



## **Sedimentary basin inversion: mild reactivation to intraplate orogenesis**

Randell Stephenson

University of Aberdeen, Geosciences, Geology and Petroleum Geology, Aberdeen, United Kingdom  
(r.stephenson@abdn.ac.uk)

“Basin inversion” describes the shortening and – at least partial – uplift and erosion of sedimentary basins initially formed as extensional basins, typically as rift basins. It represents an important mode of tectonic deformation of continental lithosphere away from active plate margins where most of the causative driving forces are generated. A key expression of basin inversion often preserved by the intraplate sedimentary record is the reactivation (“inversion”) of initially normal, rift-related, basement and intra-sedimentary faults as reverse faults during the shortening phase. Even where these deformations are shallow and mild it is generally understood that deeper, lithosphere-scale, processes are involved that link them with stresses generated at plate boundaries. This implies that such intraplate deformation may progress beyond mild fault reactivations and inversion-related folding to structural styles at a crustal or lithosphere scale and, with sufficient shortening, mimicking those formed at collisional orogens. This postulated continuum of intraplate deformation of sedimentary basins, from mild basin inversion to intraplate orogenesis, is investigated in this presentation by considering a number of geological examples from the literature and the author’s own experience. It is concluded that many large-scale compressional features within long-lived zones of convergence, usually interpreted to be indicative of plate boundary formation and formal subduction of short-lived but, nevertheless, implicitly mature ocean basins, are in fact the expressions of large-scale “mega” sedimentary basin inversion occurring in an intraplate setting.