



## **Post -rift uplift of passive margins, or 'keeping an old margin in good physical shape'**

T. F. Redfield<sup>1</sup>, P. T. Osmundsen<sup>1</sup>, and S. J. H. Buiter<sup>1</sup>

<sup>1</sup> Geological Survey of Norway, Leiv Eirikssons vei 39, 7491 Trondheim [tim.redfield@ngu.no](mailto:tim.redfield@ngu.no)

Similarities in shape between passive margins of different ages lead us to consider the role played by post-breakup structural control upon their geomorphic evolution. Here, we compare and contrast mountain ranges formed at two margins: Baltica's Scandes and Antarctica's Transantarctic Mountains. Initial uplift of both ranges appears related to Mesozoic intracratonal extension, while large pulses of uplift along discrete parts of each range occurred throughout the Cenozoic. Both ranges are structurally influenced by the roots of older orogens and inherited heterogeneities. Despite their relatively great age and the absence of a clearly-defined mechanism of present-day uplift both display the sharp, well-defined topographic asymmetry characteristic of actively-extending fault blocks. We contend that the Scandes are controlled by preferential reactivation of structures inherited from Mesozoic extension (in turn inherited from post-orogenic Caledonian collapse), and that they exhibit a 'mega-relay' fault displacement between their northern and southern highs. Data from various workers suggests the architecture of the Transantarctic Mountains may be similarly controlled. Although constraints from the Transantarctic Mountains are far fewer, we suggest the variable elevation of a laterally extensive erosional surface (the Kukri penepain) and AFT data from numerous vertical profiles are also consistent with range-front fault displacement gradients between North and South Victoria Land. In both cases, deep lithospheric buoyancy forces are balanced by flexural resistance, with ongoing modification of the 'free edge' occurring as a delicate, dynamic, isostatic dance between the forces of erosion and deformation.