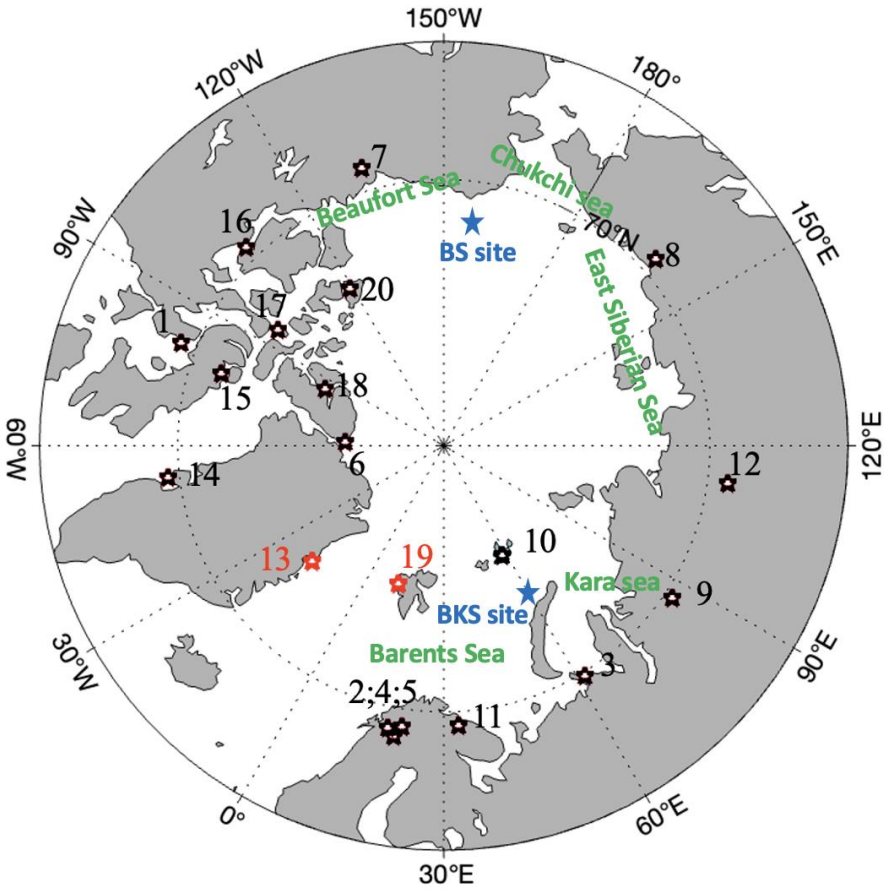
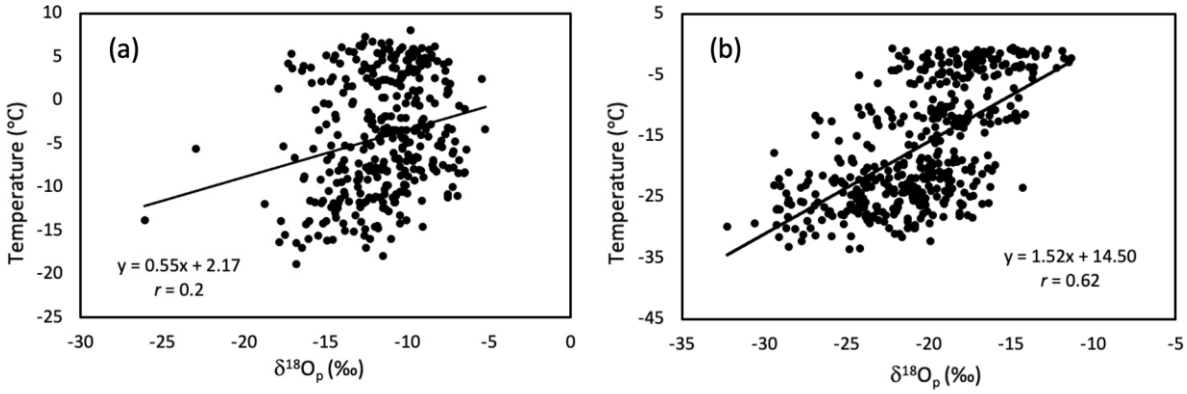
Supplementary material for: Wenxuan Song, Zhongfang Liu, Haimao Lan & Xiaohe Huan 2023. Influence of seasonal sea-ice loss on Arctic precipitation $\delta^{18}O$: a GCM-based analysis of monthly data. *Polar Research 42.* Correspondence: Zhongfang Liu, Tongji University, 1239 Siping Road, Yangpu District, Shanghai, China. E-mail liuzf406@gmail.com

Supplementary Table S1. Details of GNIP station records used in this study.

Number	Site	Country	Longitude	Latitude	Time series (year)
1	Hall Beach	Canada	81.25° W	68.8° N	1989-1993
2	Kiruna	Sweden	20.23° E	67.87° N	1975-1980
3	Amderma	Russian	61.70° E	69.77° N	1980-1990
4	Abisko	Sweden	18.82° E	68.35° N	1975-1980
5	Naimakka	Sweden	21.53° E	68.68° N	1990-95
6	Alert	Canada	62.33° W	82.5° N	1989-1993
7	Inuvik	Canada	133.48° W	68.30° N	1986-89
8	Cherskiy	Russian	161.34° E	68.76° N	2001-2010
9	Dudinka	Russian	86.18° E	69.41° N	1990
10	Krenkel Polar GMO	Russian	58.05° E	80.62° N	1990
11	Murmansk	Russian	33.05° E	68.97° N	1980-86; 1988-1990
12	Olenek	Russian	112.43° E	68.50° N	1996-2000
13	Danmarkshavn	Greenland	18.67° W	76.77° N	1991-2021
14	Disko Land	Greenland	53.47° W	69.27° N	2015-16
15	Pond Inlet	Canada	78.00° W	72.40° N	1990-92
16	Cambridge Bay	Canada	105.12° W	69.10° N	1989-1993
17	Resolute Bay	Canada	94.98° W	74.72° N	1989-1993
18	Eureka	Canada	85.56° W	80.00° N	1989-1993
19	Ny-Ålesund	Norway	11.93° W	78.92° N	1990-2021
20	Mould Bay	Canada	119.28° W	76.23° N	1989-1993



Supplementary Fig. S1. Distribution of Arctic GNIP stations located north of 65°N for model evaluation. Sites 13 and 19 represent Danmarkshavn and Ny-Ålesund. Blue stars represent the locations used for the HYSPLIT trajectory analysis in the Beaufort Sea (BS) and Barents–Kara seas (BKS). The main regions of SIC changes are marked with green.



Supplementary Fig. S2. Correlation between air temperature and $\delta^{18}O_p$ at the (a) Ny-Ålesund and (b) Danmarkshavn sites.