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The 'East' Margin of Neoproterozoic India: New Provenance, Geochemical and Age Constraints from Meghalaya, NE India

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The amalgamation of Neoproterozoic India with both the Neoproterozoic African continents and Australia forms the nucleus of central and eastern Gondwana. These continent-continent collisions took place along the East African Orogen, in the case of India-Africa, and the Pinjarra Orogen, in the case of the India-Australia collision. The focus of many recent efforts has been on the East African orogen and in elucidating the timing and nature of plate interactions as the various strands of the Mozambique Ocean closed to develop this orogen. The Pinjarra Orogen has received less attention, mainly because it is less well exposed, with much of it preserved on continental seamounts within the Indian Ocean, beneath the ice of East Antarctica, or in the poorly exposed basement of the terranes that now form much of SE Asia, but in the Neoproterozoic lay off NW Australia. The exception are two regions, one known as the Leeuwin Block in far SW Australia, the second being the Meghalaya Plateau and related areas of NE India. Here we present new whole rock geochemical and U-Pb zircon age data from Neoproterozoic/Cambrian I-type plutons that intrude early Neoproterozoic sedimentary rocks of the Shillong Group. In addition, we present new U-Pb and Hf isotopic zircon data from detrital zircons from the Shillong Group metasedimentary rocks that better constrain their age and their provenance.

U-Pb detrital zircon data for the low-grade metasedimentary Shillong Group constrains their age to younger than 978 ± 30 Ma and with sources that are broadly consistent with Neoproterozoic India at ca. 1180 Ma, between 1550-1800 Ma and a few near concordant ages at ca. 2400-2550 Ma. These suggest that the Meghalaya region was a coherent part of Neoproterozoic India. A caveat to this interpretation is the relative antiquity of the late Mesoproterozoic detritus is unusual for India (where most Stenian-Tonian magmatism is younger than 1000 Ma). Magmatism at ca. 1180 Ma is voluminous in central Australia. However, the older Proterozoic and Archaean Shillong Group detritus is consistent with Indian sources, so rather than suggest a Tonian link between India and Australia, we suggest that we are seeing a previously unknown Stenian magmatic province off NE India.

Three individual plutons of K-feldspar and titanite bearing granitoids (the so-called G2 granites) were dated and yielded crystallisation ages between 530-520 Ma. These rocks have chemistries that suggest the involvement of a slab-derived component in their formation, which, along with their consistent

Cambrian age supports previous suggestions that subduction of the Mawson Sea, which separated Neoproterozoic Australia from India, formed one of the last events in Gondwana formation.

