CRETACEOUS ANOROGENIC GRANITES AND SILICIC VOLCANICS AT THE PASSIVE MARGIN OF NAMIBIA

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This study of Cretaceous silicic complexes in NW-Namibia (Brandberg, Paresis, Erongo and Gross Spitzkoppe) reveals a great diversity in composition which is controlled by lithology and age of the local crust and by the crust/mantle ratio in the magma source. The Brandberg consists of biotite- hornblende granite (68-71 wt.% SiO2) with subintrusions of monzonite, leucogranite and an arfvedsonite granite with extreme HFSE contents (Nb to 2900 ppm, Zr to 1.7 wt.% and Y to 2000 ppm). Nd isotopic ratios of all Brandberg units overlap (eNd -0.5 to -3.5) and indicate a mantle source magma with up to 20% contamination by Pan-African (mobile belt) crust.Paresis is dominated by metaluminous rhyolites (67-74 wt.% SiO2) and HFSE-rich peralkaline comendites (75 wt.% SiO2; Zr to 2500 ppm, Nb to 230 ppm). The rhyolites (eNd = -20) can be regarded as crustal melts of Early Precambrian (cratonic) crust. Isotope ratios (eNd = -11) and trace element character of comendites suggest a hybrid origin, with ca. 30% cratonic crust and 70% mantle-derived material.Erongo silicic units are tourmaline-rich peraluminous granite (74-78 wt.% SiO2, Rb/Sr to 45) and cordierite-bearing granodiorite (67-70 wt.% SiO2) with compositionally equivalent rhyodacite tuff. Mineralogy, enclaves and isotope ratios of these units (eNd = -7 to -9) suggest a Pan-African metasedimentary source.Gross Spitzkoppe is made up of highly-evolved topaz-bearing monzogranites (76 wt.% SiO2, Rb/Sr ~30). Its high F (0.5 wt.%), high HFSE (Nb ~110 ppm, Y to 300 ppm) and annite-siderophyllite as the only mafic silicate are features typical of granites thought to be derived from melt-depleted crustal sources.