MIDDLE ORDOVICIAN CONODONTS AND FISH FROM THE STAIRWAY SANDSTONE, AMADEUS BASIN

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The Middle Ordovician Stairway Sandstone consists of a succession of siliciclastic shallow marine sediments, stratigraphically positioned between the dark organic-rich siltstones of the Horn Valley Siltstone, and the regressive siltstones and shales of the overlying Stokes Siltstone, in the Amadeus Basin. The Stairway Sandstone is notable for containing early arandaspid fish fossils, and is a prospective reservoir for Larapinta Petroleum System hydrocarbons. The unit has not been directly dated, but a field sample from the uppermost Stairway Sandstone has yielded an abundant and well-preserved fauna, including micro-vertebrate and conodont fossils that enable correlation to high resolution international conodont biozonation schemes. Vertebrate microfossils represent three agnathan genera, *Arandaspis*, *Porophoraspis* and *Sacabambaspis*. Conodont species include *Microzarkodina ozarkodella* and *Baltoniodus medius*; index fossils that allow correlation to the upper subzone of the *Eoplacognathus pseudoplanus* Zone of the Middle Darriwillian. The conodont fauna also includes stratigraphically wide-ranging larapintine species, as well as endemic forms and new species. The abundance of the fauna, and the presence of *Erraticodon*, indicates sea-level rise at the time of the latest Stairway Sandstone deposition. The global Stein Lowstand event, represented by a hiatus at the top of the Horn Valley Siltstone and the subsequent shallow or aeolian influence over the lower and middle parts of the Stairway Sandstone, occurs at 463.71 ma, and the top of the *E. pseudoplanus* zone occurs at 462.52 ma (GTS2016). The intervening time constrains the end depositional age of potential reservoir sands of the Stairway Sandstone, and age of the earliest Gondwana fish fauna.