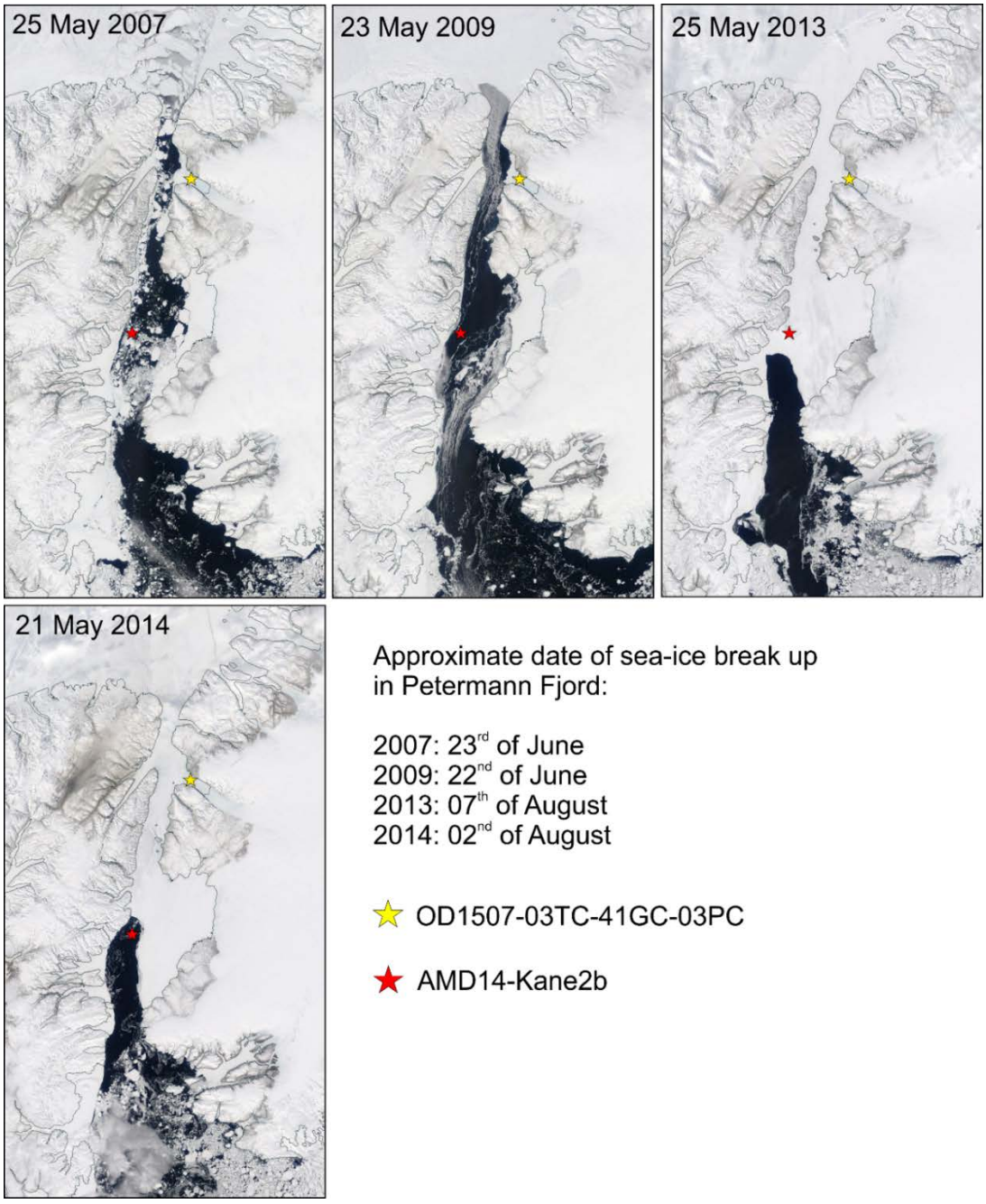
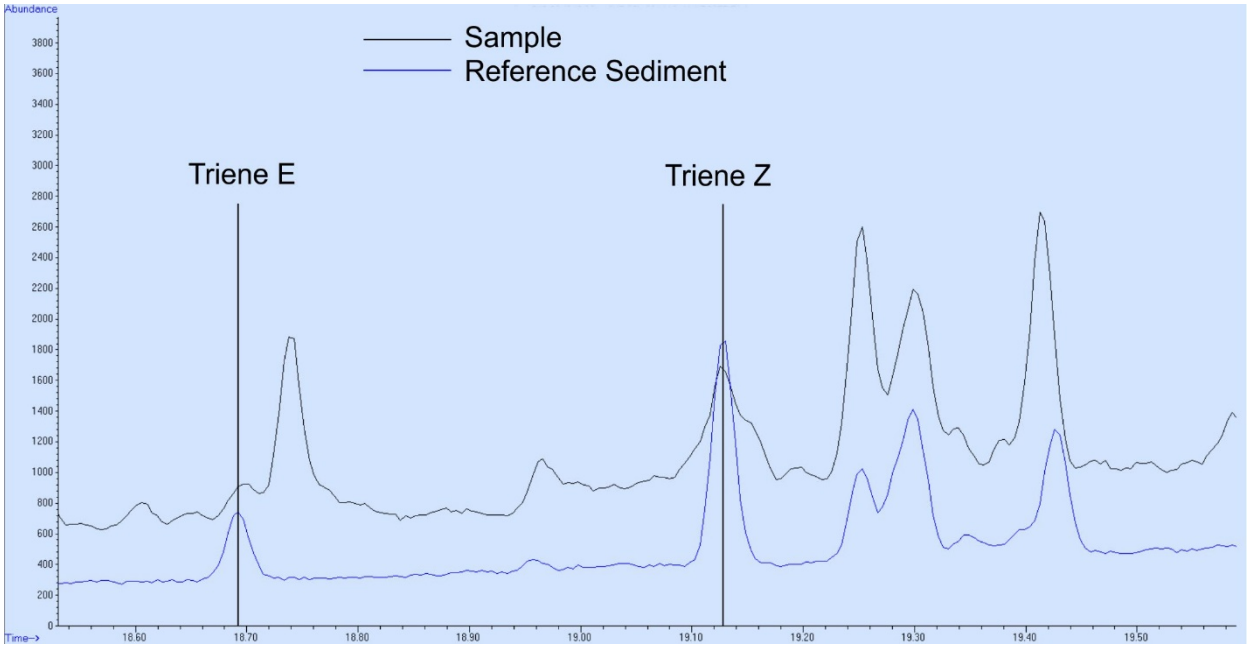
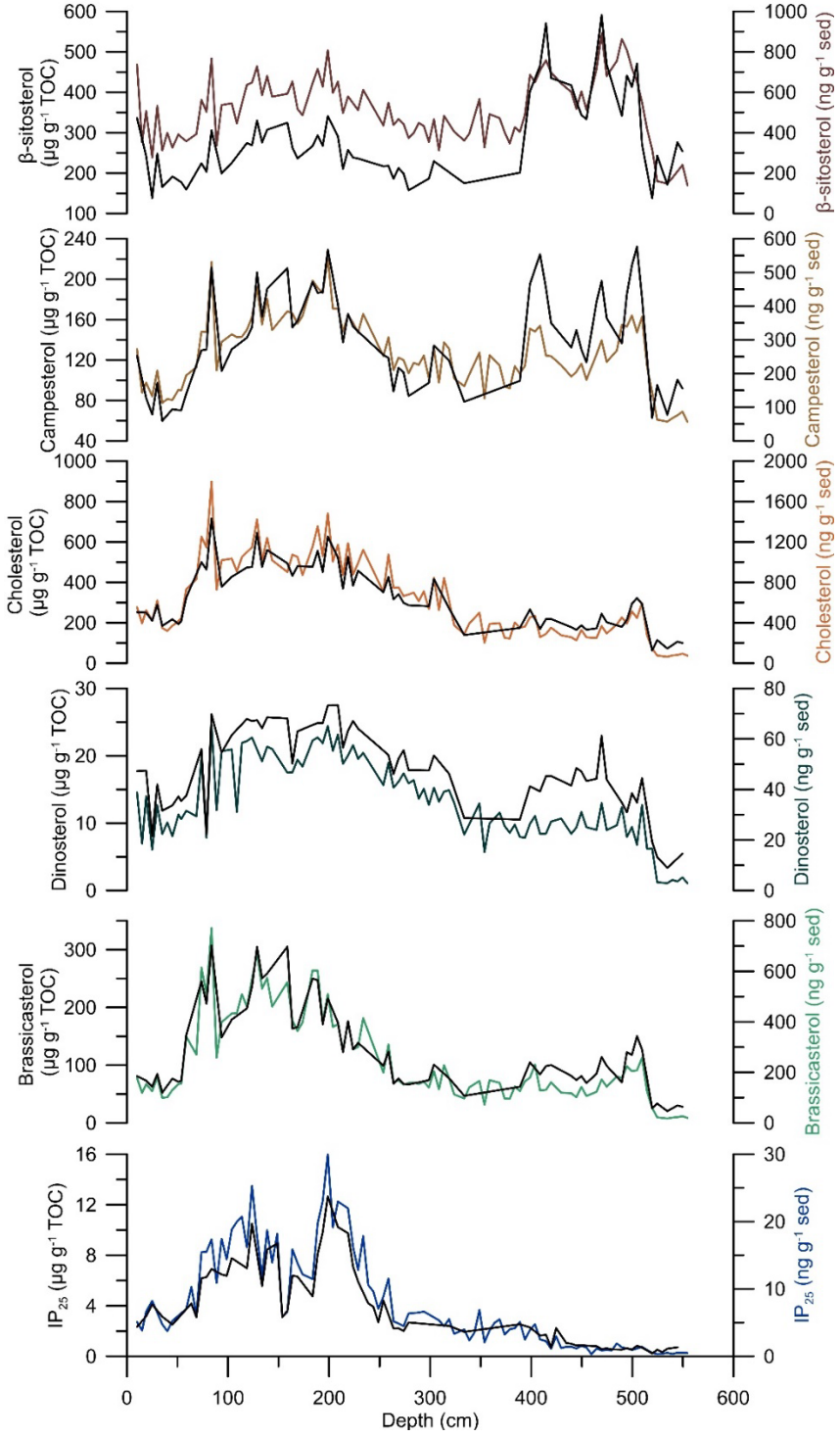
Supplement to 'Holocene sea-ice dynamics in Petermann Fjord'



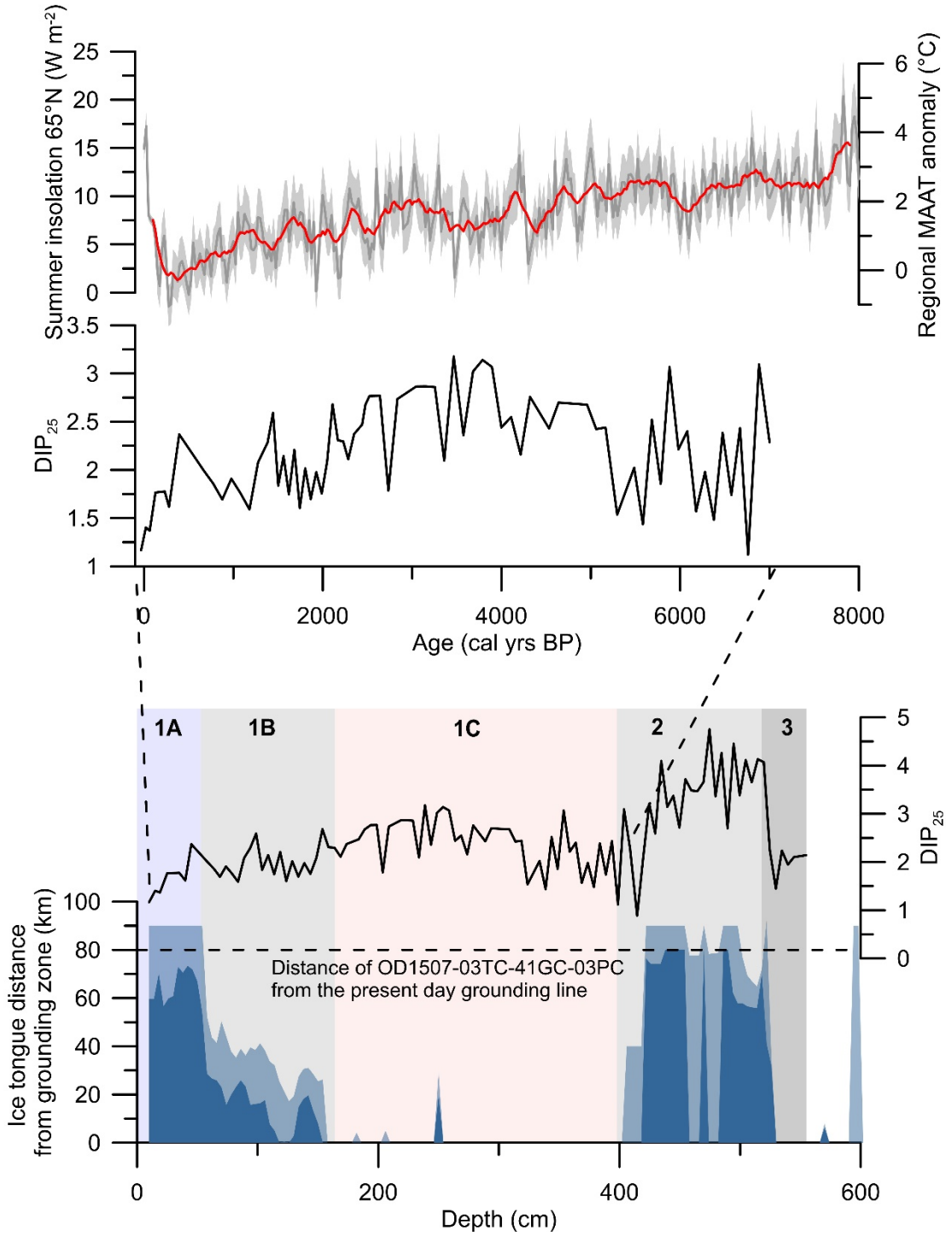
Supplementary Figure 1. Snapshots of different ice arch configurations in May (satellite images from 'NASA Worldview' (https://worldview.earthdata.nasa.gov/)) and their implication for sea-ice break up in Petermann Fjord. Core OD1507-03TC-41GC-03PC in outer Petermann Fjord is marked with a yellow star and core AMD14-Kane2b is marked with a red star.



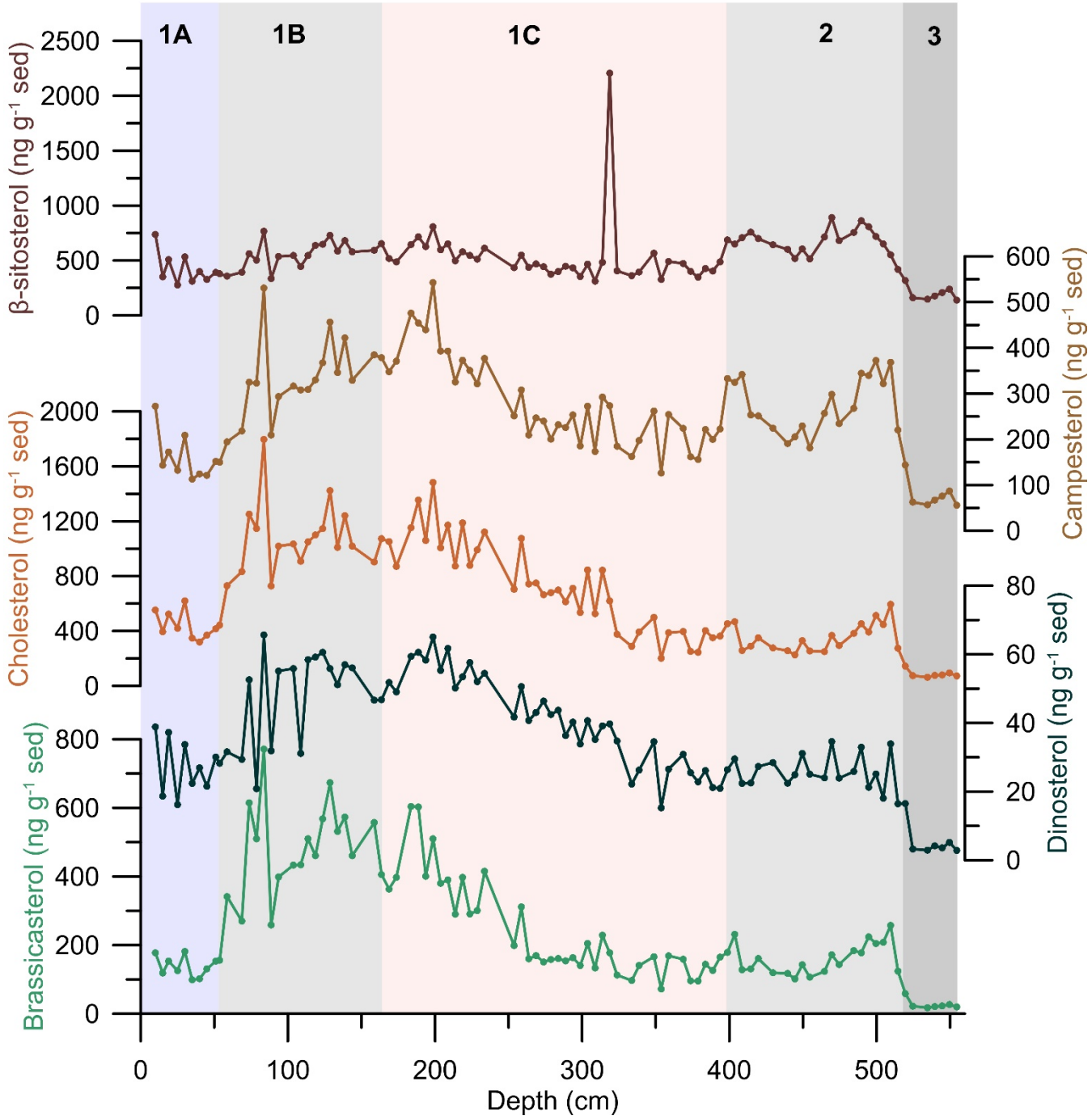
Supplementary Figure 2. Chromatogram of the m/z 346.3 for a sample from Petermann Fjord (black) and the Young Sound Reference Sediment (blue). While the reference sediment shows clearly identifiable peaks of both Triene E and Triene Z, interaction with neighbouring peaks does not allow for a clear identification and quantification of these compounds in samples from Petermann Fjord.



Supplementary Figure 3. Comparison of OD1507-03TC-41GC-03PC biomarker concentrations normalized to the amount of sediment extracted (in colour) and normalized to the samples respective TOC content (in black).



Supplementary Figure 4. The DIP_{25} index at OD1507-03TC-41GC-03PC on age (top) and depth (bottom) alongside atmospheric temperatures from Agassiz ice cap (Lecavalier et al., 2017) (top) and the Petermann ice tongue extent (bottom). The vertical background fill indicates the lithological units (1A-1C, 2, 3) at OD1507-03TC-41GC-03PC (Reilly et al., 2019).



Supplementary Figure 5. Sterol biomarker concentrations in ng g^{-1} sed including the one sample with extremely high β-sitosterol values (3x the mean). This sample has been excluded from any environmental interpretations. The vertical background fill indicates the lithological units (1A-1C, 2, 3) at OD1507-03TC-41GC-03PC (Reilly et al., 2019).

Supplementary Table 1. Splice table, indicating the tie points between 03TC, 41GC, and 03PC for the Petermann outer fjord splice (OD1507-03TC-41GC-03PC) (Reilly et al. 2019).

Core	Core depth (from-to) (cm)	Splice depth (from-to) (cm)
OD1507-03TC	0-51.27	0 - 51.27
OD1507-41GC	22.55-383.4	51.27 - 412.12
OD1507-03PC	462.5-606	412.12 - 555.62

Supplementary Table 2. GC-MS operating conditions and selective ion monitoring (SIM) ion masses.

Operating conditions		
Sample injection	splitless	
Injection volume	1 µL	
Injector temperature	280°C	
Flow of carrier gas	1 mL min^{-1}	
Oven temperature profile	40-300°C; 10°C min^{-1}; 8 minute isothermal interval at 300°C	
MSD transfer line temperature	280°C	
MS ion source temperature	250°C	
Ion masses		
HBI SIM method ion masses	342.3	
	344.3	
	346.3	HBI III
	348.3	HBI II
	350.3	IP_{25}
Sterol SIM method ion masses	327.3	22-dehydrocholesterol
	331.2	5α-androst-16-en-3α-ol
	343.3	Desmosterol
	382.4	Campesterol
	396.4	β-sitosterol
	458.4	Cholesterol
	470.4	Brassicasterol
	500.4	Dinosterol

Supplementary references

Lecavalier, B. S., Fisher, D. A., Milne, G. A., Vinther, B. M., Tarasov, L., Huybrechts, P., Lacelle, D., Main, B., Zheng, J., Bourgeois, J. and Dyke, A. S.: High Arctic Holocene temperature record from the Agassiz ice cap and Greenland ice sheet evolution, Proc. Natl. Acad. Sci. U. S. A., 114(23), 5952–5957, doi:10.1073/pnas.1616287114, 2017.

Reilly, B. T., Stoner, J. S., Mix, A. C., Walczak, M. H., Jennings, A., Jakobsson, M., Dyke, L., Glueder, A., Nicholls, K., Hogan, K. A., Mayer, L. A., Hatfield, R. G., Albert, S., Marcott, S., Fallon, S. and Cheseby, M.: Holocene break-up and reestablishment of the Petermann Ice Tongue, Northwest Greenland, Quat. Sci. Rev., 218, 322–342, doi:10.1016/j.quascirev.2019.06.023, 2019.