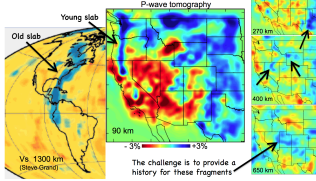


# Broken and Buoyant Slabs Beneath USArray

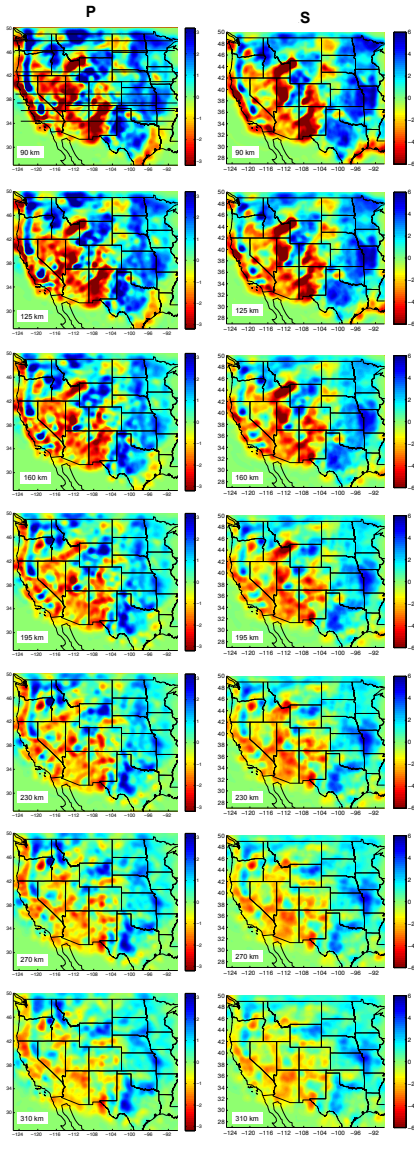
Brandon Schmandt

## Abstract

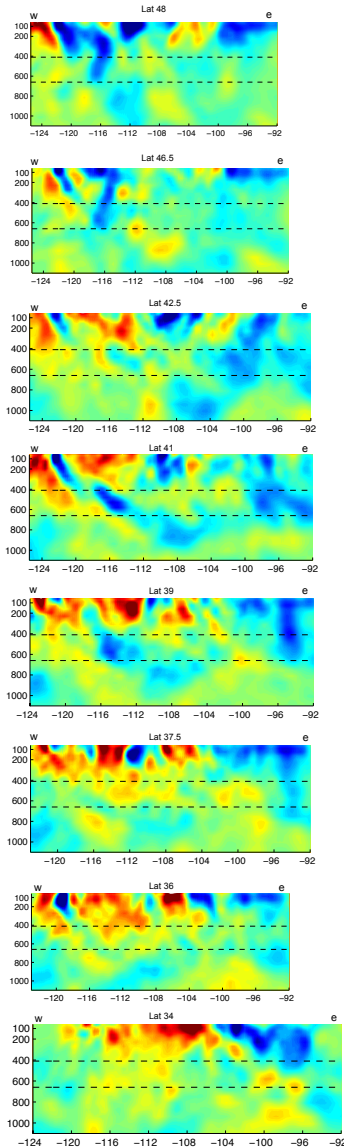
We can find the old slab (>80 Ma) and the young slab (<15 Ma) but the slab in between appears segmented, shallow, or missing (Laramide and Lignimbrite flare-up ages)



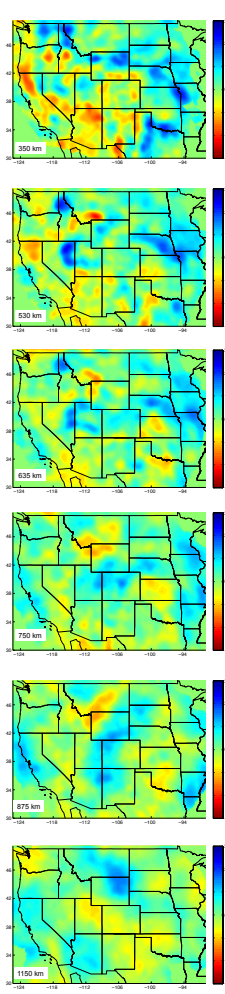
## Teleseismic body-wave tomography



## dVp/Vp cross-sections

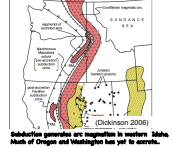


## Deeper dVp/Vp map slices



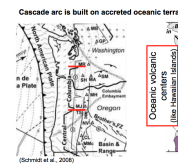
## Legacy of Eocene accretion in the Pacific Northwest

### Early Cretaceous convergent margin



Subduction generates arc magmatism in western Idaho. Slab of Oregon and Washington has yet to accrete.

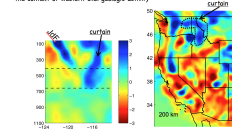
### Low <sup>18</sup>O/<sup>16</sup>O arc segment (Schmitt et al., 2008)



Cascade arc is built on accreted oceanic terrane

### The 50-Myr-old dangling slab "curtain"

Other than Juan de Fuca, this is the earliest slab to put in the context of western U.S. geologic activity

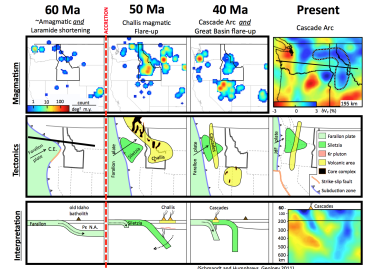


Ocean lithosphere is the only origin for this much high-velocity mantle in this location.

### Seamounts with Elevated <sup>18</sup>O/<sup>16</sup>O values very similar to Yellowstone (Searcy, 2016)

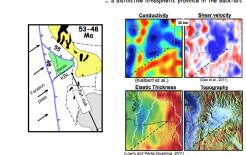


Yellowstone plume likely made these in a past life out at sea

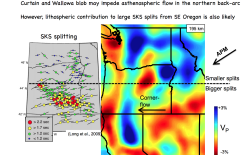


(Schmandt and Humphrey, Geology 2011)

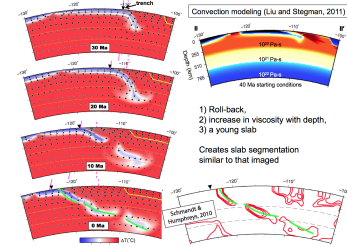
### Transformation from oceanic to continental lithosphere in the Columbia Embayment



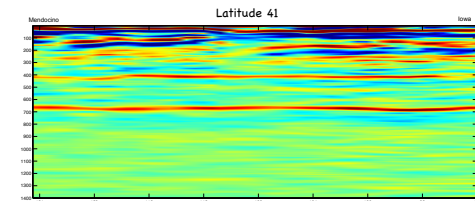
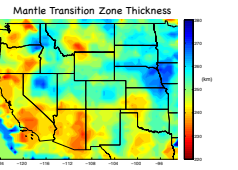
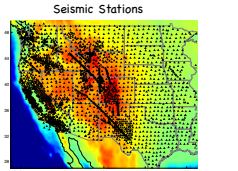
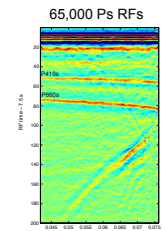
### PWV Asthenospheric flow



## A suggested origin for <40 Ma trench-normal segmentation



Ongoing work... Imaging mantle transition zone discontinuities to better understand thermal and compositional heterogeneity associated with subducted slabs



Color scale is fraction of incident P amplitude, +/- 3%