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The Lower Congo Basin, Deep-Water Congo and Angola: A Kinematically Linked Extensional / Contractional System

The Lower Congo Basin (LCB) is a gravitationally-driven linked extensional / contractional system that detaches on Aptian salt, with up-dip extension compensated by down-dip contraction. The LCB has experienced a polyphase deformational history characterized by: (1) Aptian to ~Paleocene deformation driven largely by post-rift thermal subsidence; (2) Eocene to mid-Oligocene quiescence, and (3) mid-Oligocene to Recent deformation, associated with Africa-wide volcanic activity, uplift of the continental margin, and massive influx of sediment into the LCB. The latter constitutes the main trap-forming event in the deep-water LCB blocks.

Mid-Oligocene to recent structures in the LCB can be separated into three belts oriented roughly parallel to the coastline. These are, from up-dip to down-dip, the extensional, translational, and contractional belts. While extensional horst blocks are the most important trap style in the extensional belt (e.g. Angola Block 15), the magnitude of extension in the translational belt is small, and salt-withdrawal features such as the Girassol turtle (Angola Block 17) predominate. Salt is most abundant in the contractional belt, where it occurs as thick autochthonous salt, salt walls, diapirs, salt tongues, and salt canopies. Up-dip extension is absorbed in the contractional domain by buckling and thrusting of strata, closure of diapirs and salt walls, and expulsion of salt as glaciers. Contractional structural traps include salt-cored buckle folds, thrust-related anticlines, modified turtles, diapir-flank traps, and a variety of sub-salt traps; much of the frontier exploration in the LCB is currently focused in this technically challenging area.