The Frasnian-Famennian Boundary in the Canning Basin Western Australia

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The Frasnian-Famennian (F/F) boundary coincides with one of the major mass extinctions known in the Phanerozoic stratigraphic record. In the Canning Basin it is marked by the virtual disappearance of platform-building stromatoporoids and most other shallow-water metazoans. Other notable extinctions include most conodont species and ammonoid families, and all atrypid brachiopods. The extinction had no discernable effect on microbes, which continued their platform-building role as before. Deep-water metazoans and some shallow-water molluscs also survived the crisis.

The F/F boundary is a disconformity in platform carbonates of the Canning Basin and a conformity in basin and deeper-water marginal slope deposits. It is regarded as a second-order sequence boundary, between the Pillara Sequence below and the Nullara Sequence above. In shallow-water platform carbonates the disconformity resulted from an abrupt and probably short-lived fall in sea level, when the platforms were eroded and slightly karstified, forming shallow sinkholes and small caves in some areas. Conodont analysis allows precise definition of the boundary in basin and deeper-water marginal-slope deposits. Deposition continued virtually uninterrupted across the boundary in water deeper than about 50 m.

The origin of the F/F mass extinction remains problematical. The Canning Basin section shows none of the black limestone and/or black shale that characterise the Kellwasser events in Europe and North Africa, so that anoxia cannot be invoked as an extinction mechanism in this area.