Presence of > 3.3 Ga old crust and Neoarchean juvenile magmatic accretion in eastern most part of the Dharwar craton: Evidence from Peddavura greenstone belt.

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Neoarchean witnessed rapid growth and stabilization of continents.The Dharwar Craton had significant addition of juvenile material and consequent crustal growth during 2.9 to 2.5 Ga ago in greenstone-granite terrains. [1, 2, 3]. Rocks of Peddavura greentone belt in eastern Dharwar craton was studied for Rb-Sr and Sm-Nd systematics to understand crustal growth in the Dharwar Craton.

Peddavura greenstone belt consists of pillowed basalt, basaltic andesites and rhyolites inter-layered with ferrugenous chert. Basalt and basaltic andesites define a Rb-Sr isochron age of 2551±19 Ma (MSWD=1.16), whereas, rhyolites were scattered and do not show any age. Sm-Nd system also does not yield any age for both the rock types.

The Rb-Sr age could represent time of thermal event that was strong enough to completely reset the Rb-Sr isotopic system in the basaltic rocks. The scattering of samples in Sm-Nd evolution diagram could be due to either low-temperature alteration or heterogeneity in their sources. The basalt and basaltic andesites show variation in their ε_{Nd} values, whereas they have similar ε_{Sr}. This implies that magmas representing these rocks might have derived from variably LREE enriched and depleted mantle sources. Rhyolites show larger variation in their ε_{Nd} as well as in ε_{Sr} which are negatively correlated. Parental magmas of rhyolites derived by partial melting of short-lived basaltic rocks were contaminated with older crustal rocks similar to the Gorur-Hasan gneisses. Thus, we infer presence of older crust, > 3.3 Ga, in the eastern most part of the Dharwar Craton.

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Microbial mobilization of arsenic for bioremediation of contaminated soils

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Arsenic contamination of soil and drinking water is a serious problem of worldwide concern [1, 2]. The efficiency of a novel combined strategy relying on enhancing microbial As mobilization with subsequent immobilization on nanosized iron phases for the treatment of mining impacted soil (As >2000 ppm; Lower Silesia, Poland) was evaluated.

Three bioreactors were operated in parallel assessing 1) inherent As reducing capacity of the soil; 2) biostimulation with external electron donor and 3) bioaugmentation with dissimilatory arsenate reducing microorganisms. Mobilization rates of As, Fe, Mn were anlyzed using ICP-MS, whereas aqueous As speciation was analysed by LC-ICP-MS. Potentially formed hazardous As volatiles were trapped in 1% H_2O_2 (Fig.1). Addition of an external electron donor resulted in both lower total and bioavailable As fraction in soils. Different iron phases were evaluted for their As sorption/desorption capacity of different As species following microbial mobilization. Nanosized ferrihydrite prooved to be the most effective and cheap As sorbent evaluated.

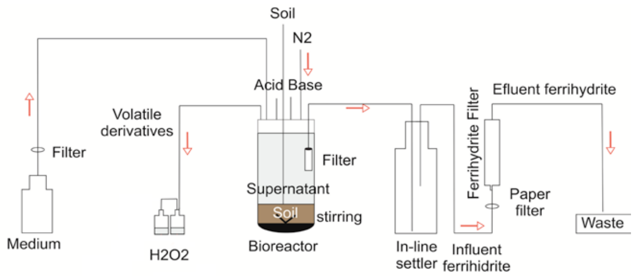

Figure 1: Scheme of bioreactor design.

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