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Radiometric dating demonstrates that Permian spore-pollen zones of Australia and South Africa are diachronous

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Abstract

The well-refined Permian palynozonation of Western and eastern Australia is the current standard biostratigraphic scheme for the Southern Hemisphere, but intra-Gondwanan floristic provincialism means that several stratigraphically useful palynomorph taxa are rare or absent elsewhere in Gondwana. Radio-isotopic ages for both Australia and the main Karoo Basin of South Africa demonstrate that key marker taxa all appear diachronously in the two countries, or they are absent in one of the countries. The establishment of new plant taxa in the Gondwanan Permian realm was strongly tied to palaeolatitude, with floral distributions primarily affected by temperature, precipitation, and seasonality. This spatio-temporal variation of floras hinders global biostratigraphic correlations. Both South Africa and Australia have excellent long-ranging Permo–Triassic terrestrial sedimentary successions, and although vertebrate biostratigraphy has been the focus of much research endeavour in the South African Karoo, palynological studies have lagged. Accordingly, a new South African palynozonation should be established that is based on the first appearances of key index taxa in the main Karoo Basin, rather than elsewhere in Gondwana. In the interim, the diachronous