Present-Day Stresses of Northwest Borneo: Implication for the Neotectonics of an Active Collisional Margin

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Previous analysis of present-day crustal stresses in the Tertiary Baram Delta Province of Brunei has lead to a better understanding of the NW Borneo collisional margin. Two stress provinces are demonstrated in Brunei; the inner shelf of the Baram Delta province displays a margin normal SHmax orientation, while the outer shelf exhibits a margin parallel orientation. These two stress provinces explain that the continued uplift of the hinterland caused the 'forced progradation' of the delta system, thus generating a margin parallel SHmax on the outer shelf, and subsequent inversion of normal faults on the inner shelf giving a margin normal SHmax. Further analysis of geomechanical wellbores and tectonic structures has been carried out to elucidate the orientation of present-day crustal stresses in the adjacent areas of Sarawak and Sabah. Whilst still on the active collisional margin of NW Borneo, both Sarawak and Sabah are geologically different to Brunei, these differences are reflected by stress orientations. West of Brunei, in Sarawak, a tectonically quiescenent environment is represented by a carbonate platform on the outer shelf region and deltaic deposits on the inner shelf. Therefore, in Sarawak initial orientations of SHmax inferred from structures on the outer shelf is margin normal and on the inner shelf SHmax is margin parallel. In Sabah, to the east, stress orientations inferred from structures mirror those of Brunei. These interpretations aid our understanding of the NW Borneo collisional margin, and lead to better insights of the early formation of mountain belts.