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Constraining upper mantle mass structure below the oceans from seismic and geodetic data

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We address the question of understanding the mantle convective structure below the oceans, in the sublithospheric to transition zone depth range. For that, we study how the mantle mass distribution can be constrained from a combination of global seismic tomography, gravity and bathymetry data and models. We focus on oriented patterns, that may arise from interactions between the flows and the plate motions. A directional analysis of the geodetic datasets, over the Pacific and Indian Oceans, shows the presence of elongated anomalies following the direction of the present-day absolute plate motions, correlated with the low shear velocity channels in the upper mantle from the SEMum2 model (French et al., 2013). We derive regional sensitivity kernels relating these observables to the internal mass distribution, and set up an inverse problem to determine the seismic velocity to density conversion factor. We discuss our approach and preliminary results.