

The Forming Mechanism of the Ngimbang Crossing Conjugate Grabens in the East Java Terrane, Indonesia

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During the Cenozoic, the East Java Terrane (EJT), as a terrane of the Sundaland margin, was affected by the relative movements of the Indian, Eurasian, and Australian plates and experienced a complex history of tectonic evolution and sedimentation. Up to now, fundamental problems such as the mechanism of the initiation of the development of the EJT still remain unsolved. Both seismic and drill core data interpretations shows that a peneplain of Upper Cretaceous sediments and underlying basement due to contraction and truncation once existed before Tertiary basin initiation in the EJT. Crustal extension and rifting processes represented by normal faulting began on this peneplain from the early Eocene. Complex structural geometries of grabens created by normal faulting appeared and were filled with transgressive clastic sediment packages. For each of the Ngimbang depocenters, there are actually two grabens crossed by each other and combined together to give an “X” shape in space. Here we give the name of “crossing conjugate graben for the “X” shaped combination. In fact, this is a squashed “X”. A S-N directed compressional stress and a W-E directed tensional stress put on sandbox experiments explains the “X” shape displacement. The EJT happens to be located at the convex of the Sundaland orocline. The S-N directed compressional stress and the W-E directed tensional stress applied to the EJT by subduction and stretching served as the main control factor for Tertiary rifting initiation.