



IV ROSS SEA CONFERENCE 2023

Università degli Studi di Napoli "Parthenope"

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Topic: Biogeochemistry

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ABSTRACT Subject :

OCEANOGRAPHY OF THE EDISTO INLET (WESTERN ROSS SEA):
FIRST RESULTS FROM THE XXXVIII ITALIAN ANTARCTIC
EXPEDITION

Abstract 18/02/2023 09:52:31

Laminated diatomaceous deposits have been documented in a few Antarctic regions, including the Antarctic Peninsula and the Ross Sea. In general, very high sedimentation rates can overwhelm limited bioturbation and thus foster the preservation of varves, for example in some glacio-marine settings. Laminated sediments, collected in the Edisto Inlet, western Ross Sea, showed well-defined dark and light laminae on mm- to cm-scale. Dark laminae contained relatively high concentrations of a biomarker of fast ice IPSO25, whereas, low IPSO25 concentrations characterized light laminae and the diatom *Corethron pennatum* became the dominant species. Based on these assumptions, fast ice dynamics were reconstructed over the last 2.6 ka for the western Ross Sea. Nevertheless, the absence of rigorous varve validation leaves uncertain the paleoclimatic and paleoceanographic interpretation of these laminated sediments. The project PNRA_LASAGNE (Laminated sediments in the magnificent Edisto Inlet (Victoria Land): What processes control their deposition and preservation?) proposes a multidisciplinary study integrating fast-ice, water column and surface sediment characteristics, supported by biological data collected in situ and time-series of satellite images of sea-ice, to gain information on factors influencing the formation and preservation of laminated sediment in Edisto Inlet. It aims at providing new insights into the sub-seasonal formation of laminated sediments providing a backbone for the interpretation of paleoclimate sediment archives. Here, we show the preliminary results obtained from an extensive dataset collected in Edisto Inlet during the XXXVIII Italian PNRA expedition conducted onboard the I/B Laura Bassi in Feb 2023. Data includes CTD vertical profiles with additional parameters (DO, fluorescence, turbidity) spatially distributed within and at the entrance of the bay, which was still partially covered by seasonal sea ice at the time of the cruise. Moreover, vessel mounted (vm) and Lowered (L) ADCPs have been collected along transects and at each CTD station, respectively. The dataset also include time series from an oceanographic mooring between Feb 2022-Feb 2023. The cruise objective was to perform a synoptic survey during austral Antarctic summer to describe the water mass distribution and current dynamics in the bay, which are mainly driven by sea ice formation and melting, and by atmospheric and tidal forcing. To complement physical data, we collected 3 sea ice cores in Nov 2022, and 7 short sediment cores together with water samples during the cruise to have a picture of the phytoplankton and microzooplankton living in the platelet ice in spring and in open water in summer, respectively. Timing and composition of organic debris sinking in the water column are obtained by sediment trap samples.



Early diagenesis has been also taken into account to define how the original signal is preserved in the sedimentary record.