



Supplementary Information: Residuals

Example of the residual variation in trace element ratios in a high-resolution LA-ICP-MS profile (profile II) after subtracting the filtered diurnal cyclicity from the record. A record of the residuals shows that a major part of the variation in the residuals exceeds two standard deviations of measurement error and consists of very high-frequency variability (periods in the order of magnitude of the sampling resolution: 10 μ m). This reflects the effect of short lived, non-periodic events (e.g. weather events such as storms) on the calcification of *T. sanchezi*. It is also possible to observe longer periodic trends associated with the 0.6 mm long fortnightly tidal cycle (see dashed lines). However, this tidal periodicity is mostly obscured by the stronger effects of diurnal and non-periodic periodicities in the records and could therefore not be extracted from the data with statistical confidence.