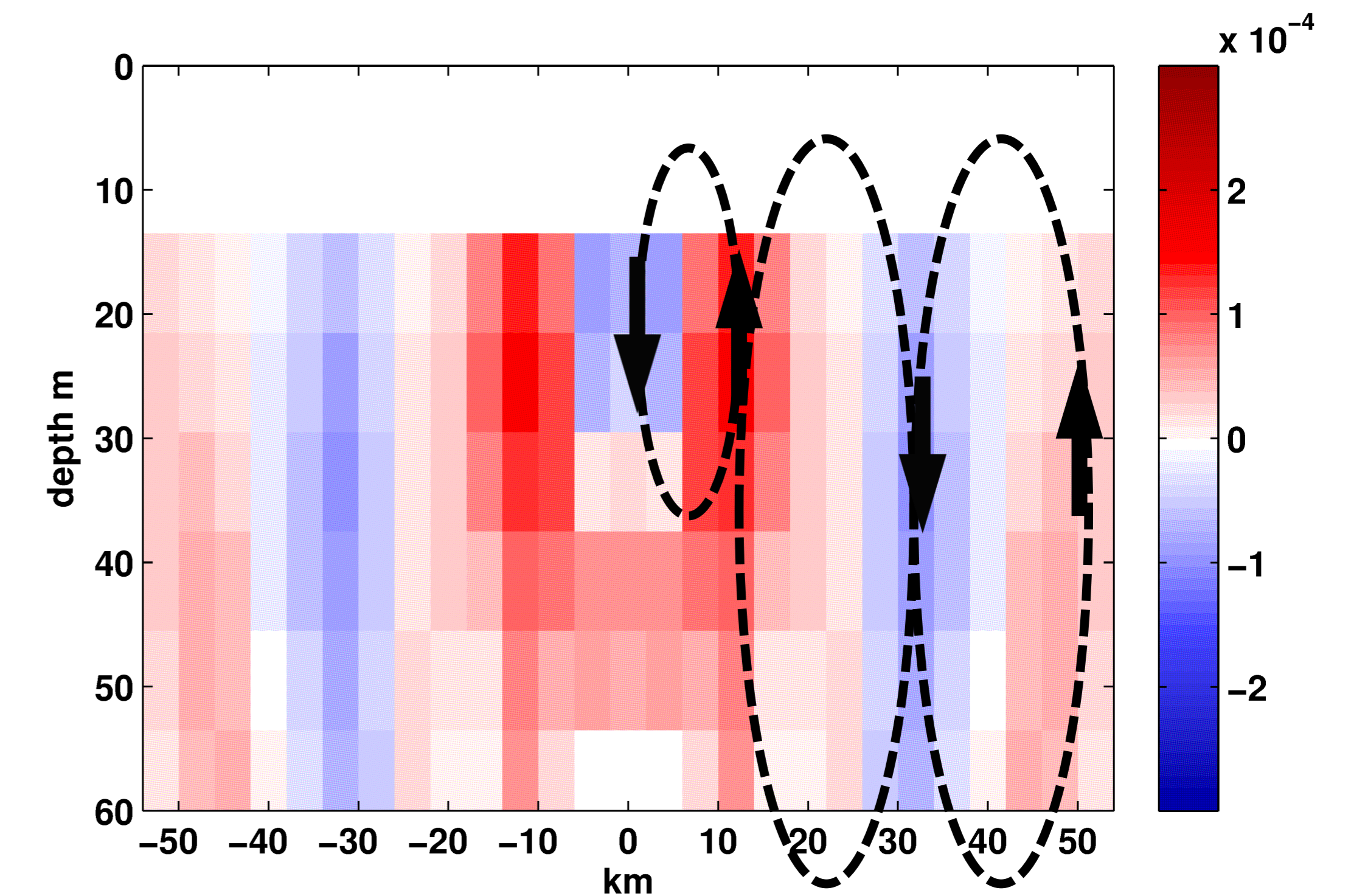
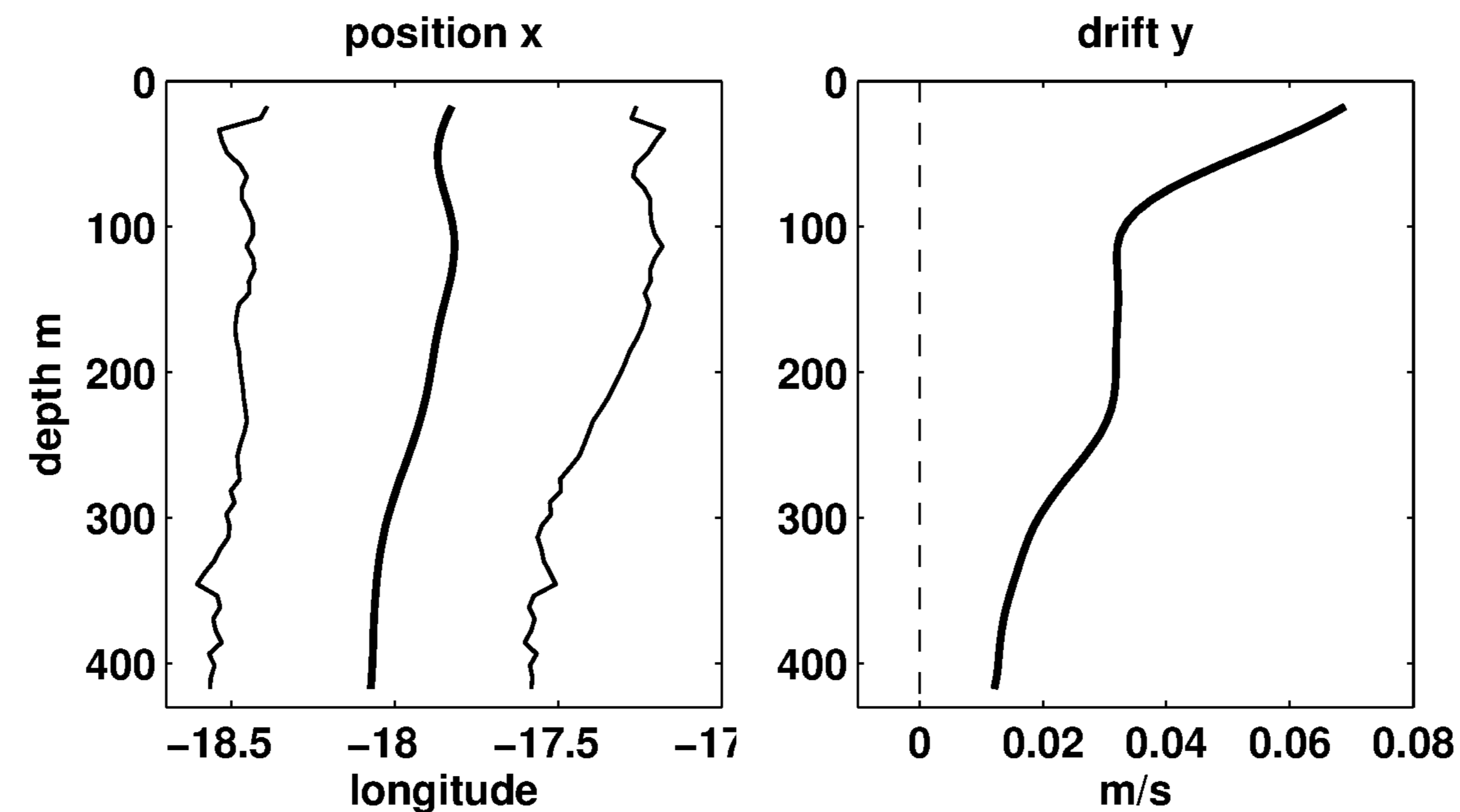
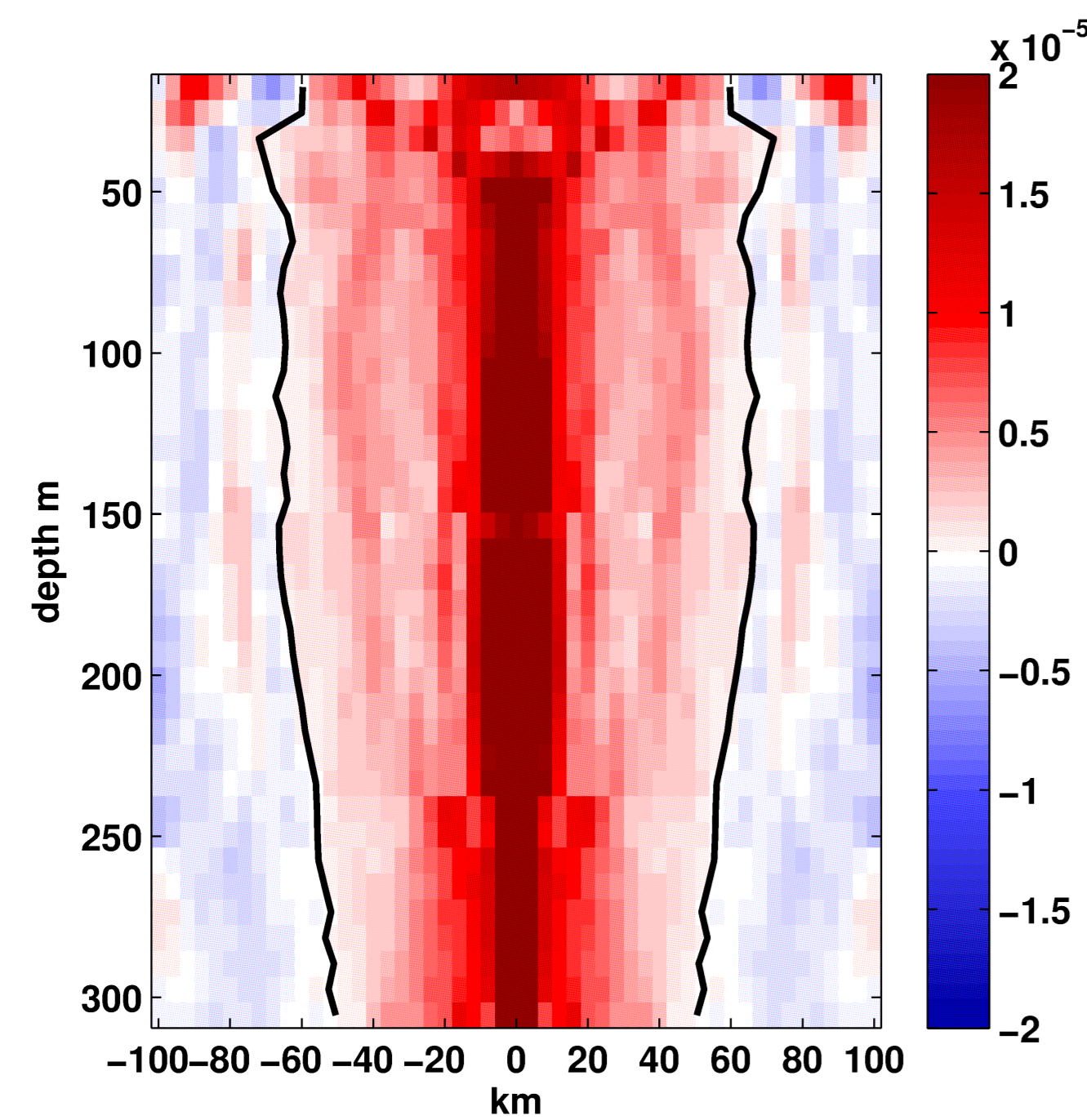


2 cyclonic ocean eddies were intensely surveyed as part of the REEBUS project

‘Mixing’ is turbulent dissipation rate at 5m to 15m below MLD



Summary



- **Vorticity and divergence structure can be derived from in-situ velocity data, on 10km-scale.**

- **Observed eddies are typically not straight. Typically shear in eddy drift in Ekman layer.**

- **Indications for cells of secondary circulation close to the surface.**