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New insights on shear margin gravitational evolution through time. The case of the equatorial margins

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30% of passive margins in the world correspond to shear margins. Unlike divergent margins, those margins present a very sharp ocean-continent boundary which is expressed by steep surface slopes and complex rift structures. In addition of tilted blocks, wrench and strike-slip faults frequently deform the continental crust. High marginal ridges, rising 1-3 km over the adjacent margin typically form along the continental side of the margin. The best known example of transform margin is the Côte d'Ivoire-Ghana margin, highly investigated in the 1980's.
New observations along the French-Guiana shear margin (GUYAPLAC survey, 2003) have evidenced massive early (immediately after rifting) and late collapses of the margin. These collapses concern huge volumes: remobilized masses that reach nearly 15000 km3 have been identified in the abyssal plain. No marginal ridge has been observed there. These observations have been compared to results published for the Surinam prolongation of this shear segment (Gouyet, 1988; Erbacher et al., 2004). There also, collapses and slope instabilities are evident, though part of a marginal ridge remains present. Finally, published data from the western Côte d'Ivoire transform margin (De Caprona, 1992) show wide collapses, some deep-seated, and other shallow. Sinking of entire parts of shear margins by gravity collapses appears thus rather common. These observations show that the post-rift gravity collapse of shear margins has been largely underestimated, and has even not been considered in evolutional models of transform margins, despite the fact this has important implications on the geometry and balance of those margins. On the basis of these observations, we propose a tentative scenario for the equatorial Atlantic shear margin gravitational evolution.

References:
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