



## **Density-depth Relationship of Serpentinised Mantle on the Iberian, Newfoundland and Nova Scotia Margins from Comparison of Seismic and Gravity Inversion Moho Depths**

Chris J. Cooper and Nick J. Kusznir

University of Liverpool, School of Environmental Sciences, Liverpool L69 3BX, United Kingdom (sr11@liverpool.ac.uk, 0044-151-7)

Basement sampling and geophysical studies reveal exhumed serpentinised mantle between thinned continental crust and basaltic oceanic crust in the ocean-continent transition (OCT) of magma-poor rifted margins. We have made estimates of the density and depth extent of serpentinised mantle at the Iberia, Newfoundland and Nova Scotia margins by comparing seismic and gravity inversion Moho depths for these margins. Seismic Moho estimates for IAM 9, SCREECH 3, SMART 1 and SMART 2 were used. Within the OCT of these margins, where serpentinised exhumed mantle is believed to exist, the reconciliation of seismic and gravity inversion Moho depth requires a mean density of serpentinised mantle of between 3000 and 3100 kgm<sup>-3</sup>. These densities are consistent with seismological estimates of serpentinisation with depth for IAM 9 (Iberian margin) from Cole et al. (2000) and Skelton et al. (2005). The proposed density-depth relationship for serpentinisation on IAM 9 shows a surface layer of high serpentinisation of thickness 1 – 1.5 km, beneath which serpentinisation decays exponentially with depth reaching approximately 5% at 5 km depth. The best fit between serpentinised mantle density determined by comparison of seismic and gravity Moho depth, and from a density-depth relationship derived from Cole et al. (2000) and Skelton et al. (2005), is achieved assuming a magnetite content of 4.5%. The average densities of serpentinised mantle determined from comparison of seismic and gravity Moho depths for SCREECH 3, SMART 1 and SMART 2 are also consistent with the serpentinisation-depth relationship determined for IAM 9. This work suggests that average densities of serpentinised mantle are greater than that of continental or oceanic basement unless serpentinisation is shallower than 2.5 km depth, and that little serpentinisation occurs deeper than 5 km in which case the average density of serpentinised mantle is 3000 and 3100 kgm<sup>-3</sup>. We believe that this work also suggests that it is unlikely that significant serpentinisation occurs under thinned continent crust at the OCT, and that in any case, if it did occur, it would be denser than continental basement unless the crust was thinner than 3 km.