Surface- and deep-water response to the Early Aptian OAE 1a in the western Tethys

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The Cretaceous was punctuated by interludes of widespread deposition of organic-rich sediments (black shales) in the oceans and epicontinental seas, named Oceanic Anoxic Events (OAEs), representing major alterations in the global carbon budget. The early Aptian OAE 1a (ca. 120 Ma) coincided with a global paleoclimatic and paleoenvironmental perturbation which lasted for ca. 1.1 Myrs probably triggered by volcanogenic CO$_2$ emissions associated with the emplacement of the Ontong Java Plateau. To date, there is a comprehensive characterization of OAE 1a paleoceanographic conditions and paleoecology of surface-waters while less information is available for bottom-water evolution. In this regard, benthic foraminifera are ideal to characterize deep-water oxygen levels and the organic carbon flux. We present a high-resolution study of benthic foraminiferal assemblages across OAE 1a in the Cismon Core (western Tethys, Lombardy Basin, Northern Italy). Contrarily to many sites, the Cismon Core yields benthic foraminifera also in the Selli Level thus providing information about deep-water conditions during OAE 1a. Our data are indicative of fluctuations in bottom-water oxygenation and organic-matter flux to the sea-floor prior to, during and after OAE 1a. The integration of the new benthic foraminiferal data with calcareous nannofossil and planktonic foraminiferal datasets is here used to produce a model of surface- to bottom-water paleowater evolution through the latest Barremian-early late Aptian. In particular, the new data show coeval changes in bottom- and surface-waters conditions prior to and at the onset of OAE 1a. Anoxia was reached during the core of the negative carbon isotope anomaly, under maximum warming and higher surface-water fertility. Conversely, the repopulation of benthic foraminifera postponed the plankton recovery. Benthic foraminifera data at Cismon show, for the first time, evidence of a repopulation event during the OAE 1a suggestive for a slight increase in the supply of oxygen to the seafloor during the Selli Level deposition.