

History of the Ross Sea Ice Sheet in Salmon Valley During the Last Glaciation

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During the Last Glacial Maximum, grounded ice fed by both the West and East Antarctic Ice Sheets filled the Ross Sea Embayment. Understanding the history and extent of this former Ross Sea Ice Sheet (RSIS) is crucial to addressing Antarctica's contribution to global sea level since the LGM, as well as the future stability of the West Antarctic Ice Sheet (WAIS). Salmon Valley, in the Royal Society Range, is a dry valley that opens to McMurdo Sound. During the LGM the valley was dammed by the intruding RSIS, and glacial deposits record the movement of ice across the landscape. Preliminary radiocarbon dates of algae from prominent moraines along the coastal headlands suggest the RSIS was at or near its maximum between ~17,000 yr BP and ~14,000 yr BP, when it reached an elevation of ~290 m. On the southern headland, dates from a moraine range between 17,180 - 360 yr BP and 14,829 - 371 yr BP. A secondary ridge ~10 m below yields ages of 13,967 - 272 yr BP and 14,038 - 222 yr BP. On the northern headlands, dates range between 14,680 - 443 yr and 14,222 - 337 yr BP. Dates from perched lacustrine deltas on the valley floor indicate ice was extensive enough to dam a proglacial lake in the valley to an elevation of 261 m at 16,388 - 529 yr BP and to an elevation of 131 m at 13,902 - 145 yr BP. These results call into question the likelihood of any significant contribution by the RSIS to MWP-1A at 14.6 kyr BP.