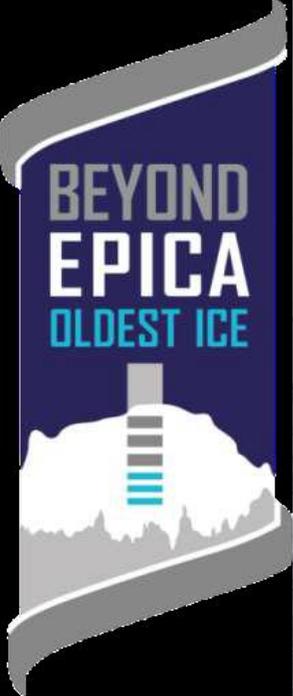


# Glaciological setting and subglacial conditions at Little Dome C: the site for Beyond EPICA – Oldest Ice Core



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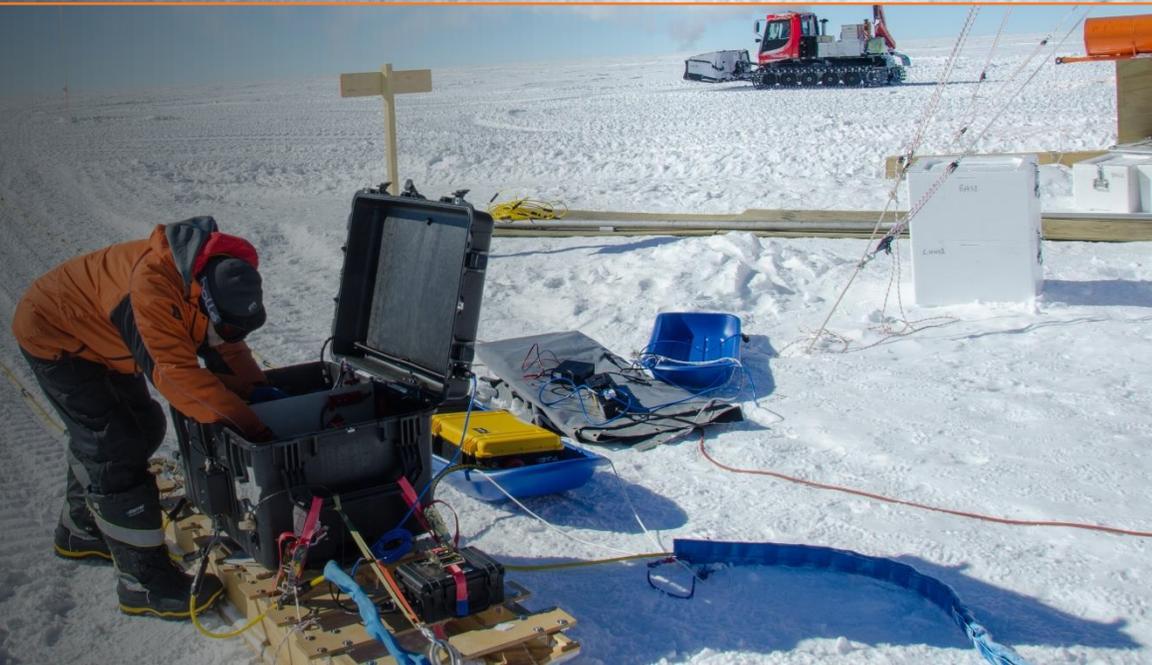
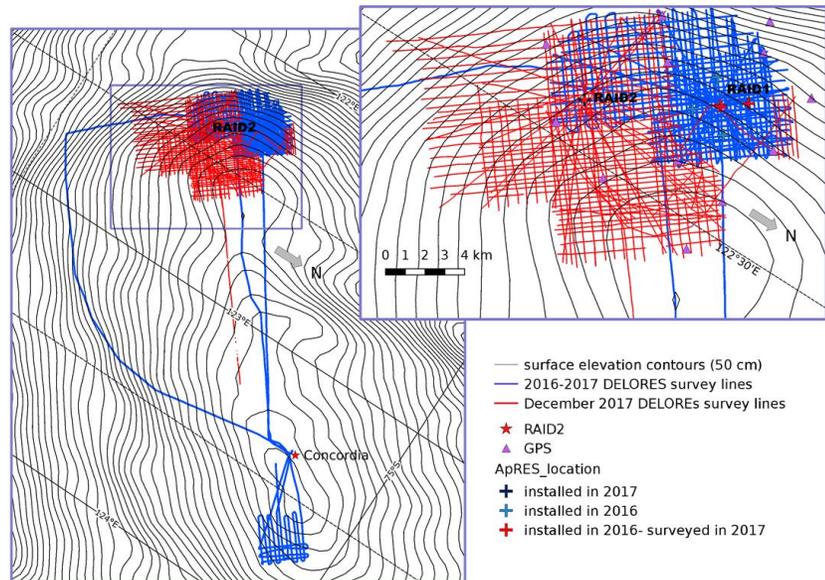


# DEep LOoking Radio Echo Sounder

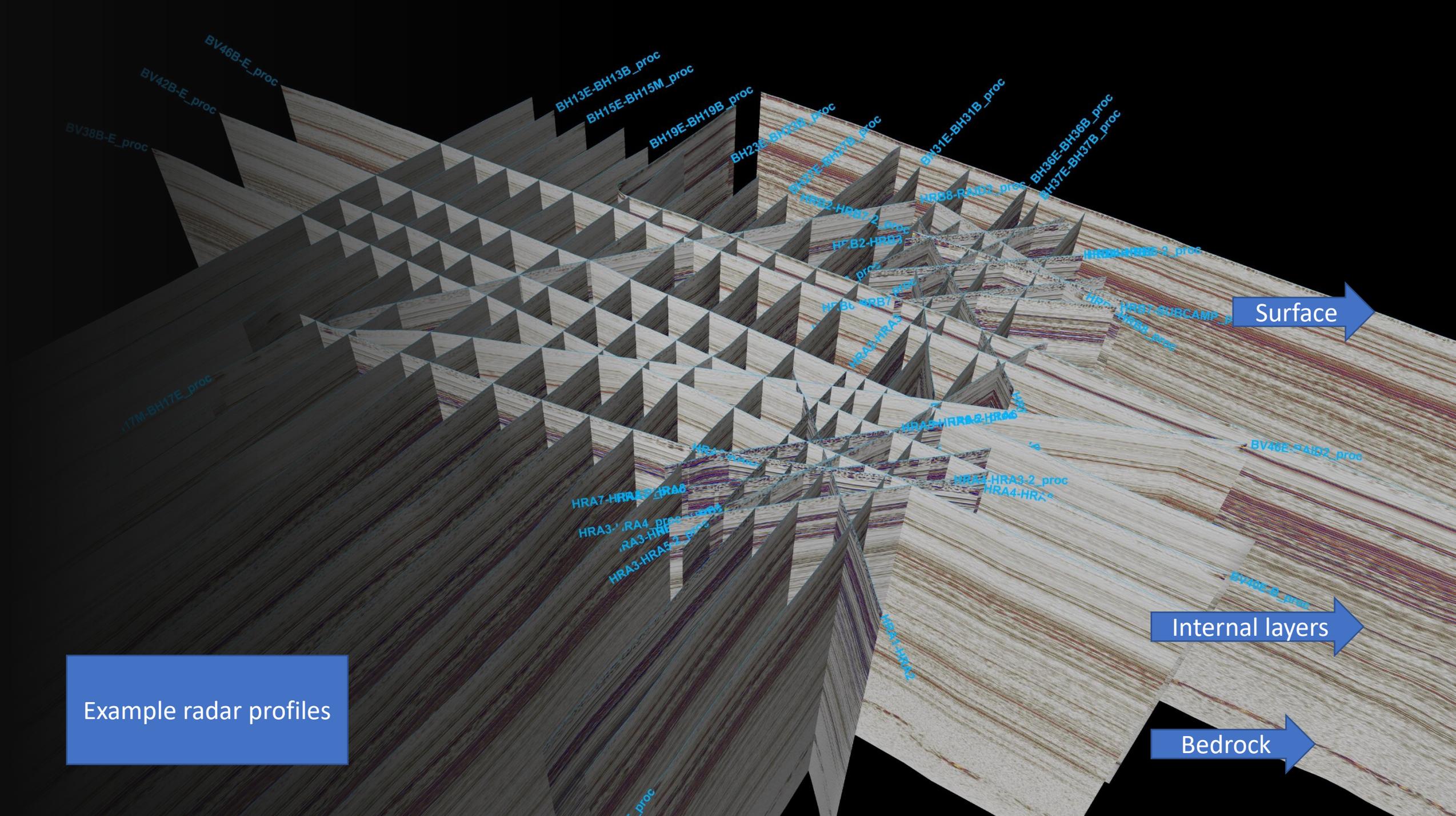
16 x 12 km search area at Little Dome C

- 2400 line km of over-snow radar
- Line spacing 250 or 500 m

# DELORES radar



Example radar profiles



Surface

Internal layers

Bedrock

Base of ice sheet shows deep incised  
valleys with melting in the deepest

Bedrock depth (m)

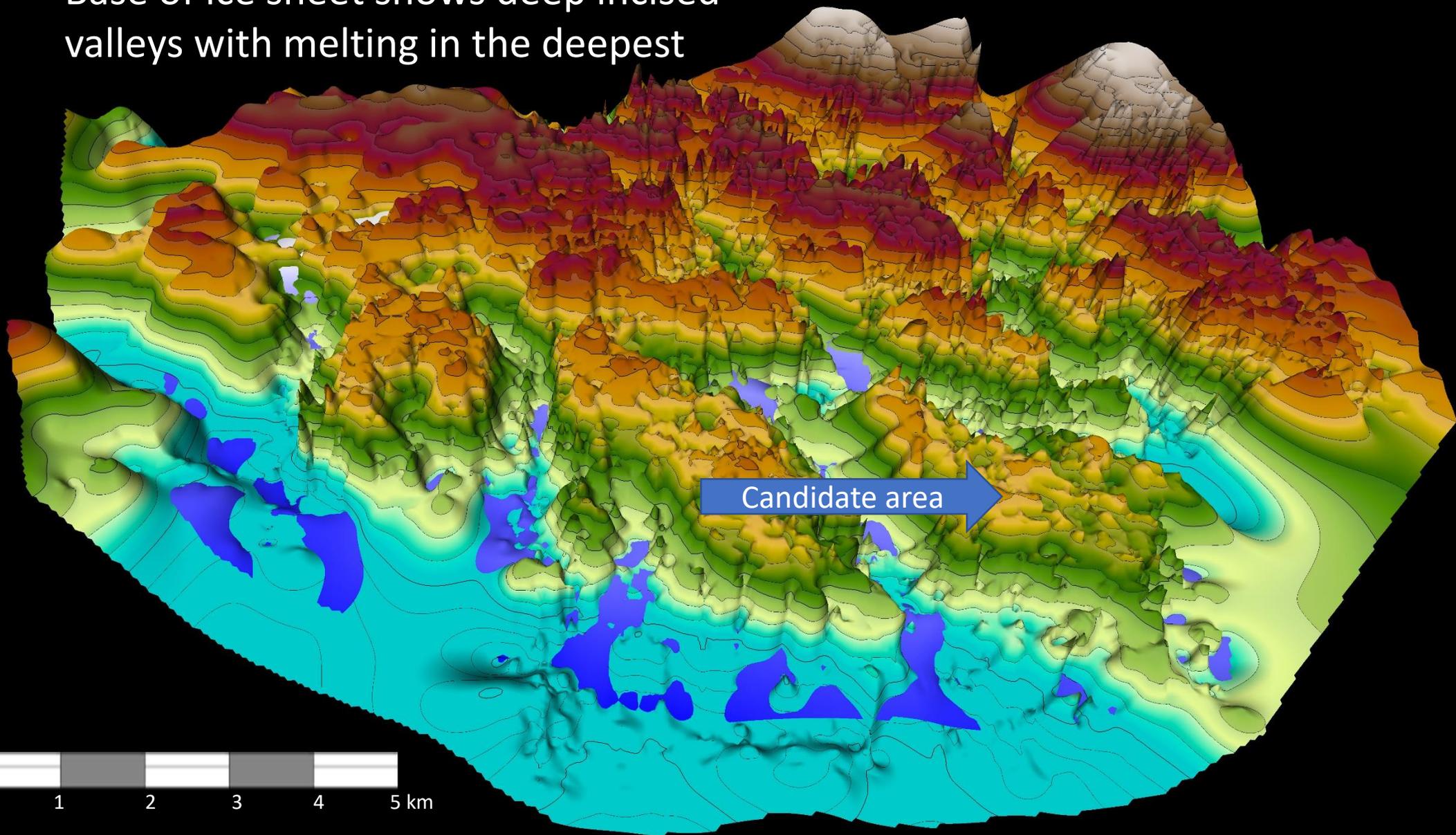
-2500.00  
-2550.00  
-2600.00  
-2650.00  
-2700.00  
-2750.00  
-2800.00  
-2850.00

Water layer (m)

-2750.00  
-2775.00  
-2800.00  
-2825.00  
-2850.00  
-2875.00  
-2900.00  
-2925.00  
-2950.00

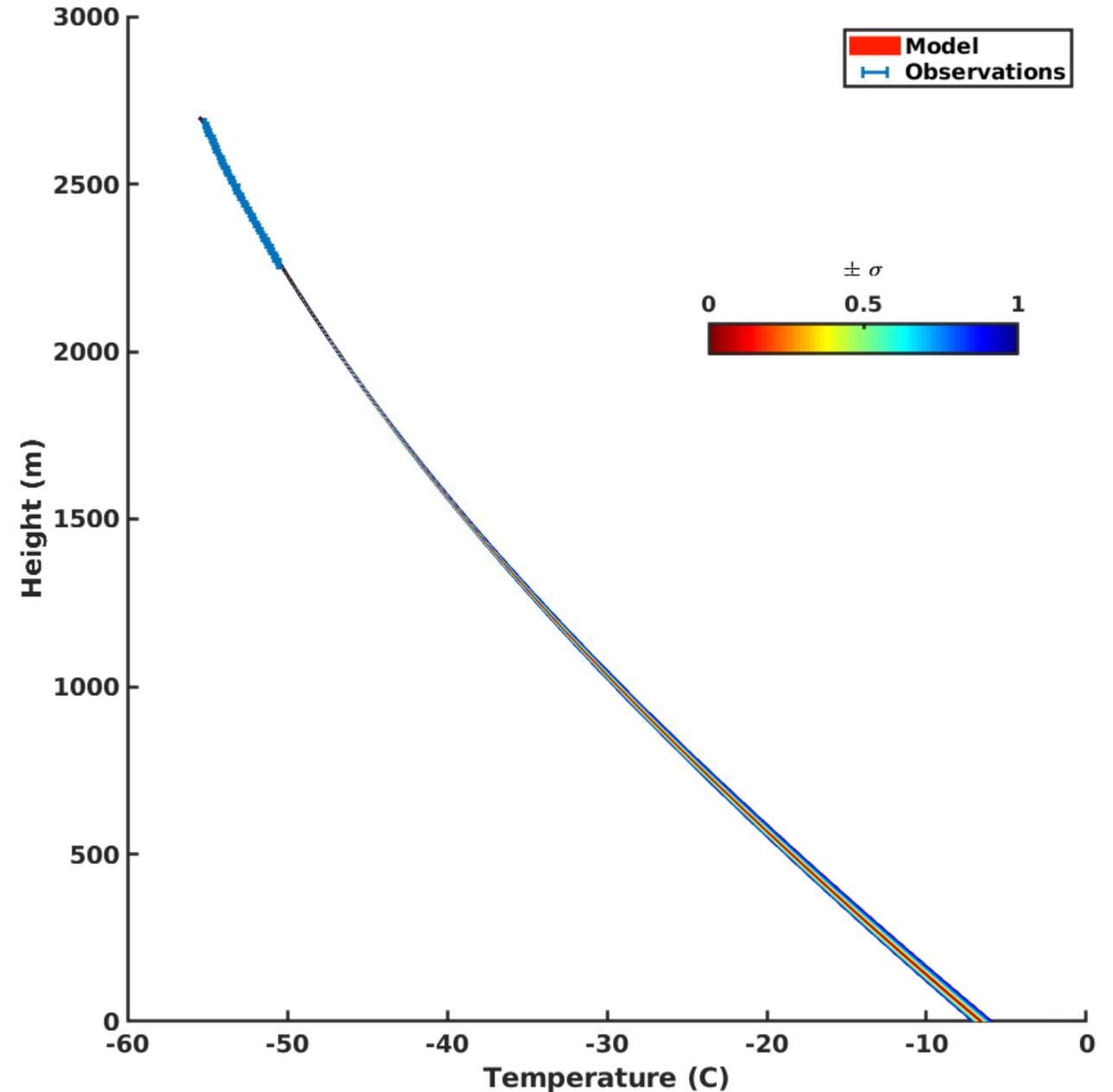
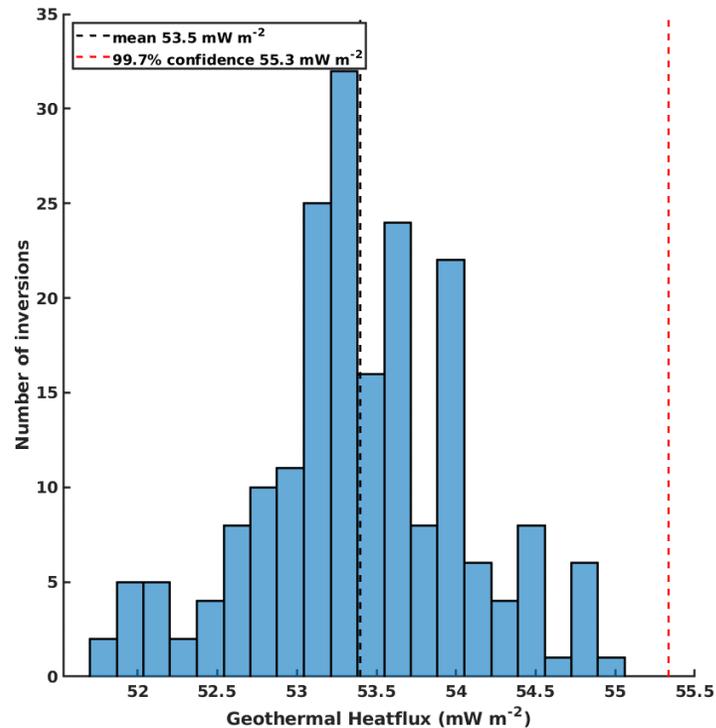
0 1 2 3 4 5 km

Candidate area



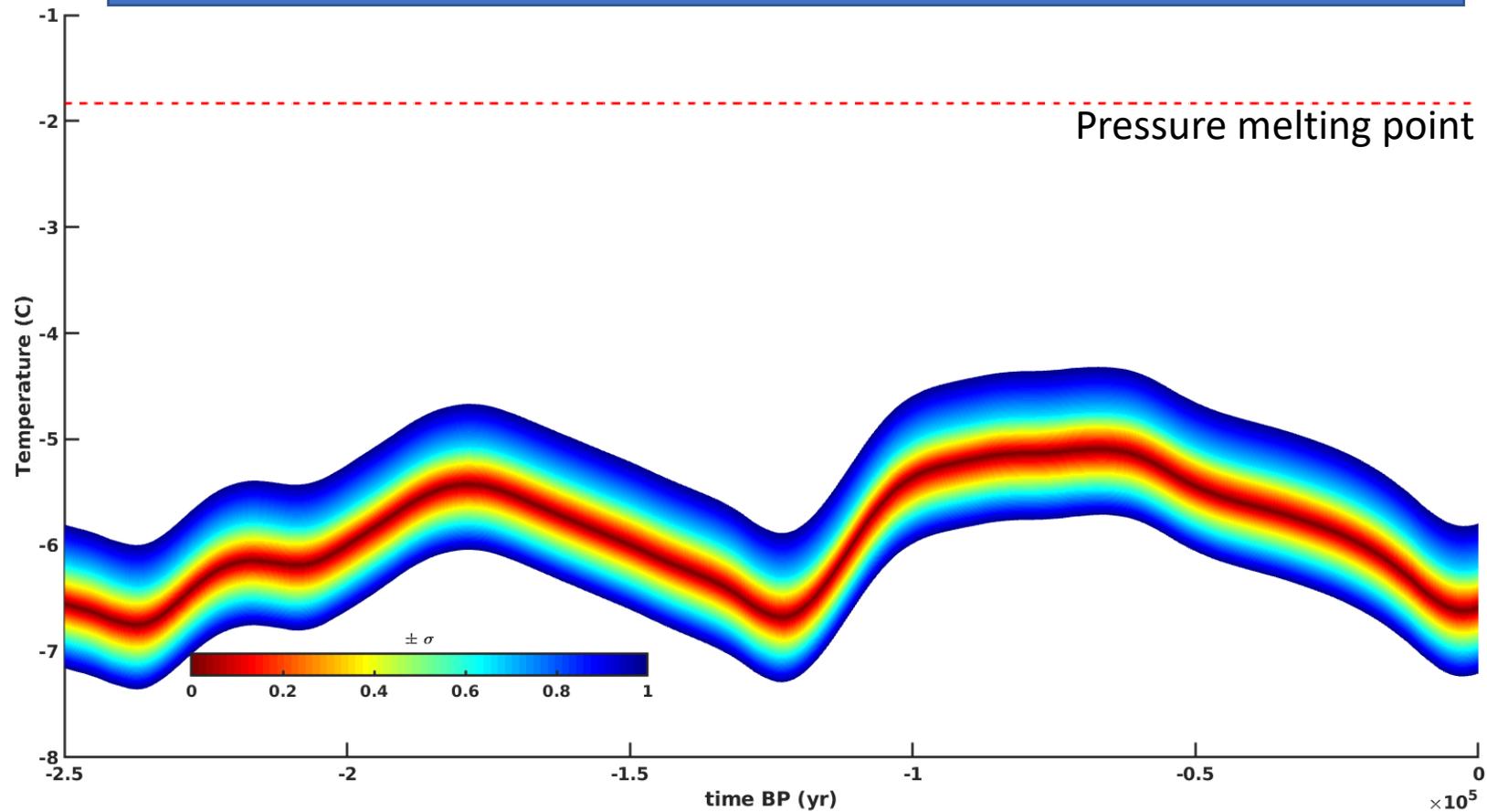
## Temperature profile in borehole close to candidate Oldest Ice drill site

- Present day basal temperature is  $\sim -6.5^{\circ}\text{C}$
- Geothermal heat flow  $\sim 55 \text{ mW m}^{-2}$

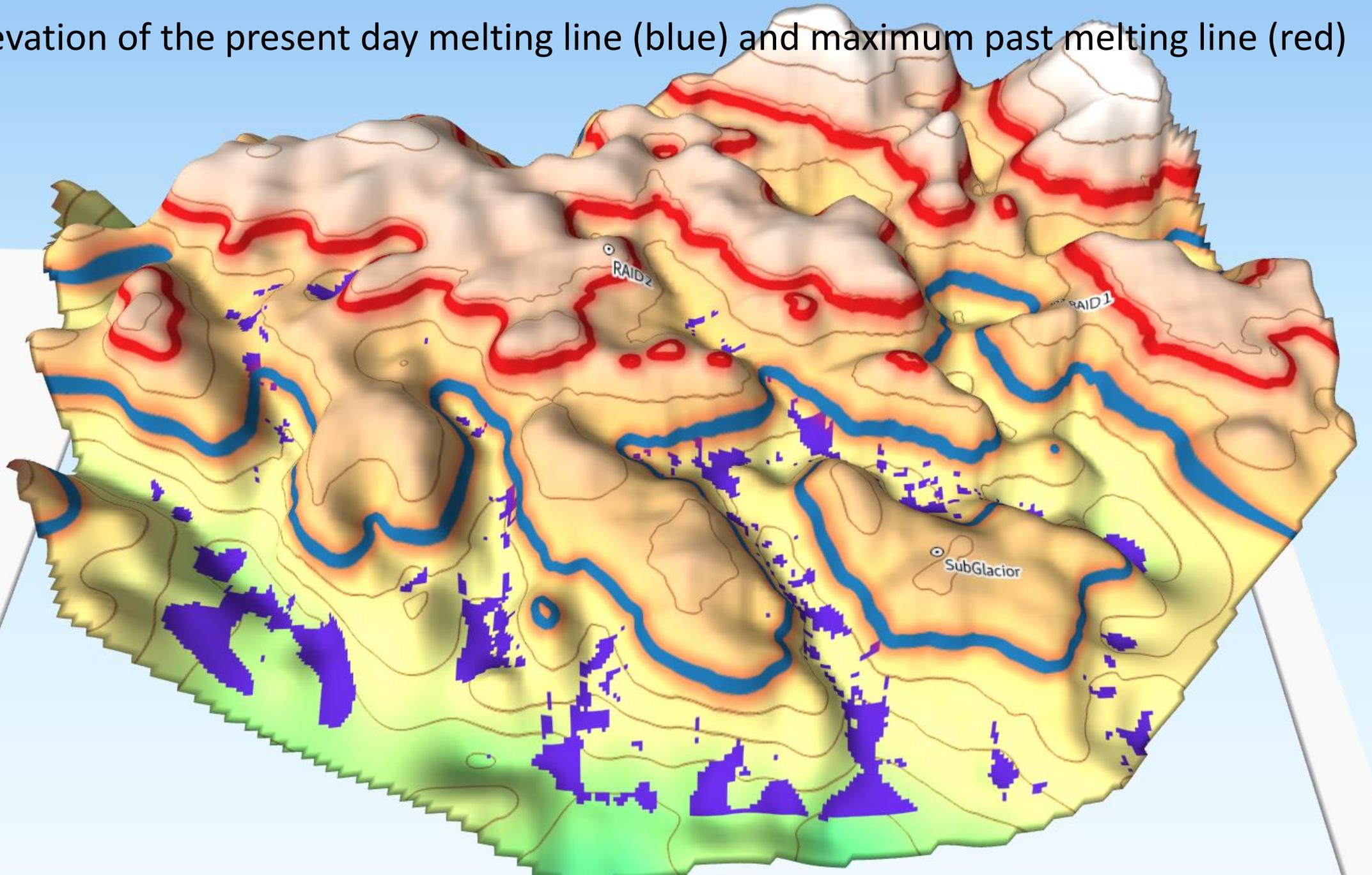


Taking the borehole thermometry, the vertical ice velocity from phase-sensitive radar, and the climate history from the EPICS Dome C ice core, we model the basal temperature through the past 250,000 year.

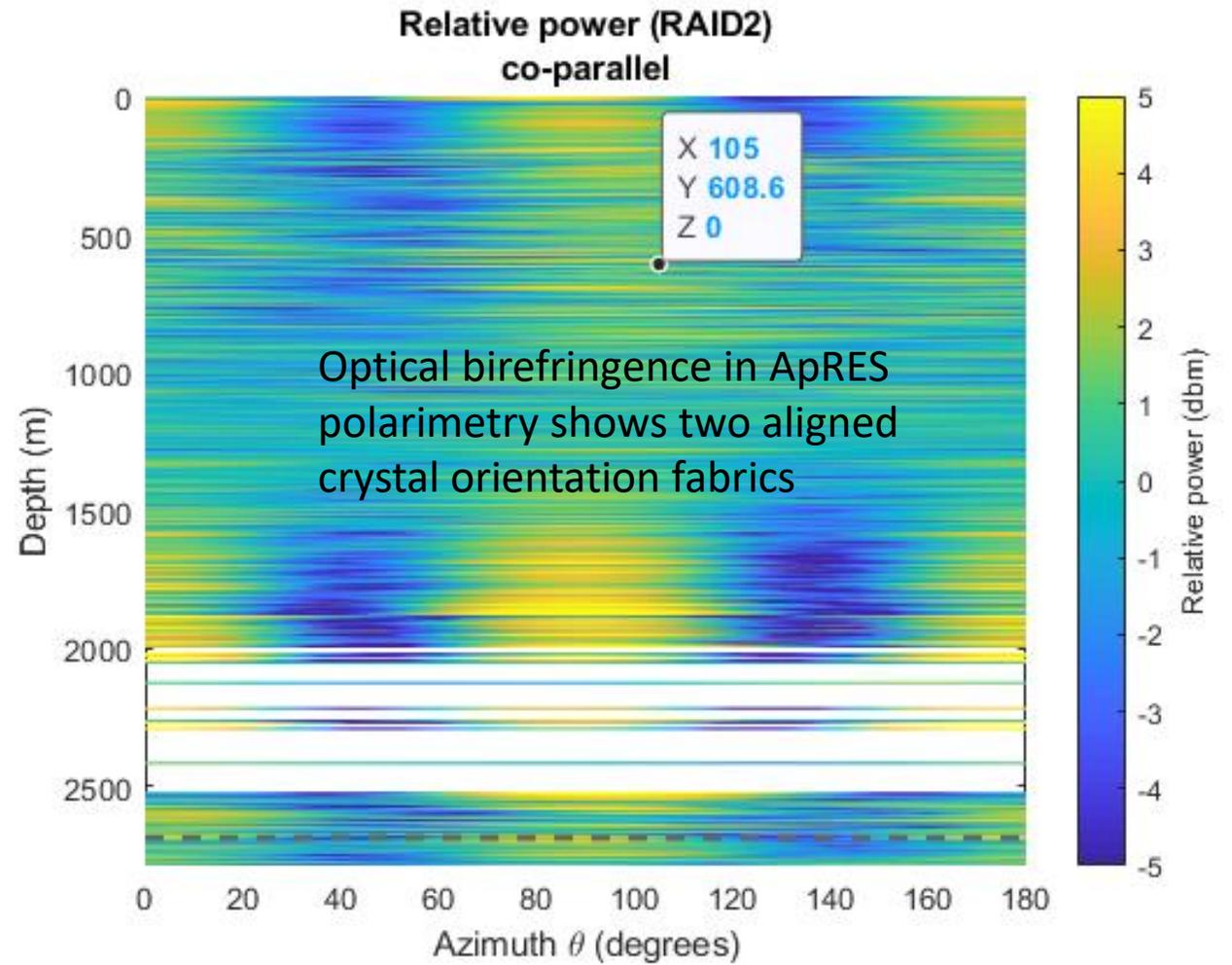
- Evolution of basal temperature follows, but lags climate
- The base of the ice sheet has not reached pressure melting point



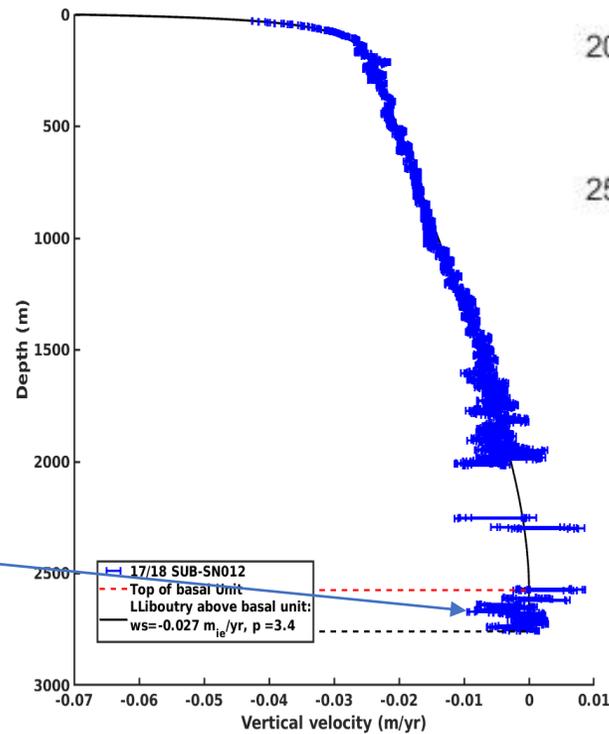
Elevation of the present day melting line (blue) and maximum past melting line (red)

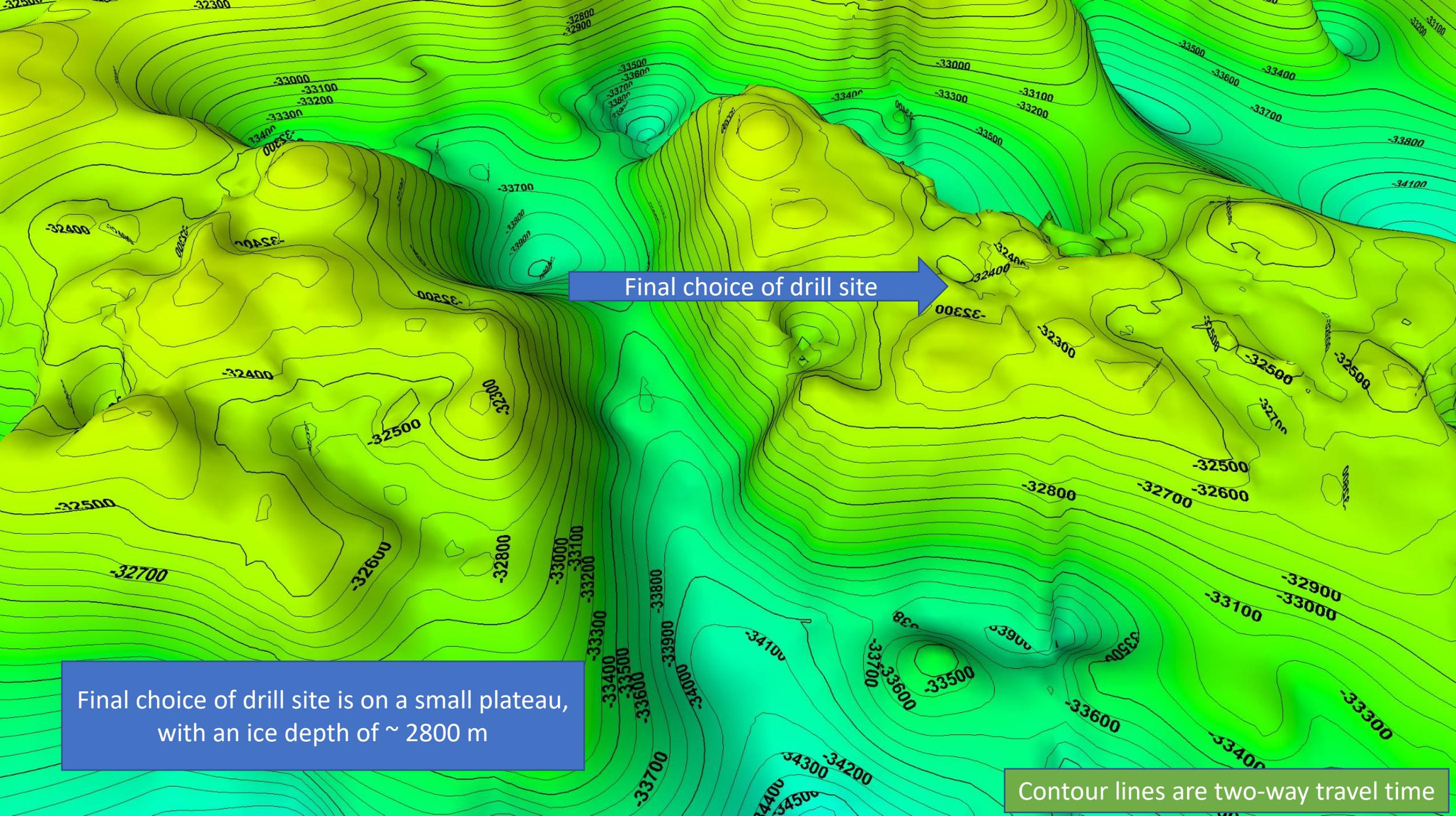


# ApRES Autonomous phase-sensitive Radio Echo Sounder



Vertical strain rate from ApRES shows  $p$  is  $\sim 3.4$  and stagnant basal unit of  $\sim 200$  m





Final choice of drill site

Final choice of drill site is on a small plateau, with an ice depth of ~ 2800 m

Contour lines are two-way travel time

2017-18 season

Julius Rix, Catherine Ritz, Massimo Frezzotti,  
Saverio Panichi, Robert Mulvaney, Michele Scalet

*Thank you to our  
colleagues in the field*



2016-17 season

Mario Quintavalla, Fabrizio Frascatti, Robert Mulvaney,  
Luca Vittuari, Massimo Frezzotti

