A rapid and synchronous initiation of the Sturtian glaciations

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The Neoproterozoic glaciations posit a remarkable milestone in Earth history due to their severe influence on atmosphere, biosphere, and hydrosphere. Of these, the Sturtian glaciation is the longest, lasting for about 50 million years. These glaciations, however, remain disputed in terms of the timing and synchroneity. Here we demonstrate the Jiangkou glaciation in South China, an equivalent of the Sturtian glaciation, was initiated at ca. 714 Ma by means of SIMS U-Pb zircon dating of intercalated metamorphic tuffaceous siltstone beds below the diamictite units. These ages are, within uncertainty, synchronous with those documented from the Laurentia and Oman, thereby indicating a synchroneity and global extent of the Sturtian glaciation. The synchronous occurrence of Sturtian glaciation at middle to lower latitudes and tropical regions must point to a rapid ice sheet advancement process as a response to ice-albedo feedback, as has been demonstrated by numerical modeling.