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Partial melting and magma generation in the Mesoarchean (ca. 3.0 Ga) TTG gneisses of the Xingu Complex, Carajás Province, Amazon Craton.

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The Xingu Complex is composed of migmatized orthopyroxene-diopside gneisses of tonalitic to granodioritic composition with *boudins* of amphibolites. These rocks are juxtaposed by mafic granulite gneisses from the Pium Complex, which are also variably migmatized. Geological and geochemical characteristics of the Xingu Complex gneiss are similar to those of sodic TTG suites with intermediate HREE content, including: (i) the association of polyphasic orthogneiss with mafic enclaves and leucosome; (ii) Na₂O content between 4.36 and 4.66%; (iii) K₂O/Na₂O ratio of 0.21 to 0.53; (iv) Al₂O₃ content between 15 and 16% for rocks with more than 70% of SiO₂; (v) Yb content of 0.18 to 1.23 ppm; (vi) (La/Yb)_N between 12 and 49; (vii) Sr/Y values between 43 and 168 ppm; (viii) Nb-Ta and Ti negative anomalies; (ix) no significant Sr anomalies and absence of Eu negative anomalies (Eu/Eu* = 0.81 to 2.1); and (xi) V/Sc values between 6 and 15. The crystallization age of the gneiss protolith was dated at 3,066 ± 6.6 Ma (U-Pb SHRIMP IIe zircon core analysis from paleosome). Its genesis was related to melting of hydrated metabasalts under compatible conditions with garnet, hornblende and rutile stability in the restite. The successive granulite facies metamorphism was synchronous to the development of a low angle gneissic banding (S₁) with N70E/40NW to N24E/50NW direction and down-dip stretching lineation. S₁ banding was affected by isoclinal folds with subvertical axial foliation (S₂) with WNW-ENE trend and by E-W strike-slip ductile shear zones (C₁). The first partial melting event occurred at 2,959 ± 15 Ma (U-Pb SHRIMP IIe in zircon core from the leucosome) and reflects the biotite dehydration reaction to form peritetic orthopyroxene (Bt + Qtz + Kfs = Opx + melt; ~800 °C) in the thermal peak of the metamorphic trajectory of the Xingu Complex gneiss. The products of anatexis include *patch* and stromatic metatexites and *schlieren* and *schollen* diatexites, in which the leucosomes show granoblastic texture. The second anatetic event was related to crosscutting coarse-grained undeformed leucosomes formed at ca. 2.86 Ga. The geochemical, geochronological and metamorphic data from the Xingu Complex gneiss reinforce the importance of active tectonic margin process in the genesis of the Mesoarchean continental crust. The preliminary metamorphic evaluation indicates also that the Xingu and the Pium complexes could represent part of the exhumed lower crust of the northern Carajás Province, probably reworked during the granite genesis events recognized in the area between ca. 2.96 and 2.86 Ga.