



# IV ROSS SEA CONFERENCE 2023

Università degli Studi di Napoli "Parthenope"

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**Topic:** Biogeochemistry

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**ABSTRACT Subject :**

From New Zealand to Antarctica (Ross Sea): the fatty acid composition of marine suspended particulate matter

**Abstract** 14/02/2023 08:14:47

The study of the lipidic component in aquatic ecosystems is crucial as it represents a structural component in all marine organisms, and it can be used as a source of energy. Furthermore, fatty acids (FAs) can be used as biomarkers to investigate community composition and assess ecosystem nutritional status, since the distribution of FAs fractions is closely related to the presence of different phytoplankton taxa [1]. The FAs profile associated with marine suspended particulate matter (SPM) collected during the XXXV Italian Expedition in Antarctica (January 2020) from 48 to 76 °S was investigated using a Gas-Chromatography Mass Spectrometry technique [2], in terms of both percentage of FAs vs total FAs and content of FAs in  $\mu\text{g L}^{-1}$  of filtered seawater. The trends of FAs biochemical indices used to elucidate the dominant sources of SPM have also been investigated. The Folch method [3] was found to be more accurate during the evaluation of the most accurate lipid extraction method. The distribution of FAs before and after the Antarctic Convergence zone was found to be significantly different. In particular, the total FAs content varied across the Pacific Ocean, Convergence zone, Southern Ocean, Ross Sea offshore, and Antarctic coast, with the highest concentrations found in the convergence zone and along the Antarctic coast. The saturated FAs were the most prevalent fraction in all sampling stations, but their percentage vs total FAs decreased near the Antarctic continent's coast. In contrast, the fractions of several lipid markers of biological activity, such as polyunsaturated fatty acids, were more widely distributed at southern latitudes, increasing in term of both percentage vs total FAs and absolute content, with respect to northern latitudes. Furthermore, the levels of FAs were also investigated in relation to the trend of the main oceanographic parameters (temperature, salinity, dissolved oxygen, nutrients, and chlorophyll a). A Principal Component Analysis revealed that FAs can be successfully used as tools to identify different geographical areas in the investigated zone. This study is the first performed on a transect ranging from 48 to 76 °S, expanding knowledge on the FAs composition of suspended particulate matter in the Pacific and Southern Ocean, including Ross Sea, in relation with oceanographic parameters. References 1. Cañavate, J.P. *Rev Aquac* 2019, 11, 527–549. 2. Truzzi, C., et al. *Chemosphere* 2017, 173, 116–123. 3. Parrish, C.C. *Lipids in Freshwater Ecosystems*; Springer New York, 1999, 4–20.

