



Sedimentology, Age and Stable Isotope Evolution of the Kurnool Group, Cuddapah Basin

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Abstract

The Kurnool Group unconformably overlies the Cuddapah Supergroup in the Cuddapah Basin, one of several Proterozoic basins in India. Neither the Kurnool Group nor the origin of the basin in which it is deposited is well constrained. In order to better establish its depositional age and basin evolution, I have performed a combined sedimentological, geochronological and isotope geochemical study of the Banaganapalle Formation, Narji Limestone, Auk Shale, Panium Quartzite, Koilkuntla Limestone and Nandyal shale, from bottom to top respectively. This study used U-Pb and Hf isotope analyses on detrital zircons to constrain the maximum depositional age and provenance of the sediments. Carbon (C) and oxygen (O) stable isotopes constrained the depositional period for the Narji Limestone and Auk Shale. Stratigraphic analysis was used in conjunction with gamma ray spectrometry (GRS) U, Th and K data to determine the depositional environment. U-Pb zircon geochronology shows that the Kurnool Group is younger than 2516 ± 19 Ma sourced from a detrital zircon in the Banaganapalle Formation. Due to peak ages at 2514 ± 13 Ma from the Panium Formation and 2623 ± 27 Ma and 3167 ± 22 Ma in the Banaganapalle Formation it is clear that the sediments are sourced from the Dharwar Craton. A clear trend in O and C isotopes reveals that sediments were deposited sometime between the Mesoproterozoic to the Early Neoproterozoic in a sub-tidal environment. There is moderate petroleum potential for the Narji Limestone and it shows potential as a frontier basin.