Geophysical Research Abstracts, Vol. 9, 08199, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08199

Pushing the Limits of Stratigraphy - The First Comprehensive Orbital Chronology for the Paleocene and its Implications for the K/Pg boundary age

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Astronomical tuning resulted in a new generation of geological time scales with an unprecedented accuracy, resolution, and stability. In 2004 the first fully revised geological timescale for 15 years, the GTS2004 (Geological Time Scale 2004) has been published. GTS2004 for the first time presents an Astronomically Tuned Neogene Time Scale (ATNTS2004). In contrast, astronomical calibration of the Geological Time Scale in its older, Paleogene parts is much more challenging than for the Neogene and requires careful evaluations of uncertainties. Here, we present an exciting and for the first time complete Paleocene cyclostratigraphy based on the identification of the stable long-eccentricity cycle (405-kyr) for both the Atlantic and Pacific Oceans. The stratigraphic framework for the Paleocene was assembled by using high-resolution records of elemental concentrations obtained by an X-ray fluorescence (XRF) core scanner and other non-destructive core logging data (magnetic susceptibility) from ODP Leg 198 (Shatsky Rise, NW Pacific Ocean) and ODP Leg 208 (Walvis Ridge, S Atlantic Ocean). Furthermore, we assembled an integrated and revised bio- and magneto-stratigraphy for Leg 198 and 208 which can be used as future standard sec-

tions for the Paleocene stratigraphy for both, the Atlantic and Pacific Oceans. Comparison of the new data with previous estimates for the absolute age of the K/Pg boundary and the PETM (Paleocene Eocene Thermal Maximum) show evident inconsistencies. We will demonstrate that the fundamental problems in extending the astronomically tuned time scale into the Paleogene are related to uncertainties and limits of astronomical calculations and also large uncertainties in radiometric age constraints for this time interval.