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The link between salt tectonics and basement faults in the Central Flinders Ranges, South Australia.

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The Central Flinders in the central part of the Adelaide basin recorded a series of rift and basin cycles followed by partial tectonic inversion from the Neoproterozoic onwards. The deposition of evaporitic sediments during the late Neoproterozoic (Willouran age) in the Central Flinders has played a major role in the subsequent tectonic evolution of the basin, to such extend that this area is described as being the best preserved field analogue of salt-driven sedimentation and tectonics in the world. Previous works have put the emphasis on the early mobilization and withdrawal of the evaporites and its vertical transport across the overlying sedimentary cover during the sedimentation of the Early Cambrian Bunker Sandstone Fm. which is part the Hawker Group. Other works have highlighted the role of these evaporites during the Cambro-ordovician Delamerian orogeny, and the influence on growth of the fold and thrust belt in the Central Flinders. However, very few studies have focused on the control exerted by pre-Adelaidean basement structures in the deposition of evaporitic beds and their influence in the latter inversion of the basin. Here, we use published geological maps, analysis of satellite imagery and aerial photograph, field work, interpretation of seismic refraction profiles and interpretation and modelling of potential field data in order to better determine the architecture at depth and better constrain the tectonic evolution of the basin. Our study raises new evidence of the strong link between the location of evaporitic diapir and the development of normal faults affecting the basement during the basin formation. These normal faults were subsequently reactivated during the Delamerian Orogeny, and still remain the main structures controlling the present-day deformation of the Flinders.