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The convective mantle and the not so passive margins

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Numerous studies have shown that dynamic topography driven by convective mantle flow has profound implications for the inference and interpretation of long term sea level variations obtained from either backstripping analysis of bore-hole data and/or seismic sequence analysis at sites within so-called passive continental margins (e.g. Moucha et al., 2008; Spasojević et al., 2008; Conrad et al., 2009). In this presentation, we will explore the geodynamic implications of convective flow on the stability of passive margins throughout the late Cenozoic by carrying out backward mantle flow simulations starting with present-day heterogeneity derived from a high resolution joint seismic-geodynamic tomography model (Simmons et al., 2009) that yields excellent fits to present day surface observables (e.g. dynamic topography and the geoid). Uncertainties in our reconstruction of margin topography that originate from the numerical method of backward convection to the staring models of mantle heterogeneity and rheology are fully investigated and compared with the geological record from the northeastern US margin and the Angolan margin of Africa.