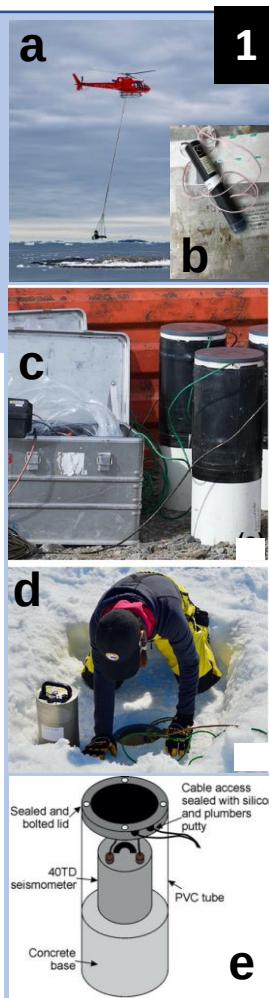
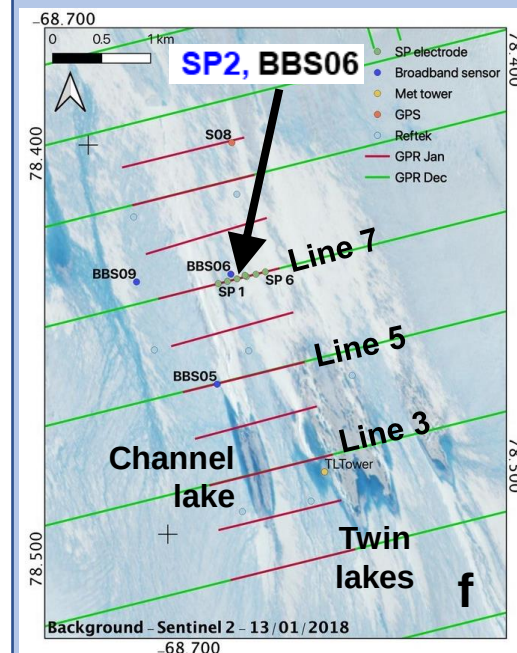


Geophysical evaluation of the surface and englacial hydrological system of the Sørsdal Glacier, East Antarctica

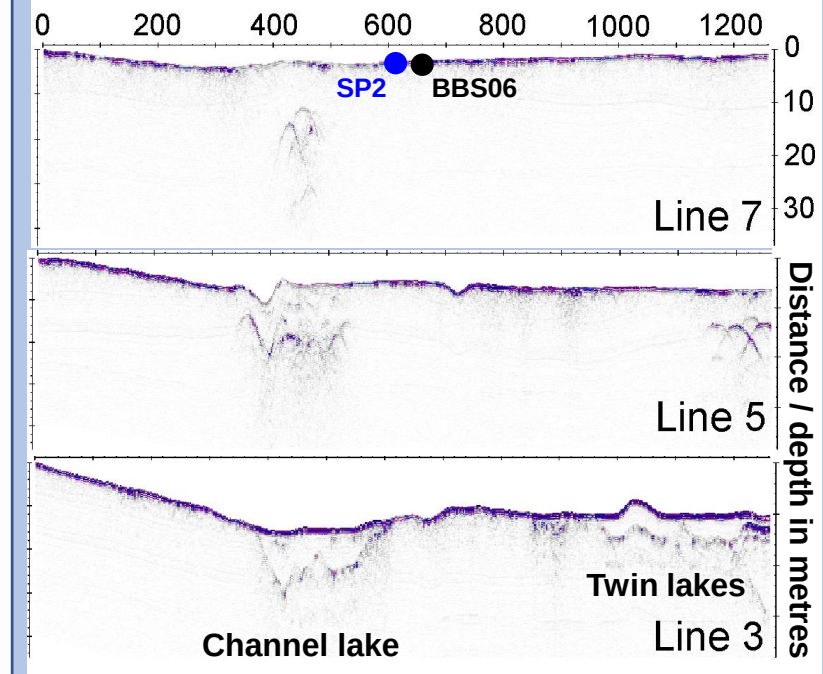
Bernd Kulesa* (1,2), Sarah Thompson (2), Sue Cook (2), Glenn Jones (1), Chris Watson (2), Christian Schoof (3), Victoria Lane (4)
 *b.kulesa@swansea.ac.uk

We acquired helicopter ground-penetrating radar (GPR, a), electrical self-potential (SP, b) and broadband passive seismic (c-e) data to evaluate the spatial and temporal evolution of the shallow hydrological system of the Sørsdal Glacier, Princess Elizabeth Land, East Antarctica, between the austral summers of 2017-18 and 2018-19 (f).

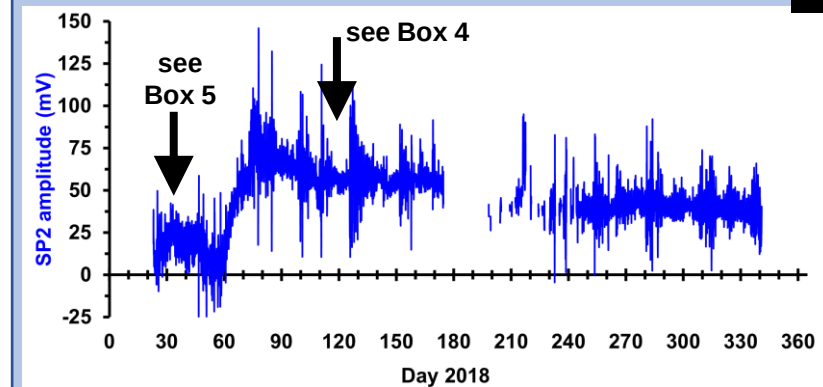


The margin of the East Antarctic Ice Sheet experiences strong surface melting during the austral summer, although the evolution of the ice-sheet's plumbing system are poorly known. Our observations imply a strong hydrological control of mass redistribution between grounded and floating ice.

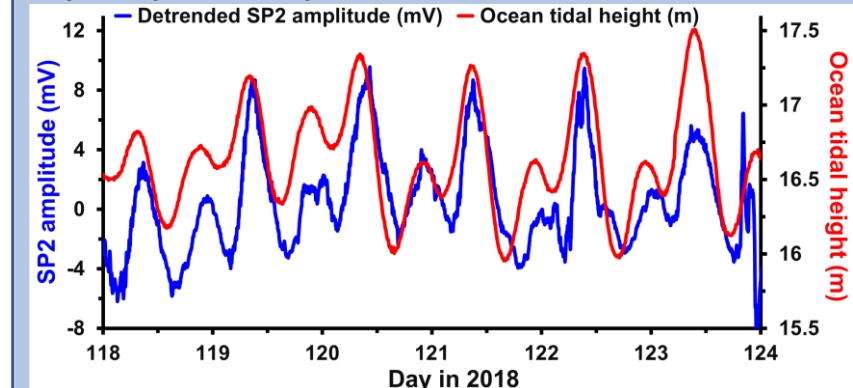
A shallow englacial hydrological system connects with surface lakes upstream of the grounding line.



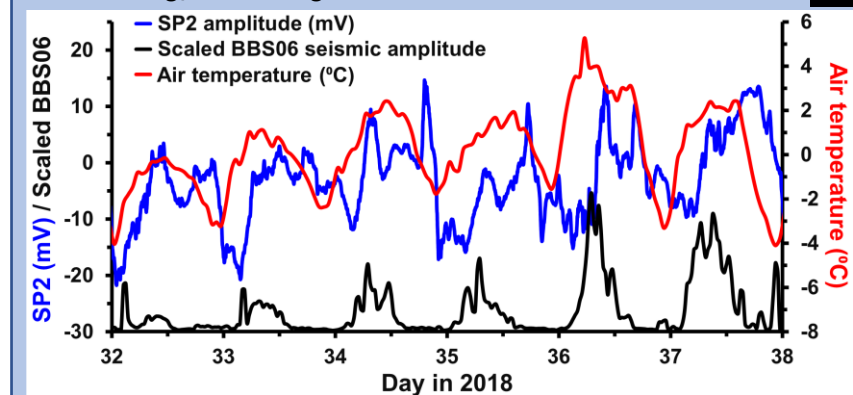
The shallow hydrological system is active through the year, exemplified by our SP2 time series in Line 7:



In winter shallow subsurface water flow (and hence SP amplitude) is forced by transmission of ocean tidal stresses.



In summer daily meltwater generation dominates flow over tidal forcing, shown e.g. in our SP2 and BBS06 seismic data.



We can constrain flow processes in the channel lake system by modelling the decay of SP pulses with distance from it.

