ID de Contribution: **53** Type: **Talk**

Testing Neutrino Oscillation Tomography as a tool for sensing LLSVPs density

jeudi 6 juillet 2023 16:15 (20 minutes)

Global seismic data reveals the existence of two, continent-sized anomalous regions beneath Africa and the Pacific Ocean. These regions are defined by lower than average seismic shear wave speed hence the name of Large Low Shear Velocity Provinces (LLSVPs). LLSVPs cover ~20% of the Core Mantle Boundary (CMB) and extend into the lowermost mantle up to 1000 km above the core-mantle boundary. LLSVP are hypothesized to be either thermal anomalies or a combination of both thermal and chemical anomalies in the lower mantle. Observations find an anticorrelation between shear wave and bulk sound speed that points toward the thermochemical hypothesis. If LLSVPs are indeed thermochemical anomalies, the exact nature of the compositional component and particularly its density is debated. Recent studies disagree when predicting whether LLSVPs are more or less dense than the surrounding mantle. For example, Tidal Tomography suggests a denser composition (~1 ± 0.5%) and analysis of Stoneley wave data suggest a less dense composition. These disparities demonstrate the need for further constraints on LLSVP density and recommend the exploration of novel techniques. Here, we explore Neutrino Oscillation Tomography as an alternative methodology to constrain LLSVPs density

For this work we used a custom code that implements the package OscProb to simulate the evolution of atmospheric muon neutrinos through the Earth's lower mantle and their corresponding signal at a simulated detector located at the Earth's South Pole. We present the distribution in energy and direction of observed events of a Water/Ice Cherenkov detector for two models of the Lower Mantle: 1) a standard earth defined by the PREM model and 2) a Lower Mantle with a single LLSVPs (defined as a slab of 400 km height and 4000 km lateral extension of material that is either 1% denser or 1% less dense that the background mantle)

Auteurs principaux: Dr MITTELSTAEDT, Eric (University of Idaho); DENIZ HERNANDEZ, Yael Armando (University of Idaho)

Orateur: DENIZ HERNANDEZ, Yael Armando (University of Idaho)

Classification de Session: Open questions in the study of Earth's mantle and core