Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10353, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10353
EGU General Assembly 2008

Astronomical calibration of Mediterranean Montalbano Jonico land section and implication for δ^{18}O, calcareous nannofossil and tephra records at the mid-Pleistocene revolution

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Astronomical dating of sedimentary sequences from the Mediterranean late Neogene has now been well established and forms the backbone of the Astronomical Tuned Neogene Time Scale (ATNTS2004; Lourens et al., 2004). The ATNTS2004 provides precise and accurate absolute ages, not only for the sedimentary cycles, but also for calcareous plankton events and magnetic polarity reversals recorded in the tuned sections. Accordingly, all the middle to late Neogene stages are by now defined in tuned land-based marine sections in the Mediterranean region. The Pleistocene part of the ATNTS2004 is based on a few ODP Sites (964, 969 and 967) and piston cores (RC9-181, MD84641, KC01B, KC01), with the exception of the Lower Pleistocene interval in which data from the land-based marine sequences of Vrica and Singa (Calabria,

Italy) were also included. The Montalbano Jonico section, cropping out in Southern Italy, represents a potential candidate to fill the gap between the top of Vrica section and the base of Ionian informal stage, which defines the Lower/Middle Pleistocene boundary (Cita et al., 2006) and it has been proposed as suitable for selection of the GSSP of the Middle Pleistocene (Ciaranfi et al., 1997; 2001). A complete high-resolution benthic and planktonic foraminiferal stable oxygen isotope (δ^{18}O) records, between Marine Isotope Stages 15 and 36, is now available for the on land Montalbano Jonico section during the Mid-Pleistocene Revolution, when the climate-forcing signal in the geological record changed from the dominant 41-kyr cyclicity of obliquity to the 100-kyr cyclicity of eccentricity (Berger and Jansen, 1994). The isotope record of Montalbano Jonico is well comparable with the standard Atlantic and Pacific benthic foraminiferal δ^{18}O stacks and with the Mediterranean planktonic record, thus providing a calibration of the section to the ATNTS2004. A pilot paleomagnetic study of the section indicated that the sequence is characterized by excellent paleomagnetic properties and a complete paleomagnetic study is presently being carried out in order to locate the position of the Brunhes-Matuyama reversal. All biostratigraphic data (*Globoratalia crassaformis* influx, First Occurrence of *Gephyrocapsa omega*, Last Common Occurrence of *Reticulofenestra asanoi*, temporary disappearances of *G. omega*) have been calibrated according to the ATNTS2004 and nine tephra layers have been dated. Two of these tephra have been tentatively correlated, based on their interpolated ages, to the volcaniclastic layers I29 and I30 of Mediterranean tephra chronology by Lourens (2004). Spectral and wavelet analysis performed on the δ^{18}O record revealed a strong imprint of 41-kyr obliquity cycle which becomes increasingly dominant after $\sim$950 ka, while the 100-kyr cyclicity of eccentricity is continuously present throughout the studied interval. This onset corresponds to a sea-level drop as evidenced in the Montalbano Jonico section, from bathyal to circalittoral environment, and to a significant change in faunal composition. The astronomically tuned chronology of the Montalbano Jonico section, together with the available accurate biostratigraphy and sapropel chronology, point out the global value of this record, which represents the only continuous benthic and planktonic δ^{18}O on-land reference in the Mediterranean area for the Mid-Pleistocene transition, between 600-1250 ka.

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