

## Sea salt sodium record from Talos Dome (East Antarctica) as a potential proxy of the Antarctic past sea ice extent

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### **Abstract**

The expansion and retreat of Antarctic sea-ice is one of the most striking seasonal changes affecting the Earth today, effectively increasing by two fold the surface area of Antarctica. Sea-ice represents a powerful phenomenon exerting a strong influence on the oceanic, biological and climatic systems and, given its importance, it is a focus in environmental research. Despite an unknown exact mechanism, sea-ice plays a critical role in the polar amplification of climate change and, therefore, it is important to predict changes in sea ice under the future conditions of an ongoing climate change. A better understanding of the links between sea-ice and climate and a real improvement of the models requires a large series of long observational datasets. Antarctic sea ice has shown an increasing trend in recent decades, but with strong regional differences from one sector to another of the Southern Ocean. The Ross Sea and the Indian sectors have seen an increase in sea ice during the satellite era (1979 onwards). Here we present a record of ssNa<sup>+</sup> flux in the Talos Dome region during a 25-year period spanning from 1979 to 2003, showing that this marker could be used as a potential proxy for reconstructing the sea ice extent in the Ross Sea and Western Pacific Ocean at least for recent decades. After finding a positive relationship between the maxima in sea ice extent for a 25-year period, we used this relationship in the TALDICE record in order to reconstruct the sea ice conditions over the 20th century. Our tentative reconstruction highlighted a decline in the sea ice extent (SIE) starting in the 1950s and pointed out a higher variability of SIE starting from the 1960s and that the largest sea ice extents of the last century occurred during the 1990s. Our sea-ice reconstruction of the past extent was compared to other ice core based reconstructions of Antarctic sea-ice.

**Keywords:** sea-ice, paleo-reconstruction, Ross Sea