Probing the igneous zircon record of the Western Dharwar craton, using U-Pb and Lu-Hf isotope systematics, to understand its early growth

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The Archean-aged Western Dharwar craton (WDC; Southern India) has been studied extensively because it contains typical granite-greenstone associations, and displays a conformable crustal section from North to South. WDC's oldest known lithologies are the 3352±110-Ma Sargur komatiites [1], and the 3342±6-Ma Hassan-Gorur TTG gneiss [2,3], although some detrital zircons with ages up to 3450-3610 Ma have also been identified [e.g., 4,5]. The metasediments these zircons have been extracted from have depositional ages ranging from *ca*. 2100 to *ca*. 3100 Ma. Therefore, it is possible that the oldest detrital zircons originated from terranes accreted to an already formed WDC and do not necessarily represent the environment of WDC's early growth. In order to bring some constraints on this issue, we have conducted a survey of WDC's basement gneisses around the Holenarsipur schist belt. We will present zircon U-Pb ages coupled with Lu-Hf isotope data for a granitic and a granodioritic gneiss, as well as for a Bt-rich enclave found within the latter.

Zircons from the granitic gneiss form a simple population that indicates a crystallization age of 3411±4 Ma. Zircons from the granodioritic sample define two distinct populations based on Th/U ratios, internal structures, and U-Pb ages. We interpret this rock to have crystallized 3178±10 My ago, and to contain a significant number of inherited zircons, with ages up to 3455±24 Ma. The Bt-rich enclave yielded two zircons dated at 3499±29 and 3607±16 Ma.

Our new results reveal the presence of crust older than *ca*. 3340 Ma in the WDC igneous record, which hence indicates that pre-existing continental crust likely played a role in the early growth of the WDC. The sources involved in this early growth will be discussed at the conference on the basis of the Hf isotope data.

[1] Jayananda et al. (2008), Precam. Res. 162; [2] Beckinsale et al. (1980), Nature 283; [3] Jayananda et al. (2015), Precam. Res. 268; [4] Nutman et al. (1992), J. Geol. Soc. Ind. 39; [5] Lancaster et al. (2015), Gondw. Res. 28.