



Are elevated passive margins formed by processes related to rifting?

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It is commonly assumed that the morphology of elevated passive continental margins (EPCMs) is directly related to the processes of rifting and crustal separation. The elevated plateau along such a margin is widely believed to have remained high since continental separation and remained flat by continuous erosion to a perched base level (no surface uplift) or alternatively represent a breakup surface (no rock uplift), despite continental-stretching theory predicting deposition of a thick post-rift sequence overlying both the rift and its margins. The absence of a post-rift section from many EPCMs is taken as evidence that it was never deposited, consistent with these margins being permanently elevated since rifting. However recent studies in West Greenland show that typical EPCM topography formed c. 50 Myr after break-up, and that the present-day high-level plateau is the remnant of a post-rift erosion surface that was uplifted in the late Neogene. Since elevated plateaux cut by deeply incised valleys are a characteristic feature of the West Greenland margin and of other EPCMs, this similarity suggests that such topography elsewhere in the world may also be unrelated to the processes of rifting and continental separation. We present geological, geomorphological and thermochronological evidence from EPCMs around the world in support of this hypothesis, and we argue that the absence of a post-rift section is due to its removal by erosion during uplift events that are unrelated to formation of the margin but are related, in some way that is not understood, to the presence of the margin.