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Contractional rejuvenation of syn-rift salt-bearing minibasins by numerical simulations

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This work presents numerical experiments of contractional rejuvenation of passive margin minibasins and related diapiric structures and the involvement in inverted rift and fold-and-thrust belt systems. We use 2D finite difference numerical experiments with a temperature-dependent Maxwell-type visco-elasto-plastic rheology. Our experiments consist of a first phase of extension controlled by basement faults overlaid by a thick salt-bearing unit covered by a pre-kinematic layer. Extension led to forced folding and stretching of the pre-kinematic layer triggering diapirism, fixing the lateral dimensions of minibasins, whereas syn-rift accommodation space was controlled by extension of the basement faults plus salt evacuation provided by sediment load. Rate of extension controlled: i) internal growth geometries of minibasins; ii) the amount of downbuilding, and iii) the timing and extent of primary welds. Contractional reactivation was then carried out as end member modes of thin-skinned shortening over the basement steps, full inversion of extensional faults (i.e. thick-skinned), and combinations of both, always including erosion and syn-contractional sedimentation. Results provide an extensive template of structural styles and related kinematic evolutions including minibasin rotation and imbrication, squeezing of salt structures and surface flaring, and development of deep contractional growth synclines. Modelling results will be compared to natural case studies.