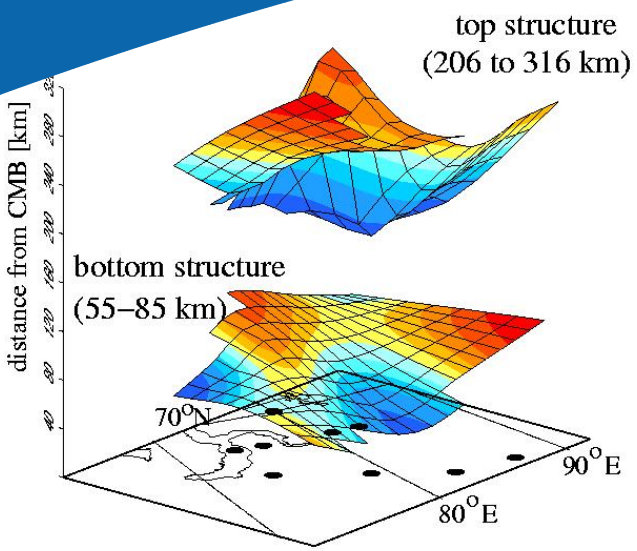
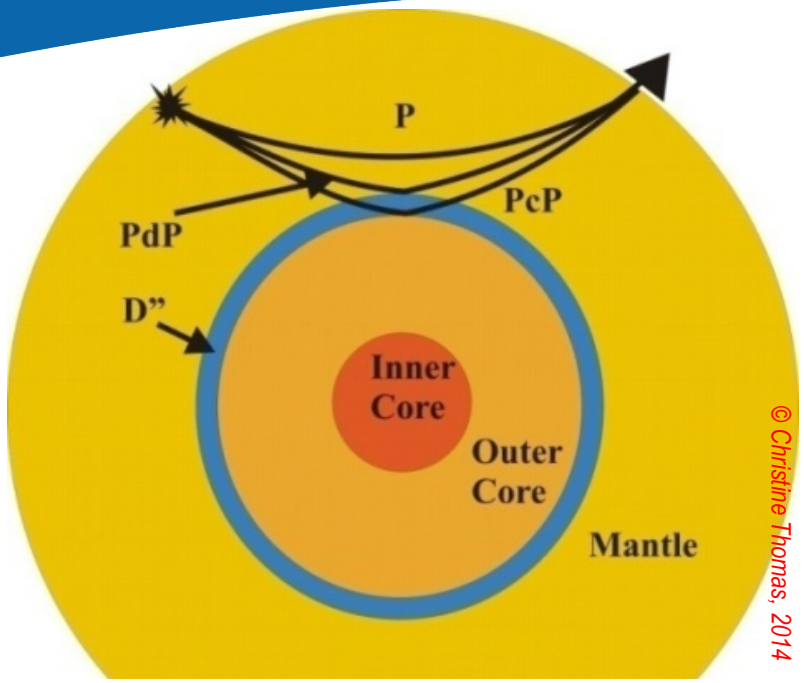
ISTerre
Institut des Sciences de la Terre

Grand Séminaire 2014





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Seismic structures in the D" region - are they due to a phase change?

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Seismology has provided information about the deep Earth's mantle with structures that span a large range of length scales. Large slow-velocity regions, seismic reflectors, small-scale scatterers, ultra-low velocity zones, and anisotropy can be found in this complex region a few hundred kilometres above the core-mantle boundary. Especially the seismic reflectors in the D" region can provide information on the dynamics of the Earth's mantle and mineralogy near the core-mantle boundary. Using array seismology and reflected waves from the D" region, including information on travel times, amplitudes and polarities of the seismic waves it is perhaps possible to discriminate between different mechanisms that cause these reflectors. In recent years the mineral phase transition from perovskite to post-perovskite has provided a possible cause for several of the observed structures including the seismic reflectors. Here we test several regions in the lowermost mantle, sampling high- and low-velocity areas and extracting as much information as possible from the seismic waves to test the hypothesis that post-perovskite could be the cause of the observed structures. Especially in high-velocity regions, i.e. possible places of past subduction, the observations are variable and do not agree with the simple phase transformation hypothesis. We find that anisotropy in the lowermost mantle in the post-perovskite minerals but also different mineralogy such as MORB can explain those diverse observations. While the phase transition from perovskite to post-perovskite is still a likely candidate for D" structures, other possibilities cannot be ruled out completely.

15 mai 2014 à 11h

Salle de conférences d'ISTerre

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