**DEPOSITION OF BANDED IRON FORMATION BY ISOLATION OF CONTINENTAL BASINS.** B. S. Kamber[1], M. Bau[2], N. J. Beukes[3], R.K. O'Nions[1], and R.M. Corfield[1], [1]Dept. Earth Sci., University of Oxford, Parks Road, Oxford OX1 3PR, U.K., [3]GFZ, Potsdam, Telegraphenberg A-50, D-14473 Potsdam, D, [2]Dept. Geology, Rand Africaans University, Johannesburg 2000, RSA.

Banded iron formation (BIF) and associated sediments testify to the co-existence of anoxic and oxic water masses. Understanding to which extent such water bodies typified ancient oceans bears many implications for the sources of Precambrian sediments, the atmospheric oxygen level, and the carbon cycle.

We report a geochemical study of carbonate cements sampling the transition from the shallow 2.58 Ga Campbellrand carbonate platform into the 2.52 Ga Kuruman BIF, Transvaal Supergroup, South Africa.

Microdrilled cements were analysed for REY (REE and Y), Zr, Hf, Cs, U, Th, Pb, Ba, Rb and Sr concentration, and C, O, and Sr isotope composition. Samples with discernible clastic contamination or post-deposition alteration were omitted.

Shale normalised REY patterns of petrologically defined sample groups are very similar. In order of inferred increasing water depth, oolites display patterns similar to present-day river water, algal mats and precipitated stromatolites have flat patterns with weak positive Y and negative Ce anomalies, filamentous stromatolites show a clear HREE enrichment ([Sm/Yb] SN = 0.3 to 0.6), strong positive La, Eu ([Eu/Eu*] SN = 1.6 to 1.8), and Y anomalies ([Y/Ho] SN = 2.8 to 4.33). Fe-carbonates from deeper water chert and BIF show HREE enrichment similar to present day seawater ([Sm/Yb] SN = 0.21). They lack the negative Ce anomaly but show a positive Eu anomaly ([Eu/Eu*] SN = 1.52). The REY data thus suggest the existence of a chemocline separating oxic shallow and anoxic deep water. The picture is, nevertheless, complicated by the fact that the strongest positive Eu anomaly is not found in siderites from BIF but in filamentous stromatolites.

The clearest signal for the hypothetical end-member for anoxic bottom water is thus present in shallower carbonate but blurred in the BIF and chert siderites.

C and O isotopes are in accord with previous studies. All samples but the siderites show del$^{13}$C values between 0 and -2 and a spread in the del$^{18}$O values between -6 and -12 (relative to PDB). The siderites, however, show mantle like del$^{13}$C values of -6 to -9, which could either reflect primary sea water or siderite growth involving some organic C.

Sr isotope data were obtained on the same aliquots as the REY data. Initial 87Sr/86Sr ratios are primitive (0.702 to 0.704) in platform carbonates. In deeper carbonates Sr isotopes become highly variable and range between 0.714 to 0.760 in the most radiogenic siderites. This strong increase of continental Sr cannot be a global seawater feature but indicates substantial restriction of the Kuruman BIF basin. Nevertheless, the Sr isotopes and positive (Eu/Eu*)SN ratios in the deeper carbonates are too variable to be explained by a simple progressive restriction model. Scatter in these ratios within the stratigraphy rather require either occasional connection to open marine sea water (one possible source providing water with positive [Eu/Eu*]SN anomalies and primitive Sr) or basin internal ridge activity.

The implications of this study are:

(i) Proterozoic carbonate cements are a valuable proxy for ancient sea water, and their REY patterns reflect the depositional environment.

(ii) Late Archaean Sr was mantle like in the ocean. Continental derived dissolved Sr was as radiogenic as in present day rivers.

(iii) The Kuruman BIF's formed as a result of basin restriction and the chemocline in this euxinic basin was not a global feature. Nevertheless, the basin was occasionally connected to the ocean.