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Controls on hydrocarbon generation and leakage in South Atlantic conjugate margins: A comparative approach.

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We present a regional comparative analysis of the possible first-order internal and external factors controlling source rock (SR) maturation and hydrocarbon (HC) generation and leakage in two pairs of conjugate margins across the South Atlantic: the Brazil (Campos Basin)-Angola (Lower Congo Basin) margins located in the "central segment", and the Argentina (Colorado Basin)-South Africa (Orange Basin) in the "southern segment". Our approach is based on the analysis and integration of borehole data, numerical modeling, 2D seismic reflection data, and published reports. Coupling of modeling results, sedimentation rate calculation and seal-bypass system analysis reveals that: (1) oil window is reached by syn-rift SRs in the southern segment during the Early to Late Cretaceous when thermal subsidence is still active, whilst in the central segment they reach it in Late-Cretaceous-Neogene during a salt remobilization phase, and (2) early HC generation from post-rift SRs in the southern segment and from all SRs in the central segment appears controlled mainly by episodes of increased sedimentation rates. These latter seem associated to the Andes uplift history for the western South Atlantic basins (Campos and Colorado) and to a possibly climate-driven response for the eastern South Atlantic basins (Orange and Lower Congo). Interestingly, Paleogene leakage indicators, which were identified in the Argentina-South Africa conjugate margins, occur contemporaneously to low sedimentation rates periods. Nonetheless, present-day leakage indicators, which were also identified in both pair of conjugate margins, might be related to seal failure events associated to eustatic sea-level drops.