

TIMING OF PALEOPROTEROZOIC EVENTS IN THE BIRIMIAN OF THE WEST AFRICAN CRATON: A CASE STUDY FROM THE HOUNDE GREENSTONE BELT (BURKINA FASO)

OLIVIER BRUGUIER¹, DELPHINE BOSCH², RENAUD CABY³, LENKA BARATOUX⁴ AND MARK W JESSELL⁵

¹Géosciences Montpellier, Université de Montpellier, CNRS

²CNRS-UMR5243, Géosciences Montpellier, Université de Montpellier

³Géosciences Montpellier

⁴Géosciences Environnement Toulouse

⁵The University of Western Australia

Presenting Author: olivier.bruguier@umontpellier.fr

This study presents geochemical (major and trace elements, Nd isotopes on whole rocks) and geochronological (U-Pb on zircon) analyses on granitoids and volcanics from the Hounde Greenstone Belt (HGB) from South West Burkina Faso.

Geochemical analyses indicate that the oldest dated plutonic samples (2195 ± 6 and 2183 ± 7 Ma) have a trondhjemitic affinity and metaluminous or peraluminous character. Similar ages at 2172 ± 5 and 2191 ± 5 Ma were also obtained on volcanics (andesite and rhyolite) from within the HGB indicating coeval development of GB and basement rocks. The trondhjemitic have geochemical characteristics consistent with magma production in a convergent plate setting and the 2.20 – 2.17 Ga period is interpreted as corresponding to arc build-up and thickening of the arc crust. Cross-cutting leucocratic veins in the trondhjemitic indicates partial melting of the arc crust at 2144 ± 6 Ma, which may be related either to a regional metamorphic event or triggered by the gradual thickening of the crustal section. Granites and granodiorites (and their volcanic equivalents) yield younger ages in the range 2132 ± 3 Ma to 2095 ± 9 Ma, and geochemical features typical of volcanic arc granites although the youngest granitoids, in the 2120 – 2100 Ma range, indicate a syn-collisional setting.

Nd isotope data show large variations (eNd ranging from +0.7 to +14.5) and a broad general trend of increasing eNd values with decreasing ages. This trend may reflect increasing proportions of juvenile mantle-derived material to the source regions of the younger granitoids. However some samples have significantly older T_{DM} model ages ranging from 2310 to 2430 Ma suggesting the involvement of early Birrimian components that could have been added to the source regions, either by assimilation at lower crustal levels or by sediment subduction.