TECHNICAL TALK

The palaeo-orientations of Northwestern Borneo and adjacent South China Sea basins

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Abstract: In the past two decades palaeomagnetic evidence from a limited number of areas onshore northwestern Borneo has been interpreted as showing progressive counterclockwise (CCW) rotation of the whole of Borneo island. For instance, palaeomagnetic computations of southwestern Sarawak data appear to represent over 51 degrees CCW rotation from the early Neogene onward. On the other hand, palaeomagnetic data from Sabah shows CCW as well as CW rotation. These data have been used for plate reconstructions of southeastern Asia. Several other authors have already pointed out inconsistencies of CCW rotations in the tectonic framework of the region. Ignored by all previous studies concerning the rotation of Borneo are published critical geological data. Among these are especially: (1) that Borneo has progressively accreted around a pre-Tertiary basement terrane (that is West Kalimantan which is part of Sundaland). Well-defined accretionary zones are the progressively younger Kuching, Sibu and Miri zones. (2) The mosaic assemblage of tectono-stratigraphic terranes that make up the Sarawak and Northwest Sabah basins. This fragmented nature has been duly recognised as basis for hydrocarbon ventures. (3) A fragmented pattern of wellbore breakouts that mostly are consistent with the tectono-stratigraphic terranes. In several hydrocarbon "blocks" successive time-structure horizons show stress histories that are at variance with progressive CCW rotation. Instances of CCW reverting to CW rotation are also known. Onshore evidence of stress kinematics suggests possible changes in compression orientations during most of the Tertiary but are definitely unequivocal in terms of systematic progression of the rotation of Borneo. It is concluded that the fragmented character of terranes of northwestern Borneo and adjoining basins preclude progressive CCW rotation, which is further constrained by patterns of well-bore breakouts, fold structures, and major wrench-faulting.

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