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A new high-resolution carbon-isotope stratigraphy for the Campanian (Bottaccione section): Its implications for global correlation, ocean circulation, and astrochronology

Nadia Sabatino^{1,*}, Stephen R. Meyers², Silke Voigt³, Rodolfo Coccioni⁴, Mario Sprovieri¹

¹ *Istituto per l'Ambiente Marino Costiero, Consiglio Nazionale delle Ricerche (IAMC-CNR), Capo Granitola, Via del Mare 3, 91021 Campobello di Mazara (Tp), Italy. E-mail address: nadia.sabatino@iamc.cnr.it*

² *Department of Geoscience, University of Wisconsin-Madison, Madison, Wisconsin, USA*

³ *Institute of Geosciences, Goethe-University of Frankfurt, Altenhöferallee 1, 60439 Frankfurt, Germany*

⁴ *Dipartimento di Scienze della Terra, della Vita e dell'Ambiente, Università degli Studi "Carlo Bo", Campo Scientifico "E.Mattei", Localita' Crocicchia, 61029 Urbino, Italy.*

Corresponding author:

Nadia Sabatino
Istituto per l'Ambiente Marino Costiero (IAMC-CNR)
Via del Mare, 3 Torretta Granitola
(Fraz. Campobello di Mazara, Tp), 91021, Italy
e-mail: nadia.sabatino@iamc.cnr.it

ABSTRACT

A high-resolution carbon isotope record is presented for Campanian strata of the Bottaccione section (Umbria-Marche Basin), through an interval that constitutes the standard reference section for the geomagnetic polarity time scale. The identification of prominent $\delta^{13}\text{C}$ excursions and high frequency variations allows the establishment of robust stratigraphic markers to link this new Tethyan $\delta^{13}\text{C}$ record with the Boreal realm (Lägerdorf-Kronsmoor section, Northwest Germany and the Trunch borehole, Norfolk, UK). A decoupling of baseline $\delta^{13}\text{C}$ values between the Boreal and the Tethyan realm is observed during the mid-Campanian, reflecting a plausible change in intermediate/deep-water mass-exchange due to a more restricted Tethyan gateway; this is hypothesized to be a consequence of northward movements of Africa associated with opening of the South Atlantic Ocean. Statistical evaluation of a segment of the $\delta^{13}\text{C}$ dataset with the TimeOpt

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