

Paleo-Hydroclimate of South African Rainfall Prior Brunhes-Matuyama

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The international ocean discovery program (IODP) expedition 361 drilled 6 sites along southeast African margin. Among these sites this research paper will mainly be focused on site U1474 located northernmost Natal Valley, southeast of Durban, South Africa. This project will constrain an ongoing the research on site U1474 changes in South African rainfall patterns, and climate along the Agulhas regime prior to the Brunhes-Matuyama boundary during MPT from 0.78 – 1 Ma. Various methods such as Chemical leaching, Benthic foraminifera analysis, K/Ar dating (Potassium- Argon), Stokes law of settling, and graphic correlations were used for this research project. South African rain fall is influenced by the SST (sea surface temperature) variability, Milankovitch cycles, intertropical convergence zone (ITCZ), and Congo air boundary (CAB). The Zambezi catchment is the biggest riverine in the southeastern portion of South Africa. The ITCZ & CAB currently overlap northern parts of the Zambezi catchment causing more rainfall in the region during the austral summer (December, January, February). A null hypothesis was generated due to the current rain fall climate presently; it may have been the same prior to the Brunhes - Matuyama boundary during the MPT. A refined timescale correlated with the LR04 $\delta^{18}\text{O}$ global age model was constructed showing depositional ages 0.78- 0.97 Ma with a high $\delta^{18}\text{O}$ signal demonstrating glacial period prior the Brunhes-Matuyama boundary, which was compared with sediment provenance ages ranging from an interval of 150- 230 Ma at depths ranging from 30- 40 m below sea floor that demonstrates a general trend of decreasing with depth (from past to more recent) suggesting older sediments from site U1474 may have originated from Limpopo and younger near local rivers prior to the Brunhes- Matuyama boundary. This indicates the ITCZ & CAB African rain belts had a different position possibly more towards the southern hemisphere causing more of a Limpopo contribution thus showing less local rainfall in the region and more from distant sources when comparing both depositional with provenance ages. It's recommended that more research done on sedimentary fluxes, Milankovitch cycle, SST variability, and XRF (X-Ray Fluorescence) data compare provenance ages with other chemical ratios in the region such as Fe/K, Ti/Ca, or K/Ca, analyzing for sediment provenance for the entire interval compared to a portion. This information potential used as an indirect way to aid in water management in South Africa as well help better prepare for upcoming climate changes in the region.