

2012 IGCP 587 Annual Report

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Publications

Grey, K., Hill, A.C. & Calver, C.R. 2011. Biostratigraphy and stratigraphic subdivision of the Cryogenian successions of Australia in a global context. In: The geologic record of Neoproterozoic glaciations edited by E. Arnaud, G.P. Halverson & G. Shields-Zhou, *Geological Society, London, Memoirs*, **36**, 113-134.

Hill, A.C., Haines, P.W. & Grey, K. 2011. Neoproterozoic glacial deposits of Central Australia. In: *The geologic record of Neoproterozoic glaciations* edited by E. Arnaud, G.P. Halverson & G. Shields-Zhou, *Geological Society, London, Memoirs*, **36**, 677-691.

Hickman, A.H., Van Kranendonk, M.J. & Grey, K. 2011. State Geoheritage Reserve R50149 (Trendall Reserve), North Pole, Pilbara Craton, Western Australia — geology and evidence for early Archean life. *Geological Survey of Western Australia, Record* **2011/10**, 32p.

Corkeron, M., Webb, G.E., Moulds, J. & Grey, K., 2012. Discriminating stromatolite formation modes using rare earth element geochemistry: Trapping and binding versus in situ precipitation of stromatolites from the Neoproterozoic Bitter Springs Formation, Northern Territory, Australia. *Precambrian Research*, **212-213**, 194-206.

Grey, K., Allen, H.-J., Hill, A.C. & Haines, P.W., 2012. Neoproterozoic biostratigraphy of the Amadeus Basin. In: Ambrose, G.J. & Scott, J. (Eds). *Central Australian Basins Symposium III. Petroleum Exploration Society of Australia, Special Publication*, 1-18.

Allen, H.-J., Grey, K. & Haines, P.W., 2012. Neoproterozoic Stromatolite biostratigraphy in the western Amadeus Basin. In: Ambrose, G.J. & Scott, J. (Eds). *Central Australian Basins Symposium III. Petroleum Exploration Society of Australia, Special Publication*, 1-11.

Haines, P.W., Allen, H.-J., Grey, K. & Edgoose, C., 2012. The western Amadeus Basin: revised stratigraphy and correlations. In: Ambrose, G.J. & Scott, J. (Eds). *Central Australian Basins Symposium III. Petroleum Exploration Society of Australia, Special Publication*, 1-6.

Grey, K., Clarke, J.D.A. & Hickman, A.H. 2012. The proposed Dawn of Life Geotourism Trail, Marble Bar, Pilbara Craton, Western Australia — geology and evidence for early life. *Geological Survey of Western Australia, Record* **2012/9**, 27p.

Note: Any papers or posters published by the Geological Survey of Western Australia (GSWA) are available free if you go to:

www.dmp.wa.gov.au/gswapublications

Use the DOWNLOAD button to obtain a .pdf file (download, print or both). All GSWA publications (>100 years worth) are available – just type in appropriate search criteria. For posters, change the cabinet (top right) from ‘GSWA Geoscience Products’ to ‘GSWA Posters and Flyers’.

Research and field work activities

Retirement from GSWA (though hopefully not from scientific studies) is getting very close (January 18th 2013) and I have spent much of the year trying to clear up the backlog of unfinished projects (although many will continue after retirement) and leave not only my own data, but nearly 100 years of paleontological work in Western Australia in an accessible state. I would have liked to have been able to say this was for my successor, but I am not going to be replaced; at least not by a full-time palaeontologist. It looks as if Sarah Martin will be managing the GSWA collection on a part time basis once I have left.

Research on Neoproterozoic topics has concentrated on identifying stromatolites from the remote western Amadeus Basin. This area has not been examined since the late 1960s, and stromatolites have proved to be abundant and invaluable in allowing correlations with better known successions in the central part of the basin. Peter Haines, Heidi Allen and I have already shown that the main part of the succession does not terminate with the Boord Formation (variously considered to be either the Sturt or Elatina glaciation equivalent) overlain by a thin somewhat younger succession, but instead contains almost the full Cryogenian and Ediacaran successions seen elsewhere in the Amadeus Basin, including both glaciations and the remainder of the succession at least as high as the Arumbera Sandstone. This news was greeted with considerable interest from petroleum companies when presented at the Central Australian Basins symposium in Alice Springs in July. The Surprise 1 petroleum discovery by Central Petroleum in the Silurian, not far from the Western Australian border, raises interesting possibilities and the suggestion is that at least some of the oil may be being generated in the Neoproterozoic. It also opens up the possibility that Ediacara fauna may be present, although none have been discovered so far. Preliminary results were presented in a series of extended abstracts and posters at both CABS3 and the International Geological Congress earlier this year.

I have also been able to pursue my interests in older Proterozoic and Archean acritarchs and stromatolites. This has included producing a GSWA Record describing preliminary studies of a proposed geotourist site to display some of the oldest known fossils on Earth. The proposed ‘Dawn of Life Trail’, south of Marble Bar, was documented by the Spaceward Bound expedition organized jointly by the Mars Society and NASA.

Work with David Flannery, Malcolm Walter and Stan Awramik has shown that axial zones are present in conical stromatolites throughout the geological record, ranging from present day examples that demonstrate that axial

zones are biogenic features to their presence in the c. 3.4 Ga Strelley Pool Formation. Preliminary results were presented as a poster at the International Geological Congress.

Work on a handbook for the study and description of stromatolites and other microbialites with Stan Awramik continues. Completion of the text was delayed because Stan was unable to visit Australia this year. The plan now is to complete the manuscript during Kath's post-retirement trip to California early in 2013.

Data capture continues for the stromatolite database (now containing <2000 records), as well as a database of all Western Australian fossils in the GSWA collection. I have been helped by Sarah Martin and several casual assistants, and we have now managed to retrieve most of the outstanding overseas loans and are focusing on Australian borrowers. Industry and academics continue to request information and assistance on a wide range of topics ranging from Archean stromatolites and microfossils, through Proterozoic biostratigraphy to modern microbialite environments.

Despite retirement, I plan to continue my studies of Neoproterozoic biostratigraphy, including more work on the Amadeus Basin succession. Later in 2013, I plan to continue work on Neoproterozoic acritarch correlations by working with Malgosia Moczydlowska and her group at Uppsala University, in an effort to extend the Australia-wide Cryogenian and Ediacaran correlation schemes globally.

(No other news or outreach activities)

Personal details.

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