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Structure of the Kangaroo Island Fleurieu Peninsula Shear Zone and the Provenance of its host sediments- The Kanmantoo Group- South Eastern Australia

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ABSTRACT

The Kangaroo Island-Fleurieu Peninsula Shear Zone (KIFPSZ) is considered to be a major cratonic boundary which was active during the Delamerian Orogeny. As shear zones are extremely localized regions of high strain, they hold key spatial and temporal information about the tectonic evolution of a region, and thus, it is important to gain a complete understanding of their structure and dynamics. Detailed mapping and strain logs show that strain along the KIFPSZ varies in intensity and manifestation. Whilst mineral lineations and kinematics indicate north-west directed transport towards the Gawler Craton, foliations and bedding readings gradually rotated into more easterly orientation. At a microscopic scale, Electron Backscatter Diffraction (EBSD) analysis shows a variety of slip mechanisms across sampled sections that

also suggest an increase in intensity of deformation moving southwards. Strain logs and transect maps highlight lithological and spatial differences in strain manifestation, and show that the SAFTB was formed during subsequent compression against the angular, rigid, Gawler cratonic margin. U-Pb detrital zircon analysis on the Kanmantoo Group sedimentary rocks yielded maximum depositional ages of *ca* 620 – 590 Ma. Age spectra are dominated by Early Mesoproterozoic, Late Mesoproterozoic, Neoproterozoic and Late Neoproterozoic sources, constraining the source terrains of the Kanmantoo Trough to the Prydz-Leeuwin Belt, and the Gamburstev Subglacial Mountains. Results of this study provide a detailed structural analysis of the KIFPSZ; lend further support to the notion that the South Australian Fold-Thrust Belt was formed during the compression against an angular Gawler Craton and provide constraints on the source of sediments of the Kanmantoo Trough.