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Long-travelled sediments from India to Australia in the assembled Gondwana

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Previous studies of the late Neoproterozoic to early Paleozoic sedimentary strata in the Centralian Superbasins of Australia revealed their sedimentary sources from the local Paterson-Petermann orogen and Musgrave Inliers during the Gondwana assembly, based on the prevailing 700-500 Ma and 1.2-1.0 Ga zircon age populations and Hf isotope affinities of these sedimentary rocks with that of the magmatic suppliers in the Petermann orogen and Musgrave Inliers.

Investigations on the Cambrian strata of the Ord basin in northern Australia, however, reveal a provenance affinity which is different from the Australian suppliers. The prevailing 980-930 Ma zircon population with dominant positive epsilon Hf values from the Ord basin Cambrian sediments indicates an Indian Himalaya source which features matching zircon age and Hf signals. Furthermore, the northeastern-directed paleocurrents in the Cambrian coastal marine environments of the Ord basin agree with the possibility of Cambrian detritus travelling along the northeastern Gondwana shoreline from Indian Himalaya to the Australian Ord basin. This work demonstrates that, during the Gondwana assembly, Australian basins not only received local sediments, but also caught detritus travelled for thousand kilometres from Indian Himalaya via longshore currents.