

Supplementary for “Dual-frequency radar observations of snowmelt processes on Antarctic perennial sea ice by CFOSCAT and ASCAT”

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Figures S1 to S6

Figure 5 of the manuscript

Table S1

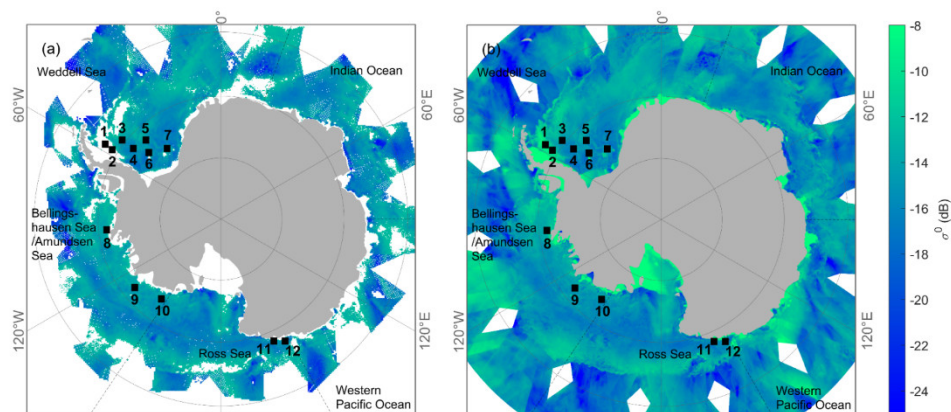


Figure S1. ASCAT backscatter maps provided by (a) IFREMER and from (b) SIR-enhanced ASCAT product. (a) is the IFREMER ASCAT backscatter map on December 7, 2010, and (b) is the SIR-enhanced ASCAT backscatter map from December 7-December 8, 2010. The black squares represent the 12 study sites.

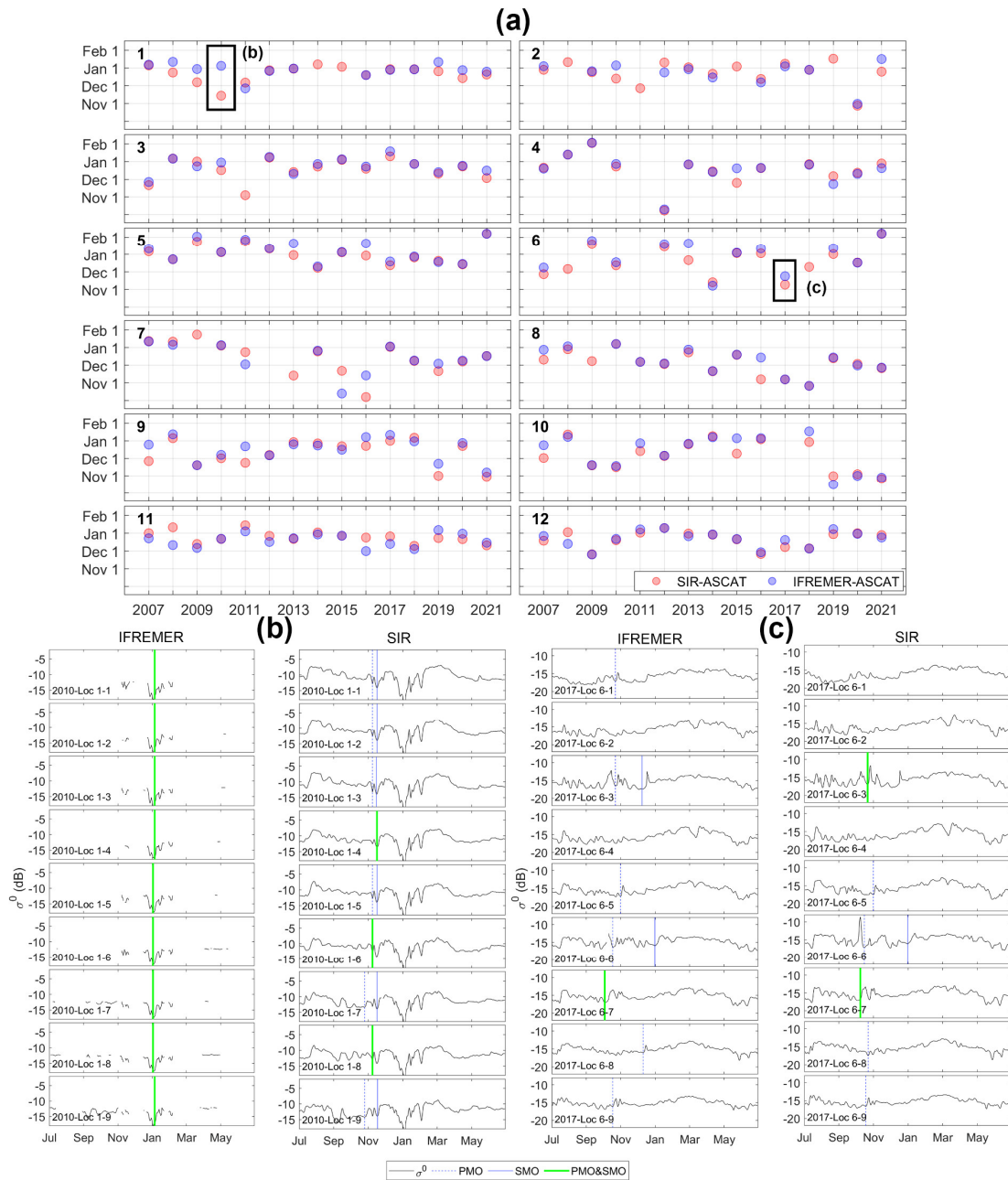


Figure S2. Melt onsets derived from IFREMER ASCAT data and SIR-enhanced ASCAT product. (a) shows the SMO from IFREMER ASCAT data and SIR-enhanced ASCAT for 12 study sites from 2007/2008-2021/2022, (b) shows the backscatter time series superimposed with the derived PMO and SMO for Location 1 in 2010/2011, and (c) shows the backscatter time series superimposed with the derived PMO and SMO for Location 6 in 2017/2018.

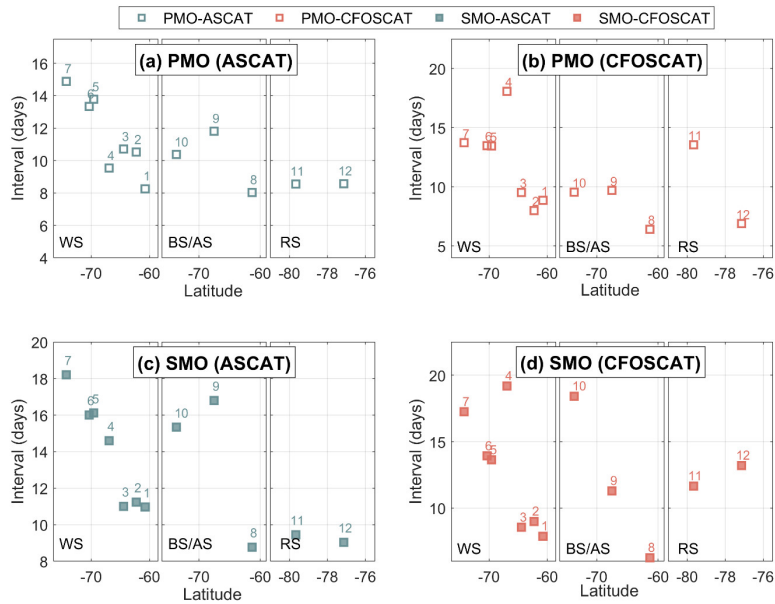


Figure S3. The time interval between the local minimum and the following local maximum when PMO and SMO are detected for 12 study sites shown by latitude during the overlapping period between ASCAT and CFOSCAT (i.e., from 2019/2020 to 2021/2022).

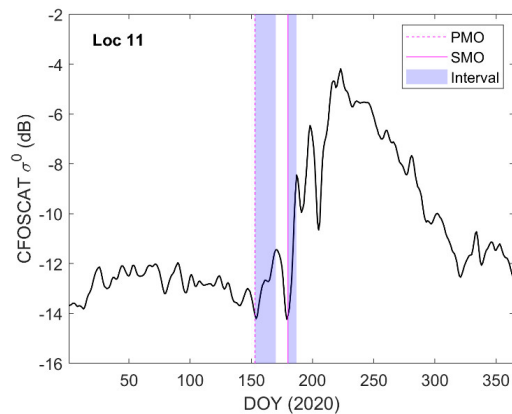


Figure S4. An example of interval days between the local minimum and the following local maximum when PMO and SMO were detected. The interval shown in the figure is calculated using CFOSCAT data at Location 11.

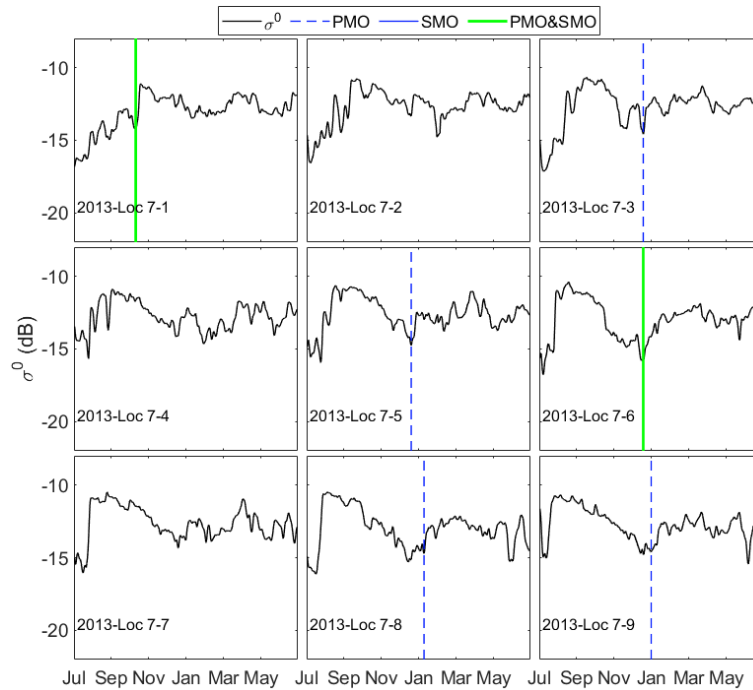


Figure S5. The ASCAT backscatter time series superimposed with the derived PMO and SMO for 9 pixels around the Location 7 in 2013/2014.

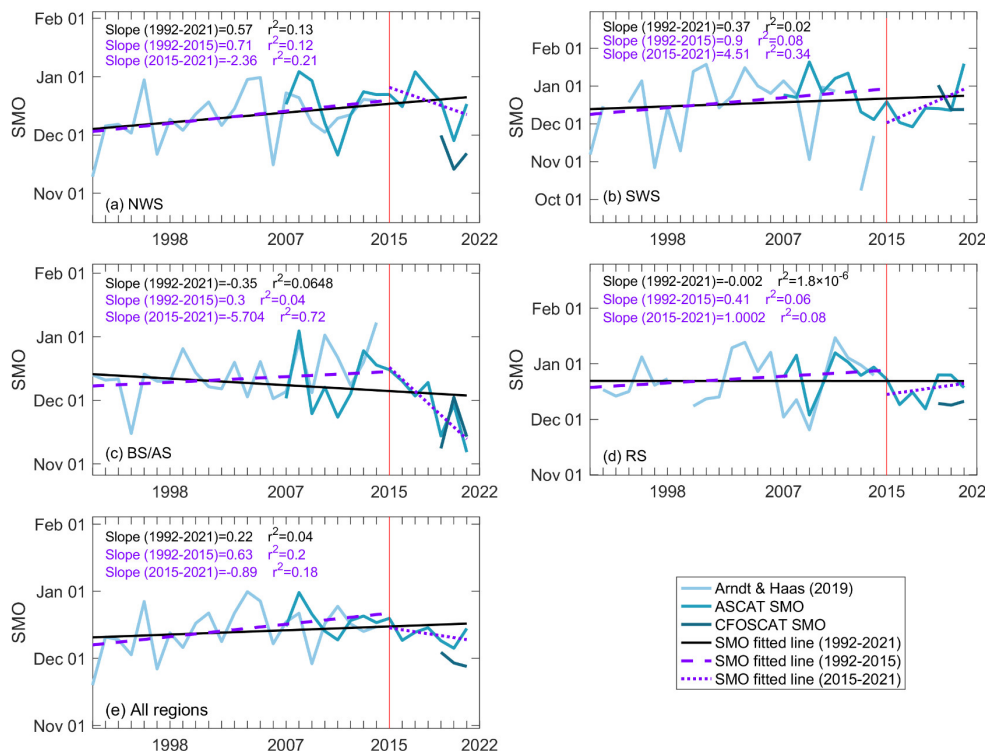


Figure S6. SMO time series from 1992 to 2021. Dark blue, medium blue and light blue solid lines represent CFOSCAT-derived SMO, ASCAT-derived SMO and SMO from Arndt and Haas (2019), respectively. The black solid line, purple dashed line, and purple dotted line are fitted trend lines for 1992-2021, 1992-2015, and 1991-2021 respectively based on the Arndt and Haas (2019) SMO and the ASCAT-derived SMO.

The following shows the Figure 5 in our manuscript:

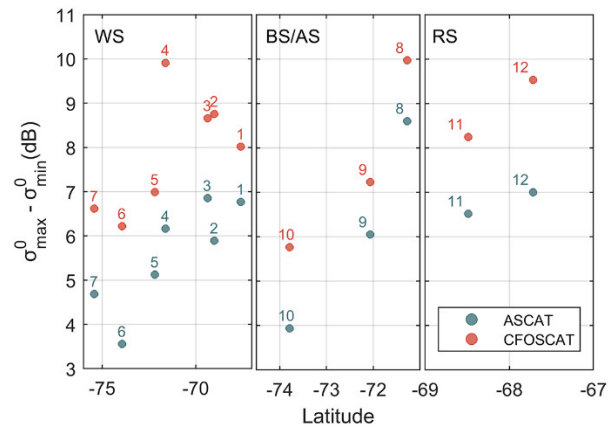


Figure 5. Differences between seasonal maxima and minima of backscatter during the spring-summer transition period over 2019/2020 to 2021/2022 for our 12 study sites shown by latitude.

Table S1. Average time intervals (days) of ASCAT and CFOSCAT in different regions.

Regions	ASCAT-PMO	CFOSCAT-PMO	ASCAT-SMO	CFOSCAT-SMO
WS	11.6	12.1	14.0	12.8
BS/AS	10.1	8.5	13.6	12.0
RS	8.6	10.2	9.2	12.4
All regions	10.7	10.9	13.1	12.5