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# The Ocean Anoxic Event 2 (OAE2) in the Vigo Seamount (DSDP Leg 47B, Site 398D) offshore the NW Iberian Peninsula: a palynostratigraphical and geochemical approach

Ivan Rodriguez-Barreiro<sup>\*1,2</sup>, Artai Antón Santos<sup>1,2</sup>, Uxue Villanueva-Amadoz<sup>3</sup>, Stephen Louwye<sup>4</sup>, and José B. Diez<sup>1,2</sup>

<sup>1</sup>Centro de Investigación Mariña, Universidade de Vigo (CIM-UVIGO), Vigo, Spain – Spain

<sup>2</sup>Departamento de Xeociencias Mariñas e Ordenación do Territorio, Universidade de Vigo, Vigo, Spain – Spain

<sup>3</sup>Estación Regional del Noroeste (ERNO), Instituto de Geología, UNAM, Hermosillo, Mexico – Mexico

<sup>4</sup>Department of Geology, Ghent University, Ghent, Belgium – Belgium

## Abstract

The studied DSDP Site 398D (Leg 47B) is located in the southern part of the Vigo Seamount, about 150 km off the NW Iberian coast. Previous geochemical and biostratigraphical analysis suggests that an expression of the Ocean Anoxic Event 2 (OAE2) was likely to be present, corresponding to a short interval of dark organic-rich clays interbedded with red and grey claystone. This work details the palynostratigraphy and the carbon isotope record from the uppermost Albian to the lowermost Turonian of DSDP Site 398D, resulting in the relative dating of the deposits and the confirmation of the presence of the OAE2. A total of 45 samples were analyzed following standard palynological maceration protocols involving treatment with HCl and HF for removing carbonates and silicates, respectively. After the acid digestion, the samples were also analyzed by Isotopic Ratio Mass Spectrometry (IRMS) for the  $\delta^{13}\text{C}$  isotopic ratio of the organic matter. Four palynological assemblages were differentiated. The Assemblage A (cores 58-2, 82-84 cm to 57-5, 87-88 cm) is of a late Albian age according to the presence of *Quadricolpites* sp. and *Litosphaeridium siphoniphorum*. The Assemblage B (cores 57-5, 23-24 cm to 57-1, 113-115 cm) dates from the early Cenomanian according to the presence of *Wilsonisporites woodbridgei* and *Ovoidinium verrucosum*. The Assemblage C (cores 65-5, 54-55 cm to 65-4, 0-2 cm) has a middle Cenomanian age according to the presence of *Complexiopollis* sp., while Assemblage D (cores 56-3, 10-12 cm to 56-2, 110-111 cm) has a late Cenomanian – early Turonian age according to the presence of *Atlantopollis heystii*, *A. reticulatus*, *Complexiopollis complicatus*, *C. vancampoeae*, *C. praeatumesces*, and *Minorpollis* sp. Within the later assemblage, a sub-division was made at core 56-2, 127-128 cm, where the Cenomanian – Turonian boundary is located according to the presence of *Dichastopollenites dunveganensis*, *Tricolpites barrandei*, and *Trudopollis pertrudens*. The  $\delta^{13}\text{C}$  analysis indicates that the OAE2 is placed in the DSDP Site 398D between core 56-3, 12 cm, up to the abrupt contact with the Plantagenet Formation in 56-2, 19 cm. The anoxic event is expressed in 5-cm intervals with a low sedimentary rate (1 m/Ma), reaching a maximum of 23,95‰ of  $\delta^{13}\text{C}$  in the positive excursion and a Total

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\*Speaker

Organic Carbon (TOC) of 13%. During this event, a major microfloral change occurred (Assemblage D), indicated by a clear shift of dominance of angiosperm pollen, specifically the Normapolles group, and possible extinction of part of the marine palynomorphs (dinocysts).

**Keywords:** Palynostratigraphy, Cenomanian, Turonian, OAE 2, DSDP Site 398D,  $\delta^{13}\text{C}$  analysis