Geophysical Research Abstracts,
Vol. 11, EGU2009-11869, 2009
EGU General Assembly 2009


# Evidence for off-axis seamounts on the flanks of the Southeast Indian Ridge, 128°E-150°E. Implications for mantle dynamics east of the Australia-Antarctic Discordance

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The intermediate-spreading Southeast Indian Ridge (SEIR) between Australia and Antarctica is mostly known for the presence of the Australia-Antarctic Discordance, an area of low magma budget on the ridge. Here we focus on the area east of the discordance, where we have analyzed gravity highs observed on satellite-derived maps of the flanks of the Southeast Indian Ridge between Tasmania and Antarctica. We show that these gravity highs likely correspond to volcanic seamounts and seamount chains, similar to those observed on the flanks of the East Pacific Rise. This area, in particular the volcanic chains, are associated with residual mantle Bouguer anomaly (RMBA) lows, suggesting thicker crust or hotter mantle or both under the study area. The large number of off-axis seamounts and the RMBA lows suggest an anomalously high magma supply under the southern flank of the SEIR, not only with respect to the magmatically-starved discordance area, but also with respect to regular sections of intermediate-spreading mid-ocean ridges. We suggest that the seamount chains might have formed above small-scale convective upwellings in the asthenospheric mantle close to the ridge axis, and that the obliquity of the ridges reflects a regional westward asthenospheric flow. This hypothesis is also supported by the intermediate-wavelength gravity lineations observed in the southern flank of the SEIR. We infer that the observed off-axis volcanism results from the partial melting of Pacific-type mantle as it flows from the southeast to the northwest, and that this process likely started with the opening of the oceanic spreading center between Tasmania and Antarctica. The mantle flow at the origin of the magmatic anomaly appears to be partly dammed by the large transform faults. It is not clear how this regional flow from Pacific to Indian domains relates to the Balleny hotspot.