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Structural analysis and regional interpretation of the Sprigg Inlet  
Shear Zone, with implications for the tectonic evolution  
of the Fleurieu Arc.

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## ABSTRACT

The Dudley Peninsula lies directly within the hinge of the Fleurieu Arc, a recess developed during the Cambro-Ordovician Delamerian Orogeny. On Dudley Peninsula, the structural grain was previously defined to bend through  $50^\circ$ , as defined by the regional trace of the Sprigg Inlet Shear Zone. A structural analysis of the Sprigg Inlet Shear Zone revealed structural features recording two deformation events. The initial and most intense deformation resulted in top to the WNW directed transpression, which involved a dextral strike-slip component. The second deformation involved sinistral strike-slip shear and resulted in the formation of a crenulation and folded boudins along-strike. Interpretation of magnetic data from Dudley Peninsula, along with mapping on the south coast of Dudley Peninsula has revealed that the structural grain on Dudley Peninsula does not define a major ( $\sim 50^\circ$ ) bend as previously proposed. A slight ( $\sim 5^\circ$ - $10^\circ$ ) bend of folds, faults and the Sprigg Inlet Shear Zone occurs between the NE coast and western part of Dudley Peninsula. This renewed interpretation is continuous with structural features on the limbs of the Fleurieu Arc, on southern Fleurieu Peninsula and western Kangaroo Island. This bend formed due to impingement of sediments onto the SE corner of the Gawler Craton during NW directed compression. The Fleurieu Arc is therefore classified as a Primary Arc, which possibly involved a small component of oroclinal bending during a late northerly directed compression active on Kangaroo Island either, late in, or post-dating the first phase of the Delamerian Orogeny.

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