Toward an Understanding of the Geometry of the Farallon Plate in North America: Synthesis of Three-dimensional Imaging Results from the Transportable Array

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We compare all accessible, three-dimensional, P and S velocity models and wavefield imaging results produced from TA data with the objective of defining the geometry of the Farallon slab. We use three-dimensional visualization techniques to compare these results in a common coordinate system linked to surface geographic line data and topography. We evaluate two fundamentally different classes of models for the geometry of the Farallon slab: (1) a single, continuous body linking current and past subduction zones to high velocity anomalies in the eastern US imaged by global tomography; and (2) a series of recently proposed interpretations that fragment the slab into pieces of different scales. The basic tool we use to evaluate these divergent models is to define one or more surfaces that define the geometry suggested by the authors. We then evaluate whether the geometry these surfaces define is kinematically reasonable and if a particular model is consistent with independently determined results. We find the results to date have major inconsistencies in relation to the Farallon slab geometry problem. Work is ongoing to evaluate additional newly published results and to develop quantitative metrics for cross-validation of different results.