

EGU2020-12101

<https://doi.org/10.5194/egusphere-egu2020-12101>

EGU General Assembly 2020

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U-Pb CA-IDTIMS geochronology of the Late Paleozoic glacial and post-glacial deposits in southern Paraná Basin

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The Late Paleozoic Ice Age (LPIA), one of the best known and prolonged glaciation events in Earth's history, resulted in the deposition of glacial sediments over Gondwana. The terminal deglaciation, a diachronic event starting earlier at the western and later in the eastern part of the continent, caused sea level rise and the widespread deposition of transgressive sedimentary successions. The Paraná Basin is one of these basins recording both glacial influenced (Itararé Group) and post-glacial (Guatá Group) deposits. However, the absence of Carboniferous and Permian guide fossils has motivated a chronostratigraphic approach based on plants and palynomorphs, which associated with sparse radioisotopic ages have suggested that transition between the glacial-influenced and the post-glacial succession would have occurred in the Sakmarian, early Permian (Holz et al., 2010). These results are in conflict with recent studies that indicate LPIA glacial deposits are constrained to the Carboniferous (Cagliari et al., 2016; Griffis et al., 2019). Therefore, in this study we present new high-precision single-crystal CA-ID-TIMS U-Pb radioisotopic ages for the glacial influenced (one samples) and post-glacial (six samples) deposits in the southern Paraná Basin. Along with these new radioisotopic ages, a Bayesian age-depth model was applied to constrain the age of the LPIA demise in the southern Paraná Basin, which also represents the icehouse-greenhouse transition. The resulting age for the Rio do Sul Formation, topmost unit of the Itararé Group, is Ghzelian (Carboniferous). For the Rio Bonito Formation, basal Guatá Group, all samples are Asselian (Permian). The results reinforce that glacial-influenced deposits in the southern Paraná Basin are constrained to the Carboniferous. Based upon the depth-age model, the icehouse to greenhouse transition likely occurred in the Late Carboniferous. The integration between our results and recent published high-resolution U-Pb ages allowed us to detail the Carboniferous-Permian chronostratigraphic framework of the southern Paraná Basin.

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