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## Stable isotope compositions of a late Jurassic ammonite shell: a record of seasonal surface water temperatures in the southern hemisphere?

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**Abstract.** Exceptional preservation of aragonite secreted by ammonites offers an opportunity to determine the seasonal temperature variations of Mesozoic surface waters. Ontogenetic profiles of carbon and oxygen isotope compositions have been obtained from the nacreous layer of a well-preserved Late Jurassic (Oxfordian) ammonite (*Perisphinctes*) from Madagascar. A similar range of oxygen isotope compositions was also obtained from an associated benthic bivalve (*Astarte*) which suggests the absence of sampling bias. Late Jurassic seasonal variations in the southern Hemisphere were close to 2.5°C and relatively weak when compared to the 2.5–6.5°C temperature range prevailing in the present-day Indian ocean at a paleolatitude of 40±1° S. According to the hypothesis of an ice cap-free Late Jurassic Earth, average sea surface temperatures may have been up to 7°C higher than now.

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