



## **Dating the N7/N8 (M4/M5) planktonic foraminiferal zonal boundary**

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One of major differences between Miocene portions of GTS2004 and GTS2012 is the age assigned for the N7/N8 (M4/M5) planktonic foraminiferal zonal boundary; ages of 16.97 Ma and 16.38 Ma were assigned, respectively, by GTS2004 and GTS2012. The difference is mainly due to lack of reliable assignment of the N7/N8 boundary to the magnetostratigraphy, and this issue needs to be resolved for better refining the geologic time scale. Here we present results of an integrated study that includes new planktonic foraminiferal, magnetostratigraphic, and U-Pb isotopic data from an onland sedimentary sequence of the Ichishi Group in Japan. Our stratigraphically dense sampling allowed us to locate the stratigraphic position of the FAD of *Praeorbulina sicana* that defines the N7/N8 boundary. We conducted zircon U-Pb dating on a thin ash bed located at 1.8 m above the zonal boundary and obtained a precise date of  $17.00 \pm 0.07$  Ma. Further, our magnetostratigraphic investigation revealed a reverse-normal-reverse (R-N-R) polarity sequence for the studied section and demonstrated that both the N7/N8 boundary and the nearby dated ash bed are located within the upper reverse polarity zone. On the basis of these data, it is safe to conclude that: (1) the R-N-R polarity sequence of the studied section is correlated to a portion of Chronozones C5Dr-C5Dn-C5Cr, (2) the N7/N8 boundary is within Chronozone C5Cr, and (3) the age of the N7/N8 boundary is about 17.0 Ma. We suggest this should be incorporated into a forthcoming revision of the geologic time scale.