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# U-Pb zircon (CA-ID-TIMS) age supports globally synchronous Sturtian deglaciation

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## Abstract

A central prediction of the Snowball Earth hypothesis is that glacial onset should be synchronous at low latitudes, and its termination should be rapid and synchronous globally. High precision U/Pb zircon ages provide supporting evidence for the synchronous onset (within error) of the Sturtian glaciation (ca. 716 Ma) on multiple continents. Successful application of Re-Os techniques on organic rich shales and carbonates allow for the possibility of a globally synchronous Sturtian deglaciation (ca. 660 Ma), but the sparse isotopic age constraints leave this open to debate. Here we report the first high precision U-Pb zircon age of  $663.03 \pm 0.11$  Ma ( $2\sigma$ ) for the end Sturtian recorded in the Bolla Bollana Formation of South Australia. This age supports previously published ages and is permissive with a globally synchronous deglaciation. In conjunction with the timing of glacial onset, this age reinforces the ca. 58 Myr duration of the Sturtian Snowball.

*Keywords: Snowball Earth, Sturtian, Synchronous Deglaciation, CA-ID-TIMS*

## Introduction

Some of the most extreme climate episodes the Earth has experienced occurred during a protracted phase of near-global glaciations in the Cryogenian period (720-635 Ma). These “Snowball” glaciations (Hoffman et al., 1998; Kirschvink, 1992), or cryochrons (Hoffman et al., 2017) are evidenced by the wide distribution of glacial deposits, particularly those associated with carbonate platforms, with the implication that glaciers entered the marine

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