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## **Paleoproterozoic extension of the east Dharwar craton and its imprint on the Papaghni sub-basin, India**

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Paleoproterozoic siliciclastic-carbonate sequences are widespread along the arcuate south-western margin of the Cuddapah Basin (Papaghni sub-basin), located on the East Dharwar Craton (EDC) of the peninsular India. The underlying bedrock of the Papaghni sub-basin is mostly composed of granite-gneisses with slivers of the Archaean greenstones, separated by a major regional unconformity. The initiation of the Papaghni sub-basin is related to the rifting of the EDC, which evolved into a passive margin basin, depositing the Gulcheru Formation (~285 m thick) and the Vempalle Formation (~2100 m thick). The upper part of the Vempalle Formation is marked by the presence of felsic tuffs, basaltic flows, dolerite dykes and sills intruding the stromatolitic dolomite (and often altering them to steatite) and shale. Here we report the U-Pb zircon ages for the felsic and associated mafic intrusions within the Vempalle Formation of the Papaghni sub-basin. Our study includes analysis of five samples of basalts and dolerites and one sample of felsic volcanic rock from the Vempalle Formation and one sample of basement granite.

The weighted mean  $^{207}\text{Pb}/^{206}\text{Pb}$  age of  $2523\pm 19$  Ma of the magmatic zircons from the basement granite corresponds to the age of cratonization. The U-Pb zircon ages from the intrusions of the Vempalle Formation are distinctly clustered into three groups. The oldest age cluster is comprised of ages ~2.4; ~2.5; ~2.6 and ~2.7 Ga, followed by a second set of age data that includes variable ages ranging from  $570\pm 12$ ;  $325\pm 6$ ;  $296\pm 7$ ;  $260\pm 3$  and  $227\pm 4$  Ma. The youngest age cluster comprises of ages from ~52; ~61; ~113 and ~132Ma, correlating with the ages reported from the Deccan traps.

These distinct age clusters obtained from the intrusions within the Vempalle Formation probably point to the repeated thermal activity during the long history of initiation and deposition of Papaghni Group of sediments. The oldest age cluster of the intrusions can be related to the basin opening phase, when the older zircons were trapped as xenocrysts entrained in the magma during ascent and emplacement within the succession during basin expansion. The Gulcheru Quartzite was deposited during this period, on the margin of rifted craton along the south western part of the basin, that accumulated the detritus derived from the south western highlands of EDC. The second set of data

includes variable ages ranging from  $570\pm 12$ ;  $325\pm 6$ ;  $296\pm 7$ ;  $260\pm 3$  and  $227\pm 4$  Ma. Barring  $570\pm 12$  Ma, these look more like Permo-Carboniferous Gondwana basin opening age in India. We keep it open; it might be re set age too.

The youngest age cluster is coeval with Deccan trap volcanisms which prompt us to extend the Deccan province to the eastern Dharwar, invading the Cuddapah Basin. Detailed geochronological studies are needed to correlate the regional tectonic and sedimentation history within the Papaghni Sub basin.

