GLACIALS, TUFFS AND TECTONISM: CONSTRAINTS OF EARLY INTRACONTINENTAL EXTENSION, DWYKA GROUP, NAMIBIA

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Sections of the Dwyka Group in southern Namibia subdivide into four upward-fining deglaciation sequences, each capped by glaciolacustrine or glaciomarine mudstone units. Two of the latter are particularly thick and widespread and have been referred to as the “Ganigobis Shale Member” and the “Hardap Shale Member”.Here we focus on the Ganigobis Shale Member, which is characterized by an abundance of marine body and ichnofossils and a total of at least 24 ashfall tuff horizons, each 0.1-2.5 cm thick. Syndepositional tectonism is recorded by type-1 unconformities and systematic thickness changes across NW-SE trending extensional normal faults. Juvenile magmatic zircon separates from the tuff horizons revealed SHRIMP-ages clustering around 300-302 Ma which date the top of the second deglaciation sequence to the late Carboniferous (Kasimovian or Gzhelian).Southward directed ice transport directions measured in southern Namibia inspired previous authors to postulate a roughly NW-SE trending Namaqualand ice lobe. The spatial arrangement of the latter is between the converging westwardly directed Transvaal ice sheet in Botswana and South Africa and the eastwardly directed Asunción ice sheet in South America, suggesting the existence of an elongate, NW-SE trending depository. In this context the combined occurrence of marine fossils and tuff beds in shale units of the Namibian Dwyka Group becomes exceptionally important. They record and date the first of a series of marine incursions of a shallow marine seaway tracing the future line of disruption between Africa and South America as early as during the Carboniferous-Permian.