



Forearc basin correlations from around the Texas Orocline, New England Orogen, east Australia

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The late Paleozoic to early Mesozoic New England Orogen occupies much of the eastern seaboard of Australia. The orogen formed by west-dipping subduction (present-day coordinates) of the paleo-Pacific plate beneath eastern Gondwana. The southern part of the orogen exhibits a series of tight bends (oroclines) that are evident in the curvature of a Devonian-Carboniferous subduction complex, in particular the forearc basin and accretionary complex. The Emu Creek Block is thought to be part of the forearc basin that is exposed in the eastern limb of the Texas Orocline, but until now the tectonostratigraphic origin of the Emu Creek Block has only been inferred from limited geological data. Here we present detrital zircon geochronology (U/Pb ICP-MS ages), a new geological map of the block, and a revised stratigraphic section. Lithological investigation of strata within the block and the age distribution of detrital zircons indicate that the sediments in the Emu Creek Block were derived from a Carboniferous magmatic arc and were most likely deposited in a forearc basin. Our new geochronological constraints indicate deposition during the late Carboniferous. We therefore propose that rocks in the Emu Creek Block are arc-distal correlatives of the forearc basin in the opposing (western) limb of the Texas Orocline, specifically the Willuri and Currabubula formations. Extensive orocline-parallel structures in the forearc basin indicate that the eastern limb of the Texas Orocline was rotated in the course of oroclinal bending by approximately 135 degrees relative to the western limb. The correlation of the forearc basin blocks on opposite limbs of the Texas Orocline provides an independent constraint on its geometry and further improves our understanding of New England Orogen tectonostratigraphy and the crustal structure of eastern Australia.