



Abstract ID : 316

Exploring reconstruction of Antarctic sea ice from sea salts in ice cores

Content

Antarctic sea-ice is a vital component of the global climate system and an important ecological habitat. However, the relatively short sea-ice record through the instrumental period limits the understanding and interpreting of temporal trends in sea ice behaviour. In this research, sea salt records from an East Antarctic ice core are used to further investigate and develop sea ice proxies, and are then used to reconstruct sea ice in this region. Our results find statistically significant correlations between chloride concentrations from the Mount Brown South (MBS) ice core, Wilhelm II Land, East Antarctica (69.111°S, 86.312°E) with records of Antarctic sea-ice area in the sector 70° E to 220° E ($p < 0.002$) and with circum-Antarctic total sea-ice area ($p < 0.05$). While the correlation does not imply causation, this work contributes towards finding and calibrating a robust sea-ice area proxy from measurement in ice cores at the MBS site. Fundamentally, sea salts are a reproducible and accurate measurement in ice cores and therefore have the potential to develop a robust sea ice proxy. By better understanding the mechanisms and modes of climate variability that influence both, the sea ice and the sea salts, we can thus improve our understanding and interpretation of the sea ice proxy record.

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Track Classification: Progress in proxy development and interpretation