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A broad Galápagos hotspot melting anomaly linked to disturbance of the underlying core-mantle boundary?

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New evidence from direct isotopic dating of the oceanic hotspot record is suggesting that hotspot melting anomalies might be much broader than commonly inferred from the dimensions of individual seamount chains and aseismic ridges and their associated active 'volcanic' hotspots. Such an inference is supported by recent thermo-chemical numerical modelling exploring scenarios where upwelling structures are more irregular in shape and behaviour compared to a classic thermal plume 'head-tail' (*e.g., Farnetani and Samuel, 2006*). New age data from the Galápagos Volcanic Province suggest that it developed via the progression of broad regions of widespread, long-lived and possibly concurrent volcanism resulting from tectonic plate motion over a broad Galápagos hotspot melting anomaly (*O'Connor et al., 2007*).

Seismic imaging of the core-mantle boundary under the Cocos plate shows a 100-km vertical step occurring in an otherwise flat D" shear velocity discontinuity (Thomas et al., 2004, Hutko et al., 2006, Kito et al., 2007). One possible explanation is that folding and piling of a cold subducted slab on reaching the core-mantle boundary might account for this lateral variation in terms of a post-perovskite phase change (*Thomas et al., 2004, Hutko et al., 2006, Kito et al., 2007*). Low velocities inferred at the edge of this proposed slab material may result from the lateral displacement of a thin hot thermal boundary layer leading to upwelling at the tip of the slab, (*Thomas et al., 2004, Hutko et al., 2006, Kito et al., 2007*), which in turn might possible be connected to our inferred broad hotspot melting anomaly. The combination of the recent imaging of an anomaly at the D"-discontinuity and the inference of a broad

overlying Galápagos hotspot melting anomaly suggest that the Galápagos region is an ideal natural-laboratory for studying the possibility of interaction between the core-mantle boundary and overlying lithosphere.