Geophysical Research Abstracts, Vol. 7, 02942, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02942

The suture zone rocks of the Pan-African Dahomeyide orogen, West Africa

K. Attoh (1) and M. Schmitz (2)

(1) Dept. of Earth and Atmos. Sci., Cornell University, Ithaca, NY 14850 USA
ka17@cornell,edu (2)Dept. of Geosciences, Boise State University, Boise ID 83725

The suture zone rocks of the Pan-African Dahomeyide orogen in West Africa are a key source of data for understanding Precambrian orogens; they provide the opportunity to extract a wealth of information about orogenic processes. The package includes a deformed alkali rocks and carbonatite (DARC) unit over-thrust by high-pressure mafic granulites and eclogites (HIPGE). The DARC suite provides the opportunity to constrain the age of the rifting events that produced the West African craton prior to incorporation into Gondwana whereas spectacular kinematic indicators consisting of garnet and hornblende porphyroclasts constrain the displacement sense associated with compressional orogenic events. The HIPGE rocks which indicate re-equilibration pressures of 15-20 kbars at 800˚C also contain garnets with exsolved rutile microstructures consistent with an earlier UHP metamorphic record. Together, the metamorphic and structural data from HIPGE are consistent with subduction of the eastern margin of WAC to mantle depths requiring continent-continent collisional orogenic phase.

Major and trace element concentrations in HIPGE rocks suggest preservation of geochemical imprints of their magmatic protoliths. Samples representing suites characterized by MORB and tholeiitic island arc (IAT) affinities have been analyzed for Nd and Hf isotopic compositions. The MORB-like sample has relatively high radiogenic Nd isotopic composition (143Nd/144Nd= .513167; epsilon Nd= 8.17) and Hf isotopic composition (176Hf/177Hf= .283496) that yielded T_{DM}= 0.77 Ga. Samples with IAT-affinities gave lower radiogenic Hf isotopic composition (176Hf/177Hf $\sim$ .282877 and .282985) and lower epsilon Nd (5.3 and 6.6) which gave an older, depleted mantle source derivation age (T_{DM} $\sim$0.96 Ga). The data suggest that magmatic protoliths of the HP granulites may have erupted $\sim$200-300 my prior to suturing involving collisional orogeny and thus provide, for the first time, some constraint on the timing of

the pre-Gondwana rifting of the WAC.