

## Three dimensional magmatism in Settupalle Complex, Cuddapah Alkaline Province, South India

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The Cuddapah alkaline Province, Andhra Pradesh, Southern Peninsular India characterised by isolated pockets of sub-alkaline and alkaline lithounits and located along the eastern margin of the intracratonic Proterozoic basin of South India Craton. The Settupalle Complex forms the saturated to oversaturated component of the said "Cuddapah alkaline province". It is conspicuously confined to an extremely narrow linear belt which is close to known basement fracture zone with which the major bouguer gravity axis is parallel in a NNE=SSW direction. This particular belt lies at the junction zone between fold belts i.e Dharwar (granite-greenstone belt towards the west and the Eastern ghat (gneiss-granulite) mobile belt towards east. The Settupalle complex was post-kinematic, tectonically controlled and passive emplacement in to the Precambrian amphibolites and granite gneiss basement.

The mineralogical and geochemical analysis suggest that the parental magma diversified into tholeiitic basalt and mildly alkaline basalt magma. The tholeiitic magma was dry and differentiated under very low oxygen fugacity conditions in a closed system fractionation process whereas the mildly alkaline basalt magma was hydrous differentiated under very low water pressure conditions. The existence of two diversified magmas suggests the three dimensional model. i.e.

- a. Evolution by branching differentiation (Petrogenys residua system) from single tholeiitic magma.
- b. Evolution by two independent magma (tholeiitic on one side and alkaline on the other side).
- c. Evolution of alkaline trend by branching differentiation only.

The exact mechanism is subject to be a question of debate and it is left for discussion.

## New Mg/Ca calibration of benthic foraminiferal species: Mapping of the tropical thermocline dynamics

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Because the Atlantic Meridional Overturning Circulation (AMOC) transports warm and salty surface waters to high latitudes, where deep-water formation return southwards, reconstruct changes within the tropical thermocline and intermediate and deep-waters circulation might solve the mechanisms linking high and low latitudes climate changes and restrain our understanding in heat transport and temperature distribution. As a part of this strategy we need a best possible calibration methods to reproduce water mass properties and to get a good representation of the thermocline area at the Brazilian Atlantic margin.

In order to map the thermocline gradient dynamics in the western tropical Atlantic we use Magnesium/Calcium (Mg/Ca) on bottom water living foraminifera as a representation of temperature at site. For the calibration we used a set of CTD casts and we calibrated Mg/Ca content versus oxygen isotopic temperature to provide an estimate of thermocline depth penetration in modern climate.

We present new Mg/Ca data calibration from a depth transect from the western tropical Atlantic, which is characterized by a bottom temperature range from 6 to 4°C corresponding to a water depth of sites from 600 to 1000 m, in order to map the thermocline gradient. We analysed on multiple benthic foraminiferal species from a series of core-tops. Mg/Ca were performed from samples cleaned using oxidative steps and by ICP-OES.

The incorporation of Magnesium have a strong correlation to calcification temperature. Depending on the foraminiferal species, we examined the sensitivity of foraminiferal inter-species in response to the carbonate ion saturation effect ( $\Delta [CO_3^{2-}]$ ) on Mg/Ca ratios.