Geophysical Research Abstracts
Vol. 18, EGU2016-10131-2, 2016
EGU General Assembly 2016

Middle Eocene paleocirculation of the southwestern Atlantic Ocean, the anteroom to an ice-house world: evidence from dinoflagellates

G. Raquel Guerstein (1), Gloria Daners (2), Elbio Palma (3), Elizabete P. Ferreira (4), Eduardo Premaor (5), Cecilia R. Amenábar (6), and Alexandra Belgaburo (7)

(1) Universidad Nacional del Sur, INGEOSUR - CONICET, Dpto. Geología, Bahía Blanca, Argentina (raquel.guerstein@uns.edu.ar), (2) Departamento de Evolución de Cuencas, Facultad de Ciencias, Universidad de la República Montevideo, Uruguay, (3) Departamento de Física, Universidad Nacional del Sur, Bahía Blanca, Argentina - Instituto Argentino de Oceanografía - CONICET, (4) Centro de Pesquisas e Desenvolvimento Leopoldo A.M.Mello, Petrobras, Rio de Janeiro, Brazil, (5) Universidade Federal do Rio Grande do Sul, Departamento de Paleontologia e Estratigrafia, Porto Alegre, Brazil., (6) Instituto Antártico Argentino - Instituto de Estudios Andinos Don Pablo Groeber - CONICET, Buenos Aires, Argentina, (7) Departamento de Geología, Universidad Nacional del Sur, Bahía Blanca, Argentina

Middle Eocene dinoflagellate cyst organic walled assemblages from sections located in the Antarctic Peninsula, Tierra del Fuego, Santa Cruz province and south of Chile are mainly represented by endemic taxa, which are also dominant in several circum - Antarctic sites located southern 45˚S. Some members of this endemic Antarctic assemblage, including especies of *Enneadocysta, Deflandrea, Vozzhennikovia,* and *Spinidinium,* have been recognised in sites along the Southwest Atlantic Ocean Shelf at Colorado (∼38˚S), Punta del Este (∼36˚S) and Pelotas (∼30˚S) basins. Northern 30˚ S, at Jequitinhonha (∼17^{o}S) and Sergipe (∼11˚S) basins, there is no evidence of the endemic Antarctic members, except for *Enneadocysta dictyostila,* recorded in very low proportion. Based on its positive correlation with $CaCO_3$ percentages we assume that this species is the unique member of the endemic assemblage apparently tolerant to warm surface waters. Previous research developed in the Tasman area has related the presence of endemic taxa at mid- latitudes to a strong clockwise subpolar gyre favoured by the partial continental blockage of the Tasmanian Gateways and the Drake Passage. In this work we propose that the dinoflagellate cyst distribution along the South Atlantic Ocean Shelf can be explained by a similar dynamical mechanism induced by a cyclonic subpolar gyre on the South Atlantic Ocean. The western boundary current of this gyre, starting on the west Antarctic continental slope, would follow a similar path to the present Malvinas Current on the Patagonian slope. Modelling and observational studies at the Patagonian shelf-break have shown that a cyclonic western boundary current promotes upwelling and intrusion of cold oceanic waters to the shelf and intensifies the northward shelf transport. In a similar way we hypothesize that during the Middle Eocene the western boundary current of a proto-Weddell Gyre transported the circum-antarctic waters and the endemic components northward along the Southwestern Atlantic Shelf. During the Late Eocene, the endemic component is replaced by more diverse assemblages with bipolar markers of cooler, typical oceanic species and an increased number of heterotrophic protoperidiniaceans. The opening and deepening of the Tasmanian Gateway and Drake Passage and the subsequent development of an incipient Antarctic Circumpolar Current during the Oligocene disrupted the subpolar gyres and promote the extinction of the endemic species.