

MSA AS A PROXY OF INDIAN OCEAN BIOGENIC PRODUCTIVITY FROM TALOS DOME, D66, LAW DOME ICE CORE STRATIGRAPHIES

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Methanesulphonic acid (MSA) measured along ice cores was largely used as a marker of past marine biogenic activity because of it is formed by atmospheric oxidation of dimethylsulphide (DMS), emitted by metabolic processes of marine biota. Changes of MSA concentration in ice core are related to variations of phytoplanktonic activity and DMS-producer species distribution, as well as changes in atmospheric processes (air-sea DMS exchange, DMS oxidation pathways and transport processes) or glaciological features (changes in accumulation rate, post depositional processes). MSA in ice cores drilled at central Antarctic sites exhibits several interpretation problems due to the low accumulation rate (loss of seasonal signal and/or post-depositional movement in the ice or re-emission into the atmosphere). On the contrary, coastal sites ice cores are more suitable in reconstructing past oceanic productivity changes by MSA stratigraphies thanks to their conservative character and because they generally fix MSA in the snow (by higher accumulation rate) and are less affected by arrival of MSA from lower latitudes, by long range transport.

In order to reconstruct the biological activity (marked by MSA) of the Indian Ocean sector facing Antarctica, MSA stratigraphies were obtained from three ice cores drilled in East Antarctica sites: Talos Dome (Northern Victoria Land, 72°48'S; 159°06'E, 2316 m a.s.l. accumulation rate 80.5mm w.eq), Law Dome (Dome Summit South, 66°47'S, 112°49'E, 1370 m a.s.l., Accumulation rate 644mm w.eq) and D66 (68°56'S, 136°56'E, 2333 m a.s.l., accumulation rate 213mm w.eq).

MSA stratigraphies were compared aiming to obtain a statistically significant history of the phytoplanktonic activity of the last century. The relationship between seasonal MSA production and sea-ice cover was also investigated in order to establish if MSA could be a proxy for sea-ice extent via connection with southern atmospheric processes (SOI and ACW).