



A paired coral Sr/Ca and delta 18O record from La Reunion: Multi-decadal and centennial variations in delta 18O seawater

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A 163-year long coral delta 18O record from La Reunion island (1995-1832, 55°E, 21°S, subtropical Indian Ocean) published several years ago suggested pronounced multidecadal variations in delta 18O seawater/sea surface salinity and a strong, almost linear trend of isotopic depletion since 1830 of uncertain origin (Pfeiffer et al., 2004). This trend is approximately -0.7 per mill, which would indicate a warming of 3.5°C at La Reunion since 1830.

We now measured monthly coral Sr/Ca ratios on a sampling path parallel to the original delta 18O measurements, for the time period from 1905-1995. The new coral Sr/Ca data largely confirms the previous interpretation of the coral delta 18O record. Unlike coral delta 18O, coral Sr/Ca correlates with regional SST and air temperature data back until 1957. Prior to this time, the correlation weakens, which may reflect the sparse instrumental data available in the SW Indian Ocean sector during this time. Coral Sr/Ca does not show the pronounced multidecadal variations evident in the coral delta 18O record, and it shows a much weaker long-term trend towards warmer SSTs. Prior to 1912, coral Sr/Ca shows a large shift towards lower Sr/Ca ratios, which is too large to be explained with temperature changes. SEM and thin section analysis show small amounts of secondary aragonite cements in this section of the core. Overall, our results suggest that the coral delta 18O record of the La Reunion coral does not show temperature variations, and care should be taken when including the published delta 18O record of this core in large-scale temperature reconstructions.