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### **Evidence for Chemically Layered Mantle**

Seismic studies have provided clear evidence that Earth's mantle is physically layered into upper mantle, transition zone, and lower mantle. These layers are separated by mineral structural transitions from olivine to wadleyite at 410 km depth and from ringwoodite to bridgmanite at 660 km depth. Our knowledge on whether or not the mantle is chemically stratified remains incomplete. This is mainly due to limited samples (<300 km mostly) and physical evidence we have. In this presentation, I will use multiple constraints from geophysics, mineral physics, and geodynamics to test the chemical stratification hypothesis. I will show evidence for chemically layered mantle in which properties of the lower mantle are more consistent with bridgmanite-predominant mineralogy (more silica rich than the transition zone and upper mantle pyrolite model). I will also address how the chemical layering can affect our understanding of mantle water circulation.