

North America regional sea level since the Late Cretaceous from adjoint convection models

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We apply adjoint models of mantle convection to North America since the Late Cretaceous. The present-day mantle structure is constrained by seismic tomography, and the time-dependent evolution by plate motions and stratigraphic data (paleo shorelines, borehole tectonic subsidence and sediment isopachs). We use adjoint algorithm of Liu and Gurnis [2008] that was developed by modifying Version 2.0 of *CitcomS* that we obtained from CIG.

The dynamic topography low associated with subduction of the Farallon slab is localized in the western North America over Late Cretaceous [Spasojevic *et al.*, 2009], representing the primary factor controlling the widespread flooding observed in the Western Interior Seaway (Fig. 1), with eustasy playing a secondary role. As North America moves westward over the Farallon slab downwelling, the dynamic topography low sweeps eastward across the continent, contributing to subsequent uplift of the western US, tilting the interior of North America, and dynamic subsidence of the US east coast during the Cenozoic [Spasojević *et al.*, 2008]. The east coast of the United States is not stable, it has been experiencing continuous dynamic subsidence over the Cenozoic, coincident with overall eustatic fall, which explain the discrepancy between sea level derived for New Jersey coastal plain and global sea-level curves.

Imposed stratigraphic constraints require that the Farallon slab was flat during Late Cretaceous, with an extensive zone of shallow dipping subduction extending farther east and north by up to 1000 km than previously suggested.

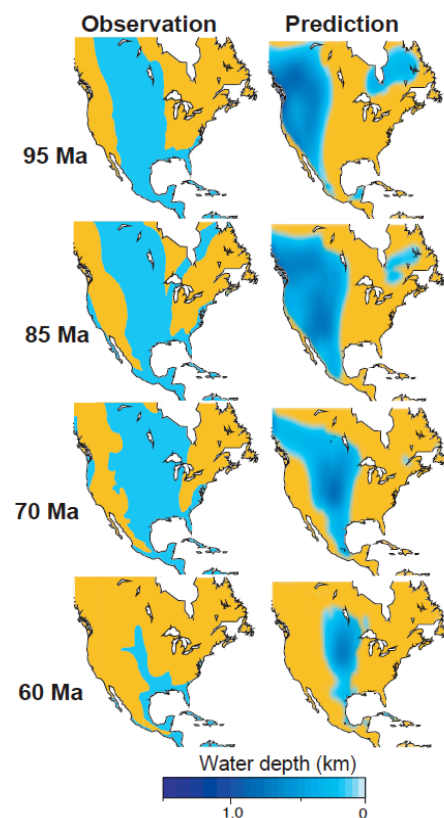


Figure 1. Comparison between observed and predicted flooding [Spasojevic *et al.*, 2009]

References

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