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Morphology of a submerged extinct spreading axis from isostasy and gravity inversion – the South China Sea mid ocean ridge

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The South China Sea spreading axis has been inferred from palaeo-magnetic data, but does not show distinct morphologic features in the bathymetry. This is caused by a sedimentary cover under which it is buried. We present and discuss a model of the morphology of the entire mid ocean ridge system from its south-western tip to its north-eastern end, where it is subducting beneath the Manila trench. We have obtained the morphology from combining gravity inversion and the lithospheric flexure model. The input data we use in the inversion process are satellite derived gravity data, the sediment model of NOAA, and the bathymetric model of GEBCO. The bathymetric model enters the calculations for the loading calculations of the flexure, which affect the position of the crust-mantle interface. All high frequency features of the final model are recovered from the gravity data. Besides the morphology of the ridge, we distinguish the crust-ocean transition and the tilted blocks of the stretched continental crust. Our analysis produces furthermore a crustal thickness model and a model of elastic rigidity throughout the South China Sea.