



## **Probing the inner core's African hemisphere boundary with P'P'**

Elizabeth Day (1), James Ward (1), Ian Bastow (1), and Jessica Irving (2)

(1) Department of Earth Science and Engineering, Imperial College London, United Kingdom, (2) Department of Geosciences, Princeton University, USA

Geophysical observations of the inner core today improve our understanding not just of the processes occurring in the core at the present, but also those that occurred in the past. As the inner core freezes it may record clues as to the state of the Earth at the time of growth; the texture in the inner core may also be modified through post-solidification deformation. The seismic structure of the inner core is not simple; the dominant pattern is one of anisotropic and isotropic differences between the Eastern and Western 'hemispheres' of the inner core. Additionally, there is evidence for an innermost inner core, layering of the uppermost inner core, and possibly super-rotation of the inner core relative to the mantle.

Most body wave studies of inner core structure use PKP-PKIKP differential travel times to constrain velocity variations within the inner core. However, body wave studies are inherently limited by the geometry of seismic sources and stations, and thus there are some areas of the inner core that are relatively under-sampled, even in today's data-rich world. Here, we examine the differential travel times of the different branches of P'P' (PKIKPPKIKP, or P'P'df, and PKPPKP), comparing the arrival time of inner core turning branch P'P'df with the arrival times of branches that turn in the outer core. By using P'P' we are able to exploit different ray geometries and sample different regions of the inner core to those areas accessible to studies which utilize PKIKP.

We use both linear and non-linear stacking methods to make observations of the small amplitude P'P' phases. We identify the three P'P' branches, as well as pre- and post-cursors to the main arrivals, which can cause confusion. To facilitate identifying each P'P' branch we make AxiSEM synthetics, carry out beamforming, and use bootstrapping to access the robustness of our observations, which focus on the inner core's hemisphere boundary beneath Africa.

Our measurements match the broad scale hemispherical pattern of anisotropy in the inner core, but also show some small scale variations.