



Episodic uplift and exhumation along North Atlantic passive margins

Peter Japsen (1), Paul F. Green (2), Johan M. Bonow (1), Erik S. Rasmussen (1), James A. Chalmers (1), and Tomas Kjennerud (3)

(1) GEUS, Copenhagen, Denmark (pj@geus.dk), (2) Geotrack International, Victoria 3055, Australia, (3) Exploro Geoservices, Trondheim, Norway

We present observations that demonstrate that the elevated passive margins around the North Atlantic were formed by episodic, post-rift uplift movements that are manifest in the high-lying peneplains that characterise the coastal mountains, in the unconformities in the adjacent sedimentary basins and in accelerated subsidence in the basin centres.

Results from West Greenland show that subsidence took place for c. 25 Myr after rifting and breakup in the Paleocene, as predicted by classical rift theory, but that this development was reversed by a series of uplift movements (starting at c. 35, 10 and 5 Ma) that remain unexplained.

East Greenland and Scandinavia seem to have had a similar evolution of post-rift subsidence followed by uplift starting at c. 35 Ma and followed by significant events at c. 23, 15 and 5 Ma. There was no major fall in sea level at the Eocene–Oligocene, so the subsiding basins must have been inverted by tectonic forces. We speculate that the forces causing this phase were related to the plate boundary reorganisation in the North Atlantic around Chron 13 time.

One feature that these areas have in common is that uplift took place along the edges of cratons where the thickness of the crust and lithosphere changes substantially over a short distance. It may be that the lateral contrasts in the properties of the stretched and unstretched lithosphere make the margins of the cratons unstable long after rifting.

Reference

Japsen, P., Green, P.F., Bonow, J.M., Rasmussen, E.S., Chalmers, J.A., and Kjennerud, T., 2010, Episodic uplift and exhumation along North Atlantic passive margins: implications for hydrocarbon prospectivity, in Vining, B.A., and Pickering, S.C., eds., *Petroleum Geology: From Mature Basins to New Frontiers – Proceedings of the 7th Petroleum Geology Conference*: London, Geological Society, p. 979-1004.