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Review of the Cambrian Pampean orogeny of Argentina; a displaced orogen formerly attached to the Saldania Belt of South Africa?

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Abstract

The Pampean orogeny of northern Argentina resulted from Early Cambrian oblique collision of the Paleoproterozoic MARA block, formerly attached to Laurentia, with the Gondwanan Kalahari and Rio de la Plata cratons. The orogen is partially preserved because it is bounded by the younger Córdoba Fault on the east and by the Los Túneles Ordovician shear zone on the west. In this review we correlate the Pampean Belt with the Saldania orogenic belt of South Africa and argue that both formed at an active continental margin fed with sediments coming mainly from the erosion of the Brasiliano–Pan-African and East African–Antarctica orogens between ca. 570 and 537 Ma (Puncoviscana Formation) and between 557 and 552 Ma (Malmesbury Group) respectively. Magmatic arcs (I-type and S-type granitoids) formed at the margin between ca. 552 and 530 Ma. Further right-lateral oblique collision of MARA between ca. 530 and 520 Ma produced a westward verging thickened belt. This involved an upper plate with high P/T metamorphism and a lower plate with high-grade intermediate to high P/T metamorphism probably resulting from crustal delamination or root foundering. The Neoproterozoic to Early Cambrian sedimentary cover of MARA that was part of the lower plate is only recognized in the high-grade domain along with a dismembered mafic–ultramafic ophiolite probably obducted in the early stages of collision. Uplift was fast in the upper plate and slower in the lower plate. Eventually the Saldania and Pampean belts detached from each other along the right-lateral Córdoba

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