GEOCHRONOLOGY AND PETROLOGY OF THE SAN GABAN IGNEOUS COMPLEX OF SOUTHERN PERU: IMPLICATIONS FOR TRIASSIC-JURASSIC FELSIC MAGMATISM AND SN-W METALLOGENY IN THE CENTRAL ANDES

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The San Gabán plutonic complex (SGPC), located within the Lower Paleozoic sedimentary belt of the Cordillera Oriental of the Central Andes, consists of a suite of gabbroic through dioritic to monzogranitic rocks. Metamorphic mineral assemblages in surrounding pelites indicate contact metamorphic conditions of ca. 2.2 kbars and 600°C; a similar T is obtained using grt-bt geothermometry (657±58°C, n=5) on microxenoliths in monzogranites. K-Ar bt dates range from 38 to 123 Ma and $^{40}Ar/^{39}Ar$ dating of a bt yields a disturbed spectrum with high T gas fractions at ca. 110 Ma. In contrast, U/Pb zircon dating [6 zircon fractions (euhedral, clear to pink) from 1 mafic and 2 felsic samples] indicates an age of 202 ± 2 Ma (2σ) with Pb loss evident in some fractions. The age data indicate crystallization of the SGPC at 202 Ma, i.e., Early Jurassic, with subsequent overprinting in the late Eocene during the regionally extensive Zongo-San Gabán tectonothermal event (Farrar et al., 1988). Despite limited exposure of the SGPC, detailed petrographic and geochemical studies suggest a continuum in magmatic evolution from an ol-opx-cpx±amph gabbro-diorite unit (45-52 wt.% SiO_2) through intermediate to felsic (70 wt.% SiO_2) members; whole-rock geochemical data outline continuous trends in Harker-type plots while biotite composition (mg values) changes accordingly. We note, however, that petrographic- (microxenoliths, non-phenocrystic spessartine) and geochemical (A/CNK ≥ 1.0 at 60 wt.% SiO_2; S-type chemistry in ACF plot) relationships suggest assimilation of pelitic material. In terms of chemical classification, mafic and intermediate members of the SGPC conform to calc-alkaline fields in standard plots (AFM; $\Sigma[Na_2O+K_2O]$ vs. SiO_2) whereas felsic rocks (70 wt.% SiO_2) correspond to "syn- or post-collisional" granites using ORG-normalized plots. Pb isotopic compositions for K-feldspar (n=3; avg.($\pm 1\sigma$) $^{207,206,208}Pb/^{204}Pb$ = 15.602±0.053, 18.588±0.036, 38.544±0.039) define a mantle signature and overlap the field of Main Arc igneous suites of Mesozoic and Early Teritary age from S. Peru. The SGPC indicates that mantle-derived magmatism was broadly contemporaneous with intrusion of mineralized (Sn-W-Cu), Triassic-Lower Jurassic, crust-derived, granitic suites of the Central Andean tin belt. This association suggests a possible connection between crustal anatexis and mantle-derived melts and also allows for magma mixing and a potential mantle contribution to the base-metal component of mineralized granites in this region.

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