

# Depositional age and provenance in the San Luis Formation, Sierras Pampeanas, Argentina: Evidence from detrital zircon studies

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The San Luis Formation is one of the lithostratigraphic units constituting the early Paleozoic crystalline basement of the Sierras de San Luis, which are part of the Sierras Pampeanas of central Argentina. The low-grade metamorphic overprint of the San Luis Formation makes it a key unit for the modelling of its sedimentary environment, which belongs to a deep-marine environment. This formation crops out in two belts named as Eastern and Western, whose stratigraphic correlation has not been clarified. Five samples from both belts of the San Luis Formation show U-Pb age distributions of detrital zircons with dominant peaks that are characteristic of orogenic systems of the West Gondwanan landmasses. However, detrital zircon age spectra and maximum depositional ages differ substantially in each belt of the San Luis Formation. While the Western belt displays polymodal age patterns with its most prominent age peaks at  $\sim 635$  Ma, a second most important population appears at  $535\text{--}575$  Ma with subordinate groups at  $720\text{--}775$  Ma and  $1.7\text{--}2.2$  Ga; the Eastern belt shows an almost unimodal age pattern dominated by an age peak at  $\sim 535$  Ma, with very subordinate peaks at  $\sim 620$  Ma,  $\sim 780$  Ma and  $\sim 1,017$  Ma. Regarding the maximum depositional age, two different ages have been recognized in the Western belt,  $\sim 555$  Ma at its bottom and  $\sim 530$  Ma at its top; whereas in the Eastern belt the maximum depositional age is  $\sim 515$  Ma. The age spectra of detrital zircons from the San Luis Formation record the evolution of the nearby Pampean

orogen. At an early stage of exhumation, the Pampean orogenic system chiefly liberated recycled sedimentary detritus containing zircons with Neoproterozoic (?635 Ma), Mesoproterozoic (?1,000 Ma) and subordinate amounts of Paleoproterozoic (?2,200 Ma) ages. Upon advanced unroofing and active erosion, the Pampean sequences sourced first-cycle detritus with latest Neoproterozoic to early Cambrian ages (555?525 Ma). A major conclusion is that the San Luis Formation accumulated in at least two stages, filling successive deep-marine basins that were marginal to the Pampean orogen during and after its latest Neoproterozoic to Cambrian development.