We present high resolution $\delta^{13}$C$_{org}$, CaCO$_3$ (weight %), TOC (%), N (%) and magnetic susceptibility records from a 120m long Triassic-Jurassic boundary record from St. Audrie’s Bay (UK). Bandwidth filters of these proxy records, based on Blackman-Tukey power spectra, show periodic forcing of the data with an average period of ~579cm, ~318 & ~230cm and ~163 & ~130cm, representing 100kyr eccentricity, obliquity and precession forcing respectively. In addition, a stacked proxy-curve also records 400kyr eccentricity forcing.

Discussion

Based on this floating astronomical time-scale, we suggest a length of the Hettangian of ~1.2Ma. Ammonite zones in the Hettangian, in contrary to common view, are different in duration, with the first zone less than half the length of the second zone. The short initial Carbon Isotope Excursion (CIE) and long main CIE are suggested to be related to major volcanic activity in the transition from the Triassic to the Jurassic (Hesselbo et al., 2002). Astronomical forcing of lacustrine sediments in the Newark basin (eastern US) suggest a period of 600kyr for the duration of the volcanic activity (Olsen et al., 1996). A minimal duration of the main CIE of 1.4Ma suggests either a longer volcanic activity or an other cause for the main CIE.

Conclusions

- High resolution proxy records (end-Triassic to first stage of Jurassic) show eccentricity, obliquity and precession forcing
- Duration of the Hettangian is reduced from 3.1Ma to 1.2Ma
- Ammonite zones at the base of the Jurassic are different in duration
- We suggest either an extended duration of volcanic activity or a different cause for the main CIE

