



SHRIMP U-PB ZIRCON AGE OF THE LA CRUZ GRANITE, EASTERN
 PRECAMBRIAN OF BOLIVIA: IMPLICATIONS FOR THE LOMAS MANECHIS
 OROGENY IN SW AMAZONIAN CRATON

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ABSTRACT

The San Ignacio Schist Group comprises Mesoproterozoic rocks that occur along the SW part of the Amazonian Craton, in the Eastern Precambrian shield of Bolivia, and hosts granitoid bodies of the Lomas Manechis Suite. Zircon grains from La Cruz Granite belonging to this suite yielded SHRIMP U/Pb age of 1673 ± 21 Ma considered as the emplacement age. In the Western Cordillera of Bolivian Andean chain (Arequipa-Antofalla Block – AAB) a basement exposure called Cerro Uyarani yielded 2024 ± 133 Ma. Subduction during the San Ignacio orogeny (1340-1320 Ma) led to the collision of the Arequipa-Antofalla Block (AAB) and the Paraguá Block against the Rio Negro Juruena province, leading to reworking and metamorphism of the Lomas Manechis Suite. The relatively younger Sunsás orogeny (1.1-1.0 Ga), marginal to the Paraguá Block, produced the accretion of AAB and the Sunsás belt against the Rondonian San Ignacio Province. This shows that the SW border of the Precambrian shield of Bolivia was allochthonous with respect to the Rio Negro-Juruena province.

Keywords: Bolivia, San Ignacio Orogeny, Geochronology, Amazonian Craton.

INTRODUCTION

The San Ignacio Schist Group (SISG) comprises Mesoproterozoic rocks that occur along the SW part of the Amazonian Craton, in the Eastern Precambrian shield of Bolivia, and hosts bodies of the Lomas Manechis Suite, San Ignacio and Sunsás age granitoid rocks. Further the extreme SW of Eastern Precambrian shield of Bolivia, called San Ramón district, was deformed by an important oblique tectonic style, with sinistral shear sense during the Sunsás orogeny related to the collision between Amazonia and Laurentia. We report new

SHRIMP U-Pb zircon ages of the La Cruz granite (Lomas Manechis suite). This pluton hosted by the San Ignacio Schist Group has been deformed by the tectonic events related to both the San Ignacio and Sunsas orogenies. Our results provide a better understanding of the Precambrian framework of Bolivia, and with implications for the Mesoproterozoic evolution of the SW part of Amazonian Craton.

SHRIMP U-Pb RESULTS

Eight zircon grains from La Cruz Granite were analysed. Five analysis of the core of these grains lie on Concordia and yield a weighted mean $^{207}\text{Pb}/^{206}\text{Pb}$ age of 1673 ± 21 Ma (Figure 1) considered as the emplacement age. This age compares within error of two ages obtained by Boger et al. 2005 and one by Santos et al. 2008 in the range of 1689 to 1663 Ma.

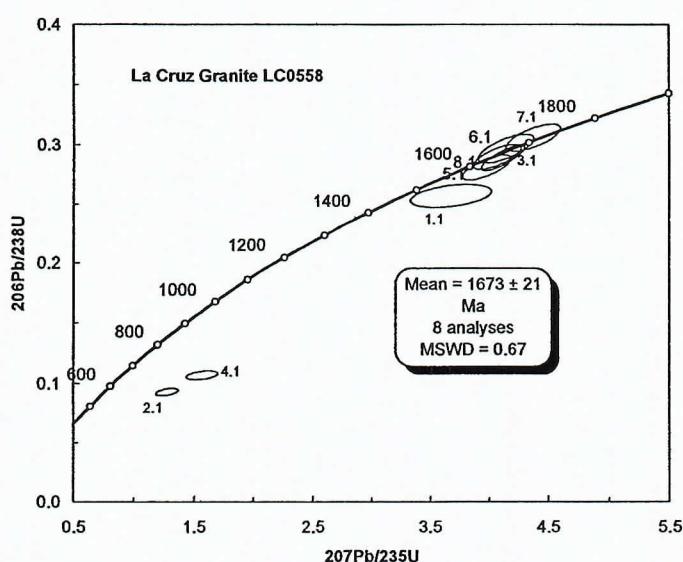


Figure 1. SHRIMP zircon U-Pb concordia diagram of the sample LC0558, La Cruz granite.

PRECAMBRIAN GEOLOGIC EVOLUTION OF BOLIVIA

The San Ignacio Schist Group (SISG) crops out as discrete belts composed of metapsamites, schists, phyllites, slates, mafic metatuffs, BIF, metachert, metalavas of tholeiitic and felsic composition; rocks of oceanic affinity associated to volcanogenic massive sulphide deposits. The SISG was intruded by the Lomas Manechis granitoid rocks (e.g. La Cruz and Refugio granites). Santos et al. (2008) reported SHRIMP U-Pb ages in zircon from

the Refugio granite yielding a $^{207}\text{Pb}/^{206}\text{Pb}$ age of 1641 ± 4 Ma. On the basis of our new data and geologic correlations we envisage the following evolution for the Precambrian shield of Bolivia: the AAB would be a Proterozoic terrane as part as the Amazonia. Rifting during break up in late Paleoproterozoic times led to separation of AAB from the Paraguá Block. The boundary between the two crustal blocks constitutes an ocean. Andean- type subduction responsible for the origin of the Lomas Maneches granites at late Paleoproterozoic times (1.7-1.6 Ga). The paleosuture of the ocean crust could be the mafic and ultramafic rocks of the SISG of San Ramón area. Later subduction led to the collision of the Paraguá Block against RNJP during San Ignacio orogeny. Finally the Sunsás orogeny resulted from collision of Laurentia against SW Amazonia, and consequently the accretion of AAB and the Sunsás belt against the Rondonian San Ignacio Province.

The San Ramón district is characterized by an oblique tectonic style produced during the Sunsás orogeny over pre- San Ignacio rocks, with structures similar to the Nova Brasilândia and Ji-Parana shear zones with sinistral shear sense observed on the field and interpreted geophysically, all related to the collision between SW Amazonia and Laurentia and implying a continuity of such structures from Rondônia to Bolivia. This scenario let us to conclude that the SW border of the Precambrian shield of Bolivia was allochthonous with respect to the Rio Negro-Juruena Province.

REFERENCES

BOGER, S.D., RAETZ, M., GILES, D., ETCHART, E., FANNING, M.C., 2005. U-Pb age data from the Sunsás region of Eastern Bolivia, evidence for the allochthonous origin of the Paraguá Block. *Prec. Research*, 139, 121-146.

SANTOS, J. O. S., RIZOOTTO, G.J., MCNAUGHTON, N. J., MATOS, R., HARTMANN, L. A., CHEMALE JR., F., POTTER, P. E., QUADROS, M.L.E.S., 2008. Age and autochthonous evolution of Sunsás Orogen in West Amazon Craton based on mapping and U-Pb geochronology. *Prec. Research*, 165, 120-152.