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Louisville Ridge subduction at the Tonga-Kermadec trench: preliminary models to compare pre- and post collision zone crustal velocity structure.

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New geophysical data were acquired from the collision zone of the Louisville Ridge and Tonga-Kermadec subduction system during April-June, 2011. Around 1800 km of data as four profiles were collected in this NERC-funded multidisciplinary, multi-institutional project. The subduction of the Louisville Ridge seamount chain is associated with changes in subduction zone seismogenesis, crustal structure, and trench strike and depth. Due to the oblique plate convergence, there is a southward migration of the Louisville Ridge of ∼200 km/Ma. North of the Louisville Ridge the forearc has already undergone seamount subduction, whereas to the south of the forearc is not yet deformed by this process. Some of the highest convergence rates seen globally are observed along the Tonga-Kermadec trench and this, and the oblique nature of convergence, makes it an ideal locality to study the effects of seamount subduction. Three of the new geophysical profiles follow a perpendicular trend to the trench; one along-axis of the seamount chain, and one to both the north and south. Presented here are preliminary results for the southern pre-collision profile line across the subduction system. A background, pre-collisional crustal structure model of the system is required for comparison to those zones further north where seamount subduction has or is occurring. Variations in seismic velocity structure from the pre-to-post-collision zones may elucidate the degree of crustal deformation due to faulting, and alteration due to fluids/serpentinisation. The velocity model paves the way for a flexural study of the pre-collision line, which will provide information on seamount coupling during subduction and related seismicity.