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Regional climate and ice shelf melt captured in an Antarctic Peninsula ice core

Daniel Emanuelsson and Elizabeth R. Thomas

British Antarctic Survey, Ice Dynamics and Palaeoclimate, Cambridge, United Kingdom of Great Britain – England, Scotland, Wales (danem@bas.ac.uk)

In this study, we present the stable water isotope record ($\delta^{18}\text{O}$) from an ice core drilled in Palmer Land, the southern Antarctic Peninsula (AP). This unique record, records changes in eastern AP ice shelf melt on the Larsen ice shelves. We show that warm years recorded in the ice core $\delta^{18}\text{O}$ record are associated northeasterly winds that pass over the peninsula and subsequently result in foehn-induced surface warming and melt events on the Larsen Ice shelves on the eastern coast. The recent strengthening of westerly winds that circumference Antarctica (positive trend in SAM) and the deepening of the Amundsen Sea Low drives these strong northeasterly winds. We reconstruct the number of yearly melt days on the Larsen B ice shelf using melt days estimates from the published QSCAT/ASCAT dataset. Our record shows that melting on the Larsen B ice shelf since the late 1990s was higher than at any time during the past 388 years. However, periods with a high number of melt days have occurred in the past during the latter parts of the 17th and 19th centuries, as well as more recently during the 1940s, which may indicate past foehn-induced ice shelf melting.