



## **First occurrence of *Arctica islandica* in the Mediterranean Sea: bio- and lithostratigraphy of the Arda and Stirone River successions (Italy)**

Michele Azzarone (1), Gaia Crippa (2), Cinzia Bottini (2), Stefania Crespi (2), Fabrizio Felletti (2), Mattia Marini (2), Maria Rose Petrizzo (2), Daniele Scarponi (1), Sergio Raffi (3), and Gianluca Ranieri (4)

(1) Dipartimento di Scienze Biologiche Geologiche e Ambientali, Università di Bologna, Bologna, Italy (mikeal.mikeal@gmail.com), (2) Dipartimento di Scienze della Terra, Università degli Studi di Milano, Milano, Italy, (3) Museo Geologico G. Capellini, Bologna, Italy, (4) Parco Regionale dello Stirone e del Piacenziano, Salsomaggiore Terme, Italy

The Arda and Stirone marine successions (Italy) represent key-sections for the lower Pleistocene, as they deposited continuously within a frame of climate change, recording the Calabrian cooling as testified by the occurrence of the “northern guests” *Arctica islandica*, *Hyalinea balthica* and *Neogloboquadrina pachyderma* left-coiled. Despite its historical importance in the past, when the first occurrence of *A. islandica* in the Mediterranean Sea was used as the main criterion to mark the former Pliocene-Pleistocene boundary, the age of this bioevent was never well constrained. Here, we describe the Stirone depositional environment and constrain for the first time the section age using calcareous nannofossils and foraminifera biostratigraphy; we correlate the Arda and Stirone sections, complementing biostratigraphic and magnetostratigraphic data. Our results indicate that *A. islandica* first occurred in both the successions slightly below the top of the CNPL7 biozone (dated at 1.71 Ma). The comparison with other lower Pleistocene Mediterranean marine successions indicates that the stratigraphically lowest level where *A. islandica* first occurred in the Mediterranean Sea is in the Arda and Stirone sections; these environments satisfied the ecological requirements for the establishment and the proliferation of the species, which only subsequently colonized southern Italy and other areas of the Mediterranean Sea.