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PP42D-06 INVITED

Implications From a new Continuous Astronomically Calibrated Geological Time Scale Back to $\sim$ 42 Myrs

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Precise, orbitally calibrated geological time scales form a pre-requisite to further our understanding of phase relationships between orbitally driven climatic processes, and to decipher the detailed mechanisms that interact to encode orbitally forced (Milankovitch) processes in the geological record. One of the great successes of ODP Leg 199 was the recovery of a high-resolution ($\sim$1-2 cm/ky) biogenic sediment record, together with an uninterrupted set of geomagnetic chrons, as well as a detailed sequence of calcareous and siliceous biostratigraphic datum points. In addition, lithological measurements revealed clearly

recognisable cycles that can be attributed to climatic change, driven by Milankovitch style orbital variations of the Earth. By integrating lithological, geochemical, and stable isotope data sets, we have now derived a long, astronomically calibrated, time scale from the Miocene into the latest Eocene from ODP Leg 199. Using additional data from ODP Legs 177 and 171B, we have generated a detailed continuous time scale back to $\sim$ 42 Myrs. We can contrast the encoding of astronomical forcing terms in sedimentary records from different ocean basins, latitudes, water-depths, and water masses. Our results show that the dominantly recorded orbital parameters vary as a function of the carbonate system response, with a very strong eccentricity component in the record from the deep equatorial Pacific, and a stronger obliquity component in the equatorial Atlantic. In addition, we investigate the phase relationship between astronomical forcing terms and carbonate preservation, with a potentially different response during "green-house" and "ice-house" conditions, separating the Oligocene and Eocene.

1035 Geochronology
1535 Reversals (process, timescale, magnetostratigraphy)
4267 Paleoceanography
5450 Orbital and rotational dynamics
9604 Cenozoic
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