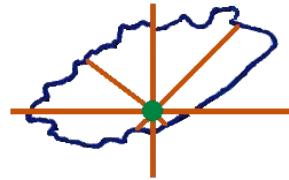


# Landscape Processes in Antarctic Ecosystems

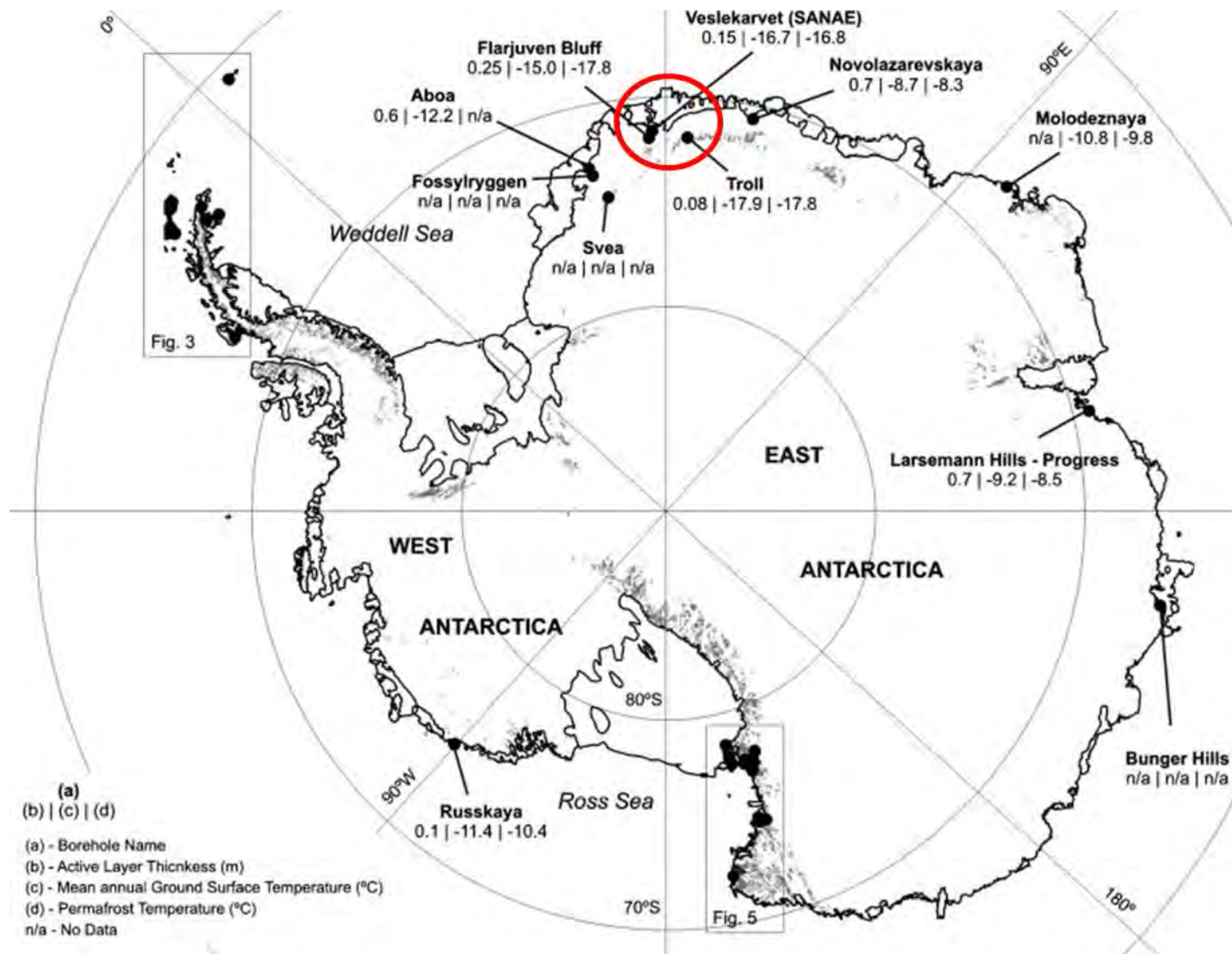


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## ANTPAS Ground Thermal Boreholes

Vieira, G., Bockheim, J., Guglielmin, M., Balks, M., Abramov, A.A., Boelhouwers, J., Cannone, N., Ganzert, L., Gilichinsky, D.A., Goryachkin, S., López-Martínez, J., Meiklejohn, I., Raffi, R., Ramos, M., Schaefer, C., Serrano, E., Simas, F., Sletten, R. & Wagner, D. 2010. Thermal State of Permafrost and Active-layer Monitoring in the Antarctic: Advances During the International Polar Year 2007–2009. *Permafrost and Periglacial Processes*, 21, 182-197.

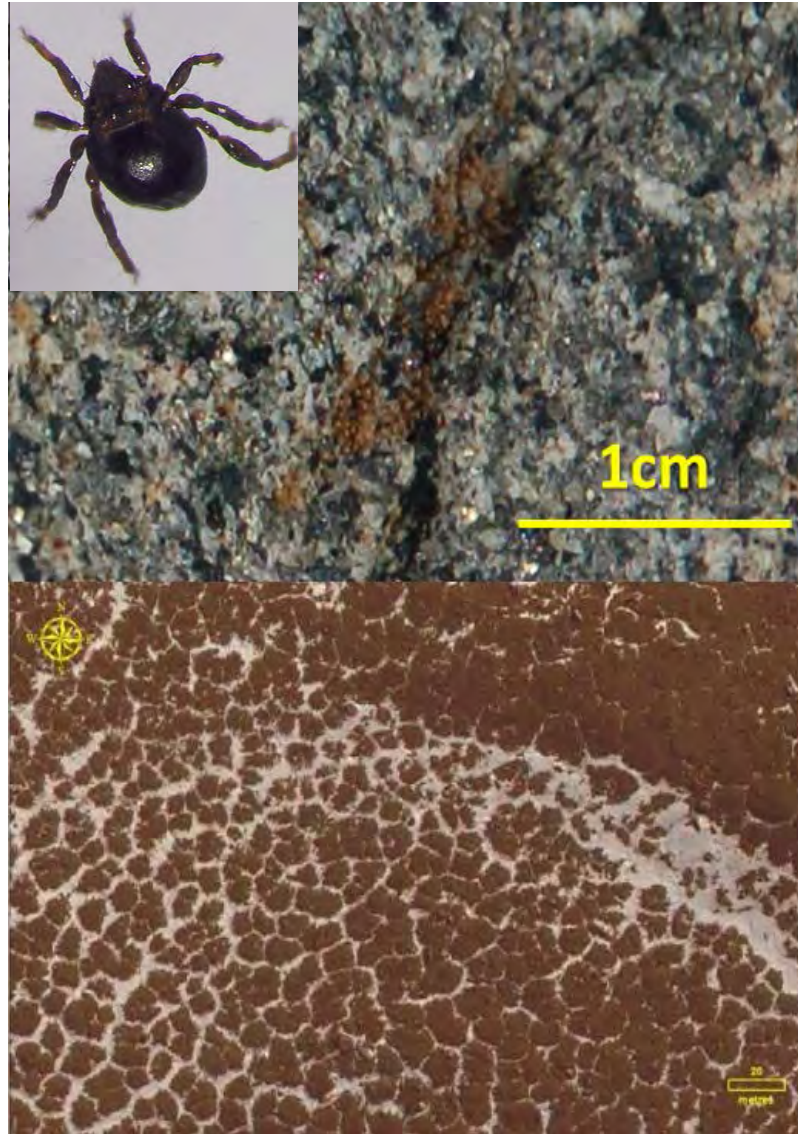
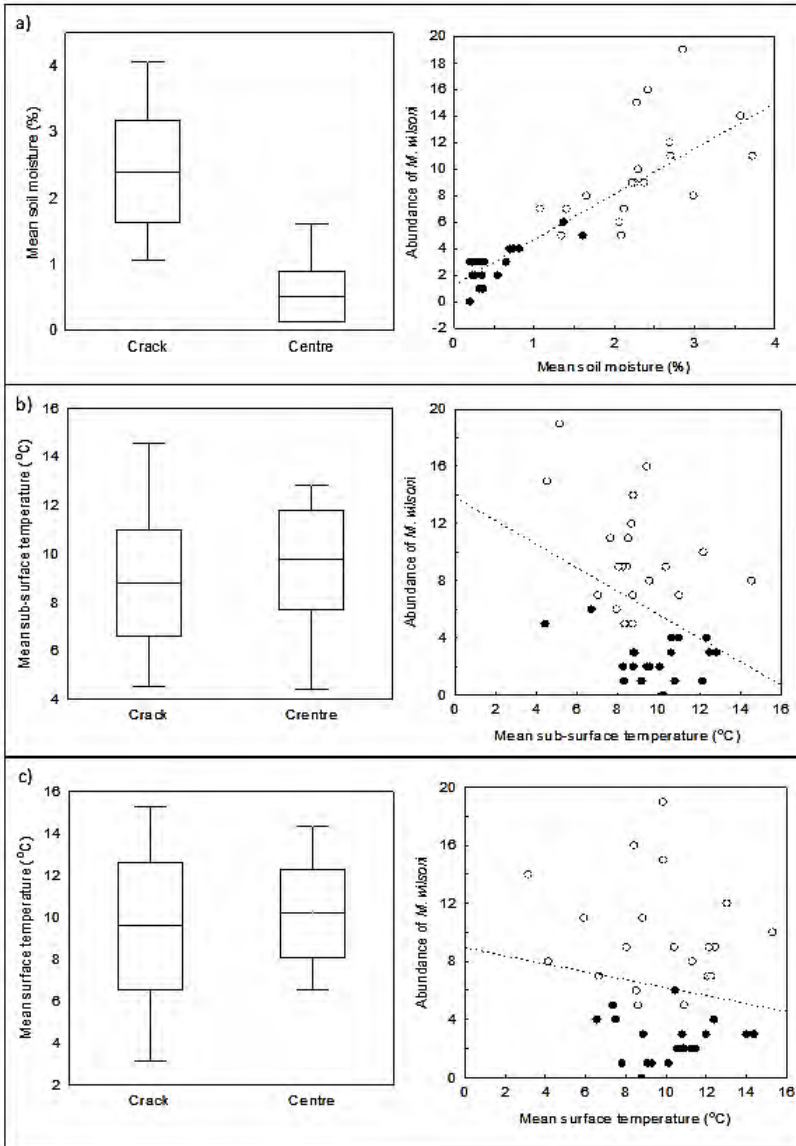




## Life at the Edge: *(of polygons/cracks)*



# Relationship between ground temperature, soil moisture & the abundance of *Maudheimia wilsoni*.



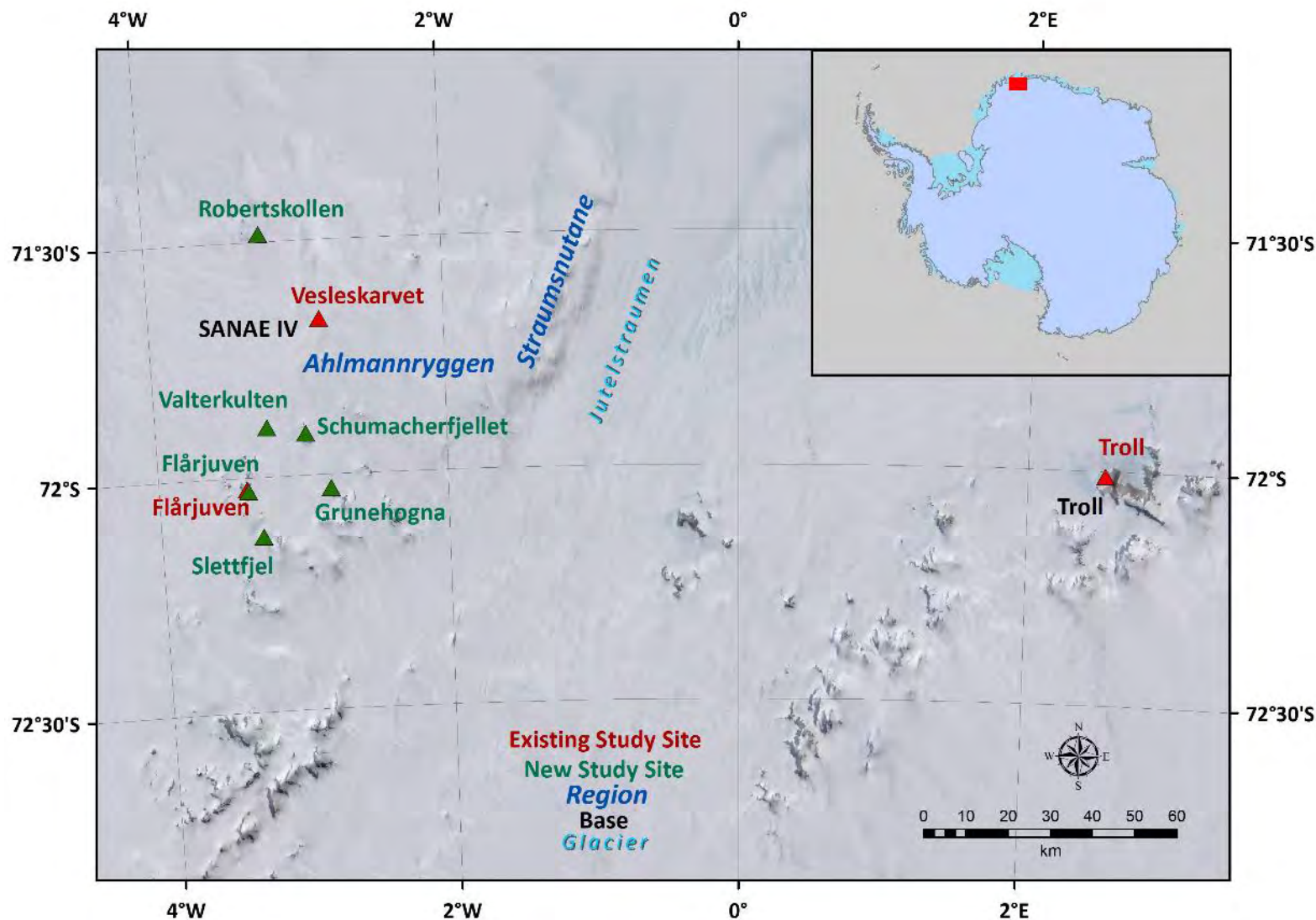


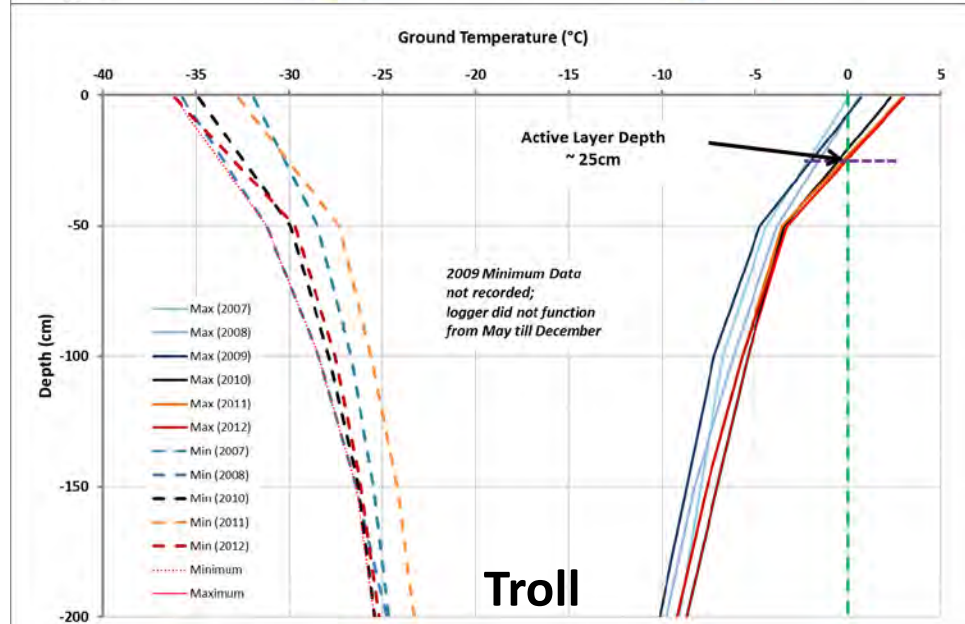
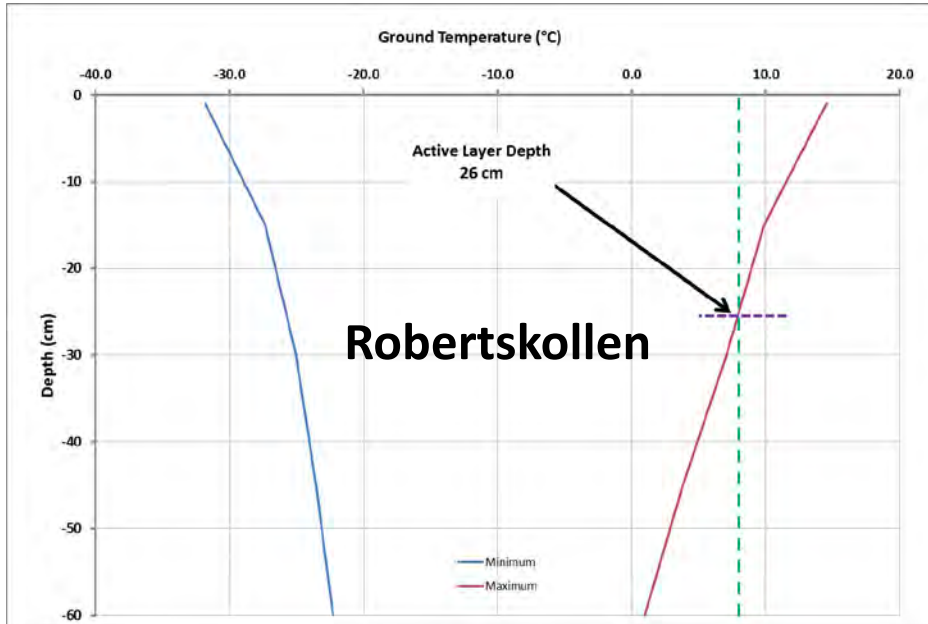
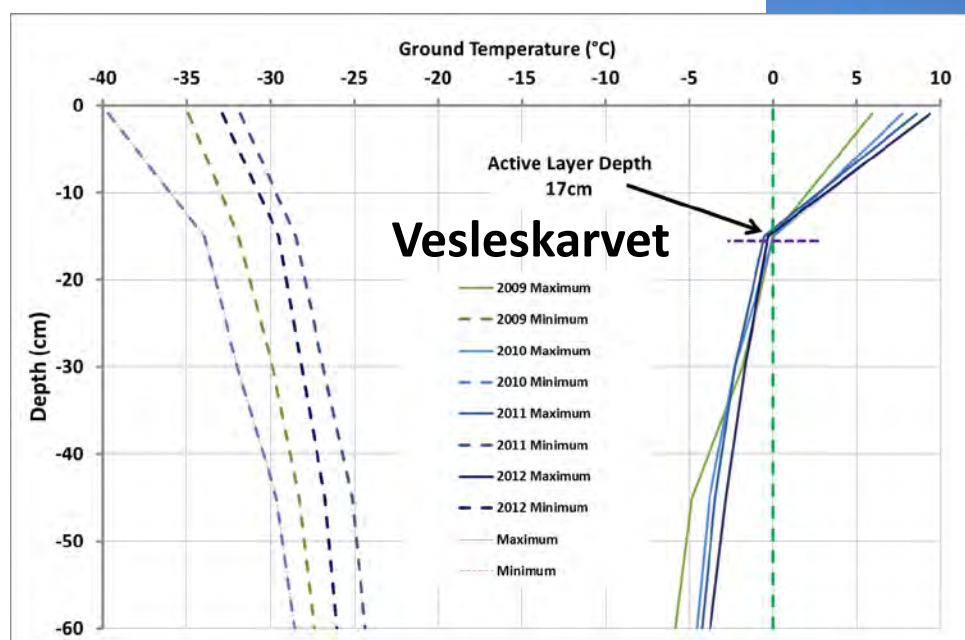
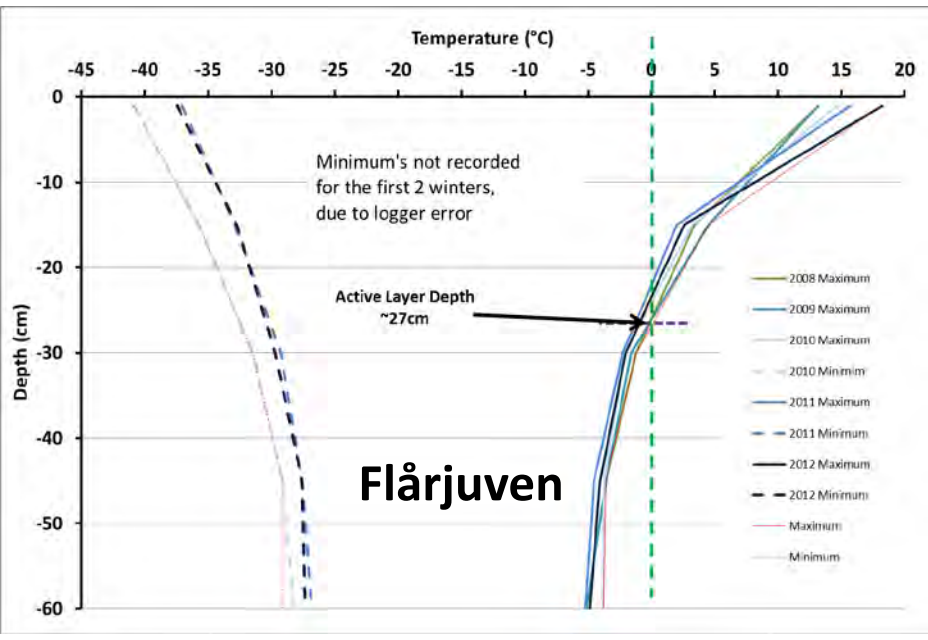
## Weathering & Lichens

- Colonisation in sheltered locations.
- Growth more prolific, where rock is softer.
- Weathering provides suitable habitat.
- Feedback through biogenic weathering.

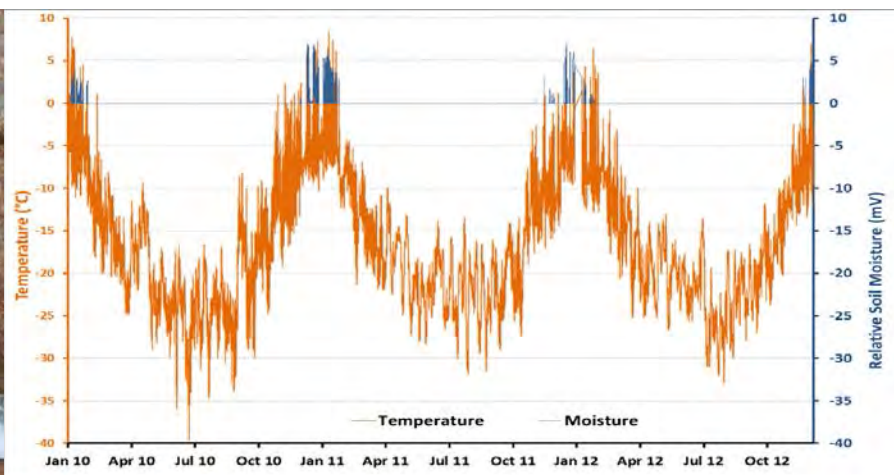


# Location of Study Sites

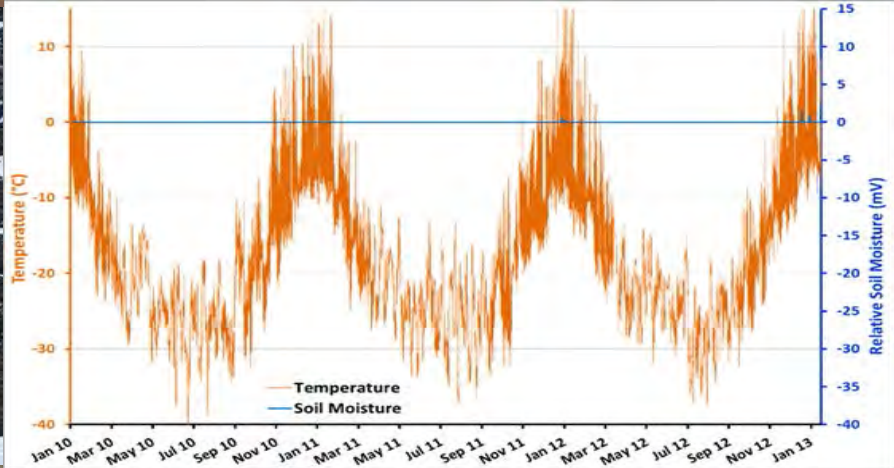




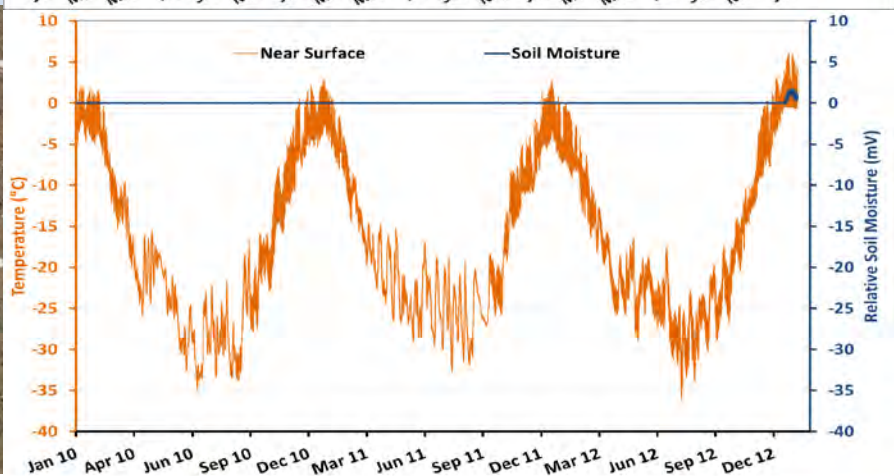
# Vesleskarvet



# Flårjuven



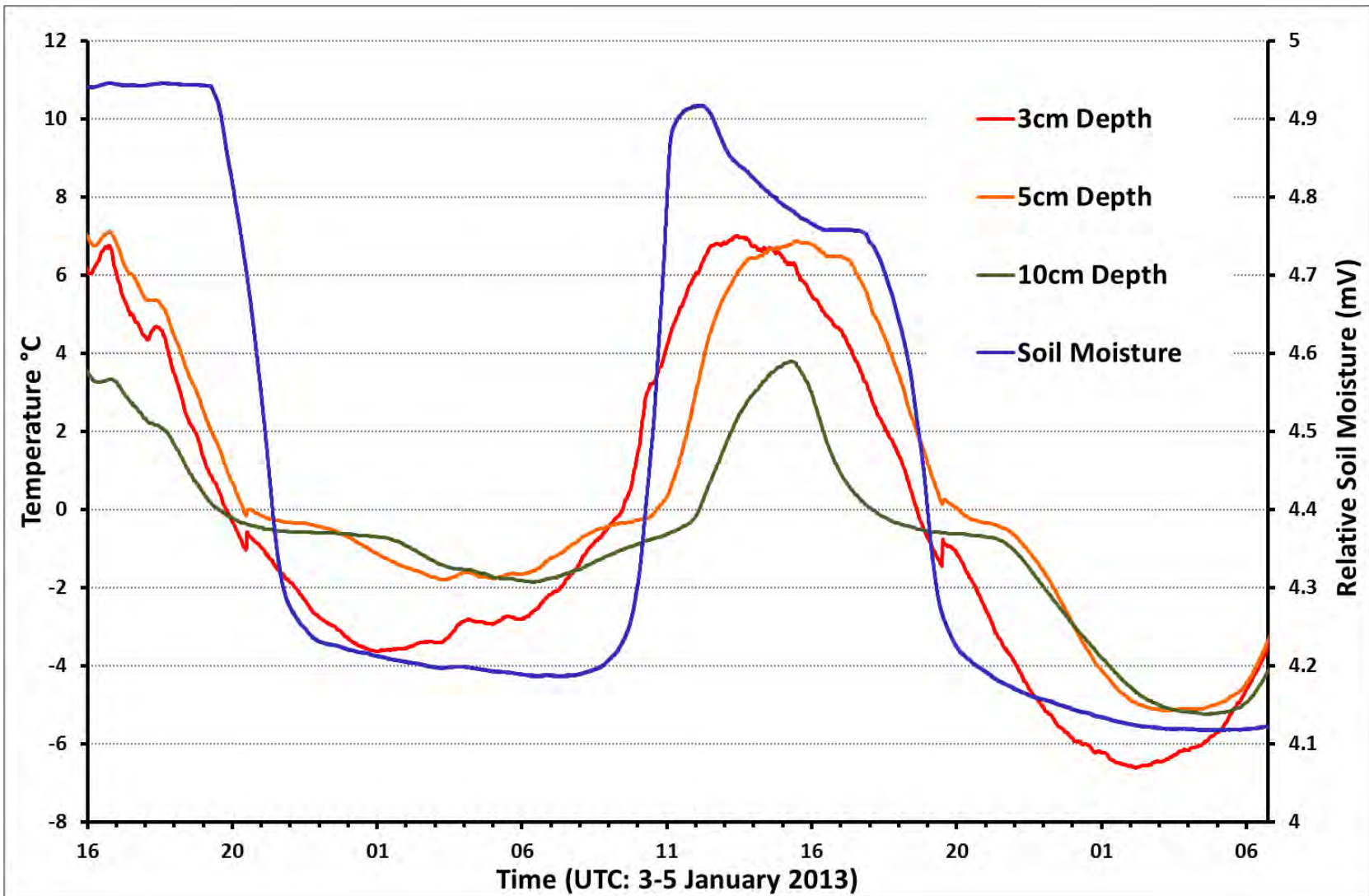
# Troll



Near Surface Ground Temperature and Relative Soil Moisture



# Vesleskarvet Ground Temperature & Moisture: 1 Second Interval Data





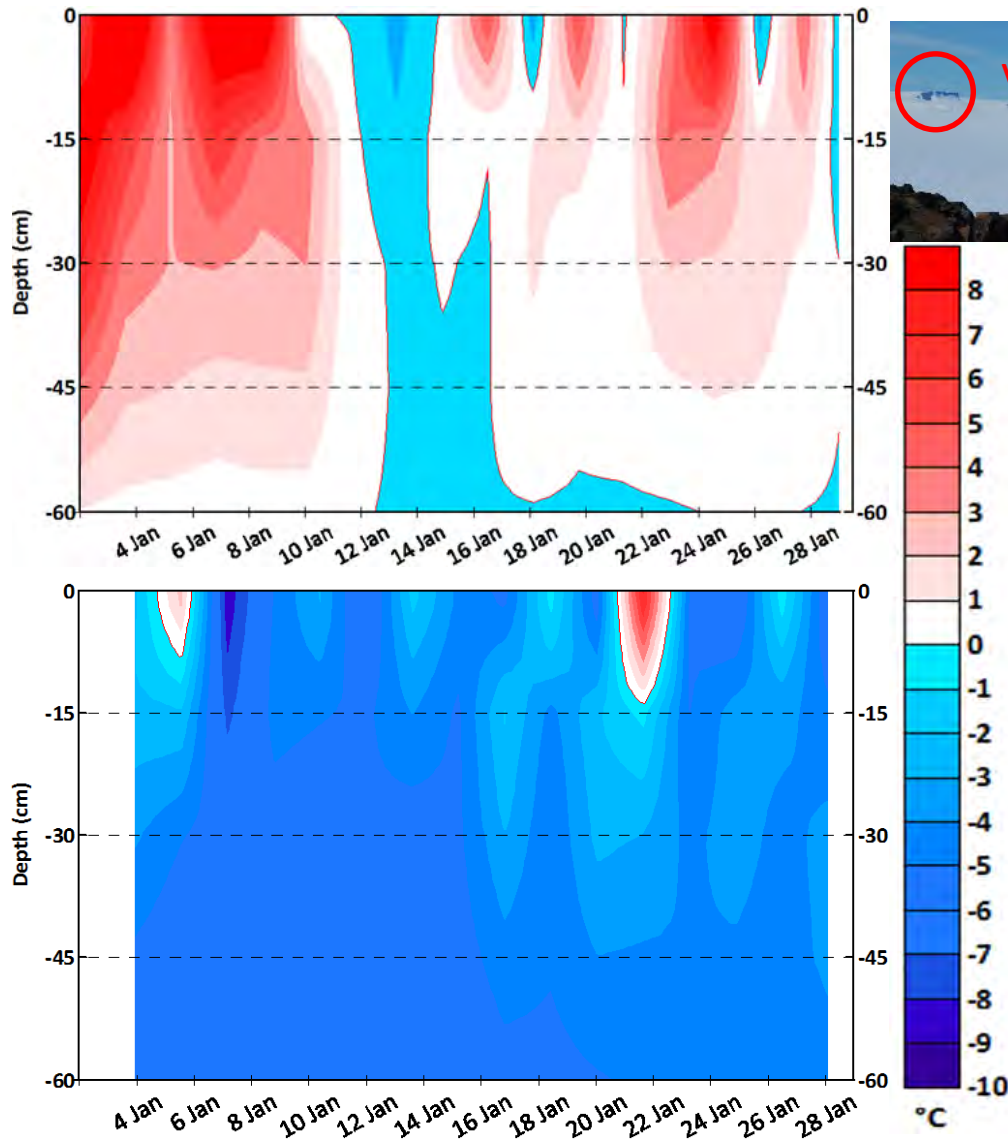
# Summary Data



	Vesleskarvet	Robertsollen	Jutelsessen
<b>Geology</b>	Dolerite	Dolerite	Granite/Gneiss
<b>Active Layer Depth</b>	16cm	27cm	22cm
<b>Ground Surface Temperature (°C)</b>	-16.3	-16.9	-17.4
<b>Permafrost Temperature (°C)</b>	-16.3	-18.3	-17.3
<b>Average Values per Summer</b>			
<b>Cycles: 0°C Isotherm</b>	36	63	34
<b>Cycles: -2.5°C Isotherm</b>	59	91	64
<b>Melt Cycles (Ground Moisture)</b>	33	80	0.25
<b>Patterned Ground</b>			
<b>Non-Sorted Patterns</b>	x	✓	✓
<b>Sorted Patterns</b>	✓	✓	x
<b>Consequences:</b>			

The data are highly site specific and more sites are required for a regional analysis.

# Robertskollen & Vesleskarvet Thermal Profiles



Robertskollen

24km  
apart;  
390m  
altitude  
difference.  
Data from  
**2013**



Robertskollen

Vesleskarvet

# Differences in Biological Activity



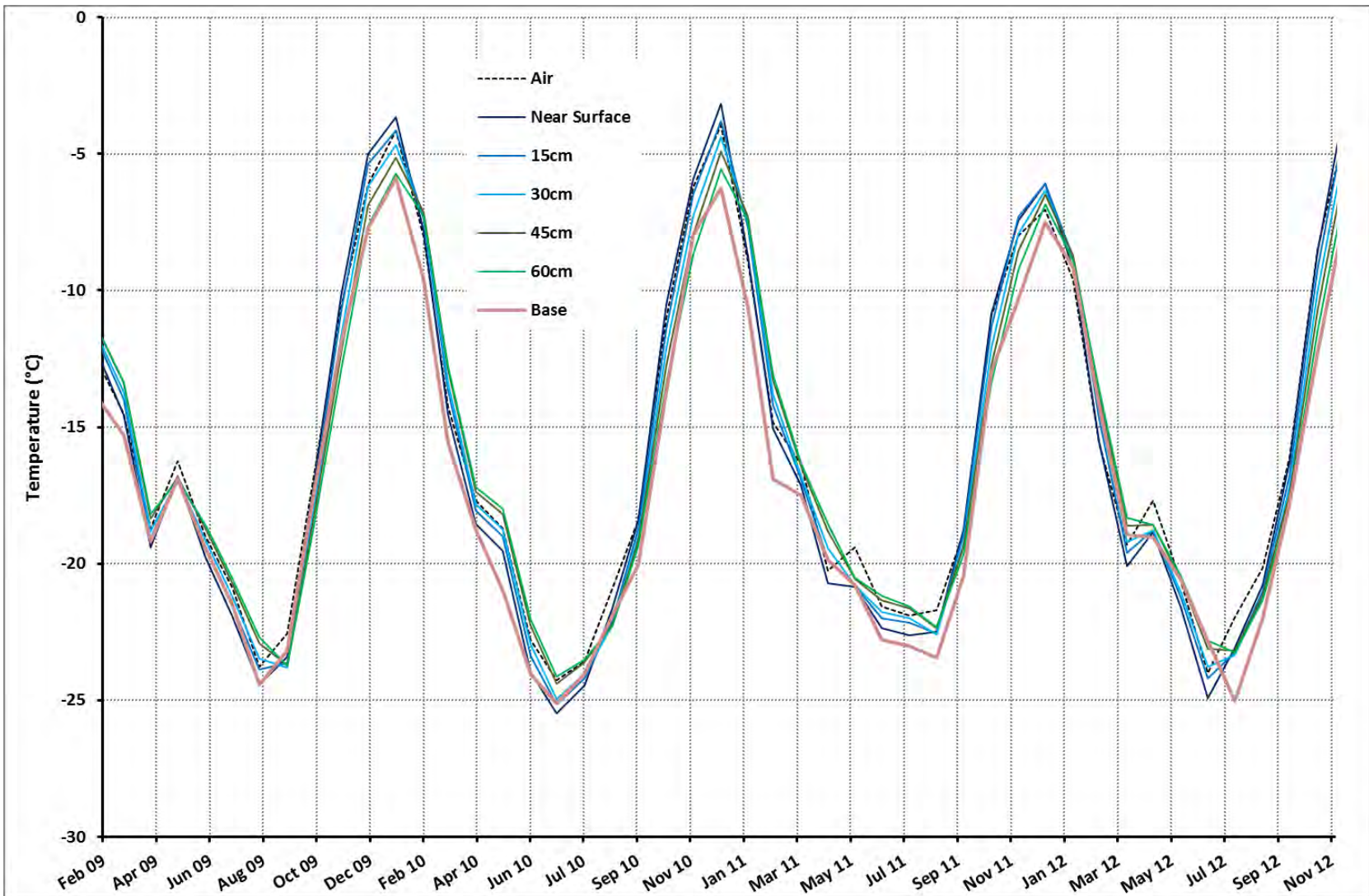
Vesleskarvet



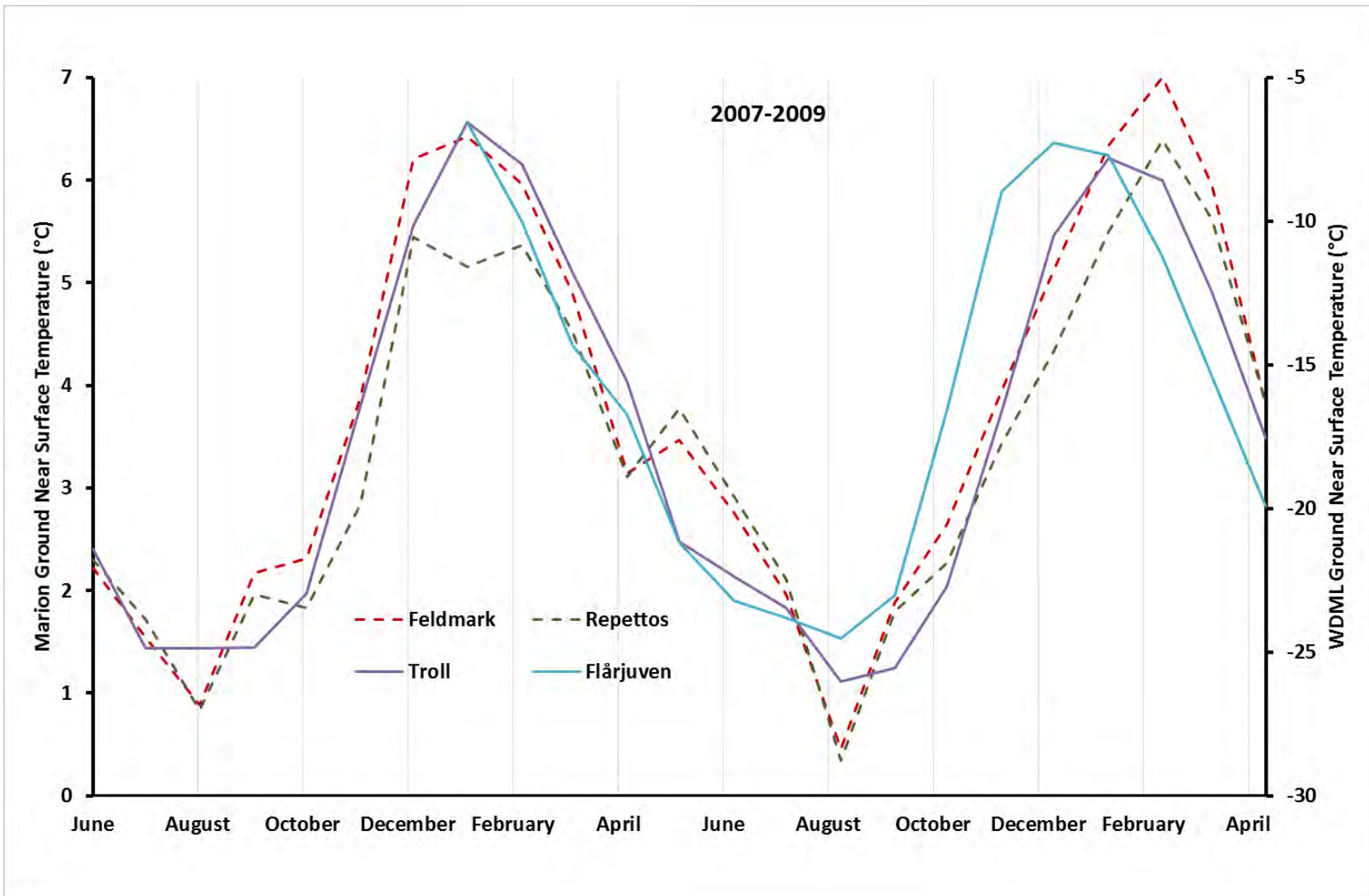
Robertskollen



# Vesleskarvet: Monthly Average Temperatures



# Comparative Ground Surface Temperatures





## Openwork Block Deposits: Falkland Island Stone Runs

Darwin, C., 1839. *Geology and Natural History of the Various Countries Visited by H.M.S. Beagle*. John Murray, London, pp. 254–256.

André, M. F., Hall, K., Bertran, P. & Arocena, J. 2008. Stone runs in the Falkland Islands: Periglacial or tropical? *Geomorphology*, 95, 524–543.





## Allochthonous Blockstream, Near Sani Pass, Lesotho

See Boelhouwers, J., Holness, S., Meiklejohn, K.I. & Sumner, P.D. 2002. Observations on a blockstream in the vicinity of Sani Pass, Lesotho Highlands. *Permafrost and Periglacial Processes*, 13, 251-257.

Wilson, P. 2007. Periglacial Landforms, Rock Forms: Block/Rock Streams. *Encyclopedia of Quaternary Science*, 2217-2225.

**Ground View:** Meiklejohn (1998)

**Aerial View:** Digital Globe (2004)



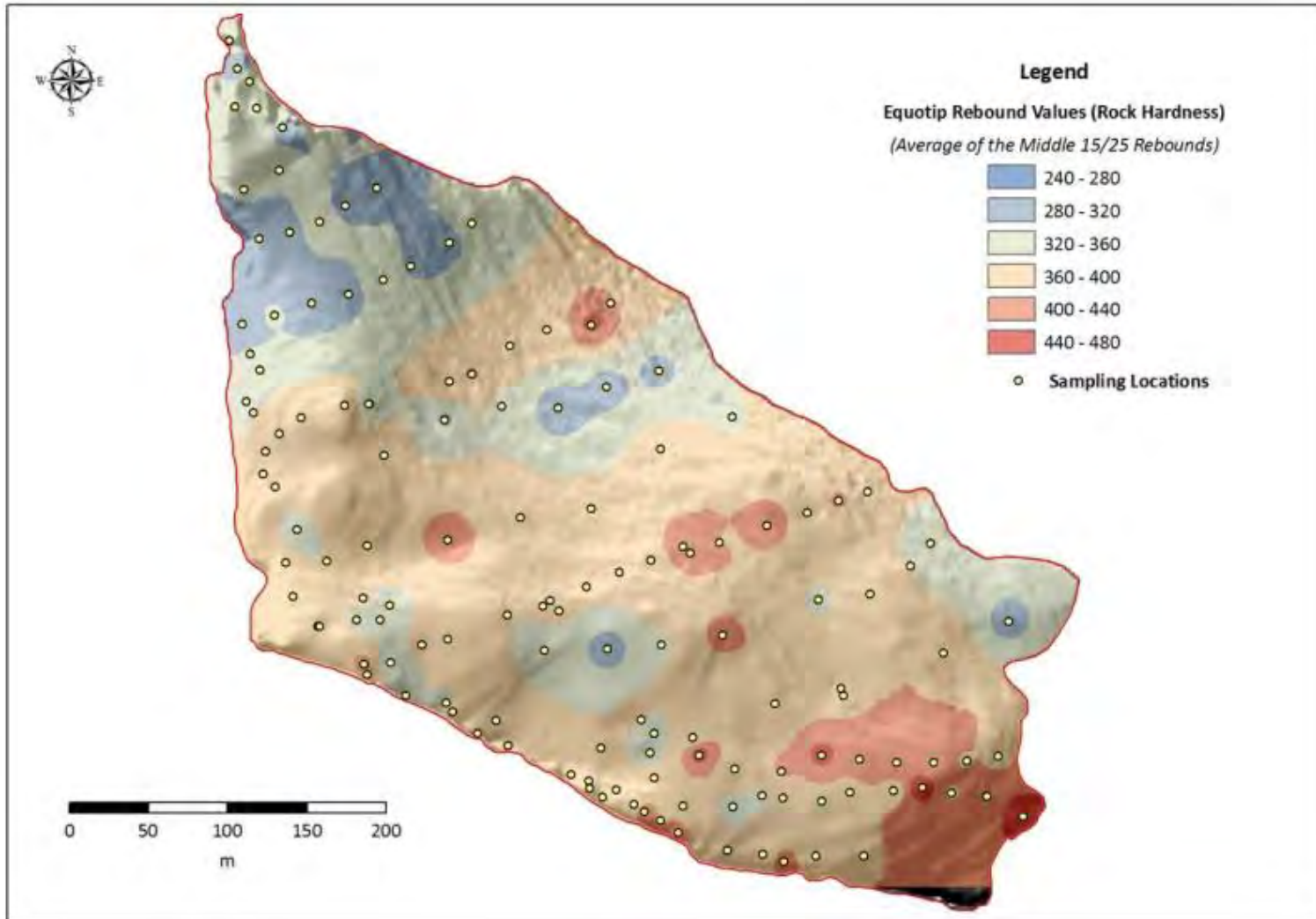




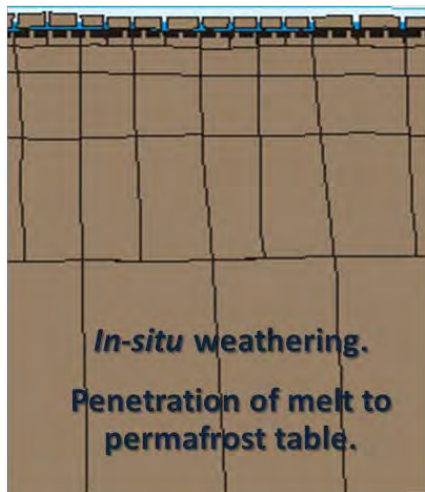
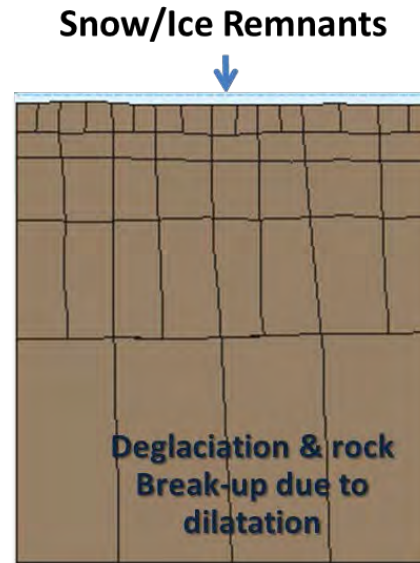
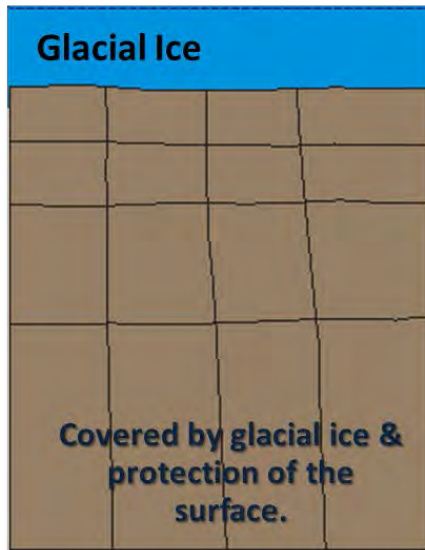
## Ice Supported Blocks: Vesleskarvet Northern Buttress



# Summary Data: Equotip Rebound Values, Vesleskarvet



# A Model for Blockfield Development



**Permafrost Table**

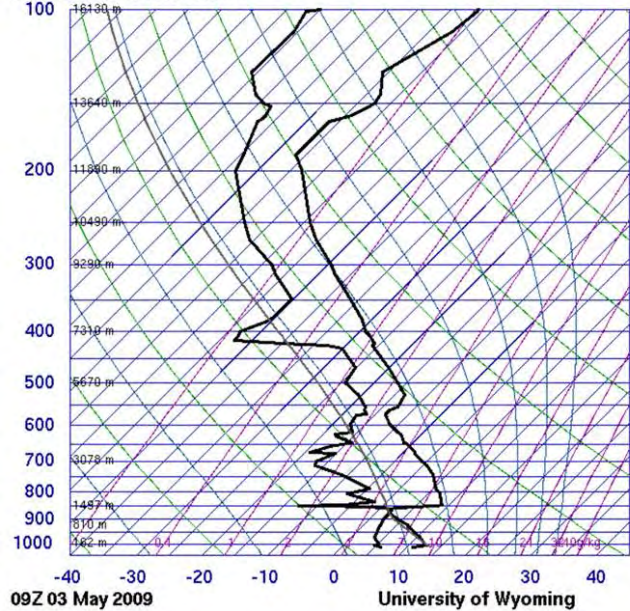


18 000BP

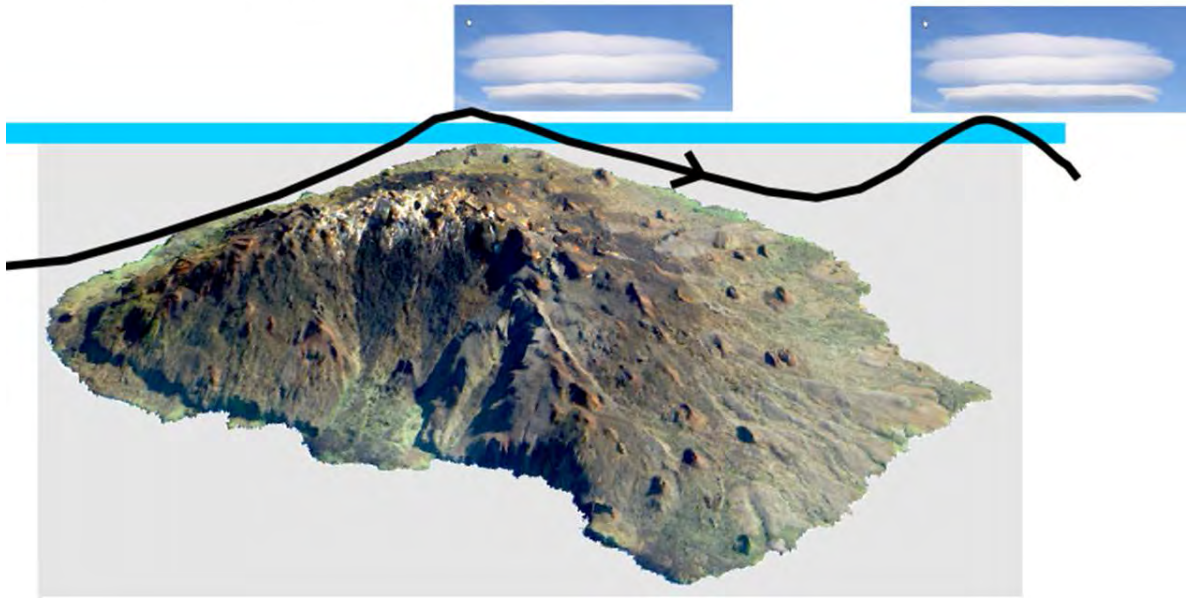




68994 FAME Marion Island

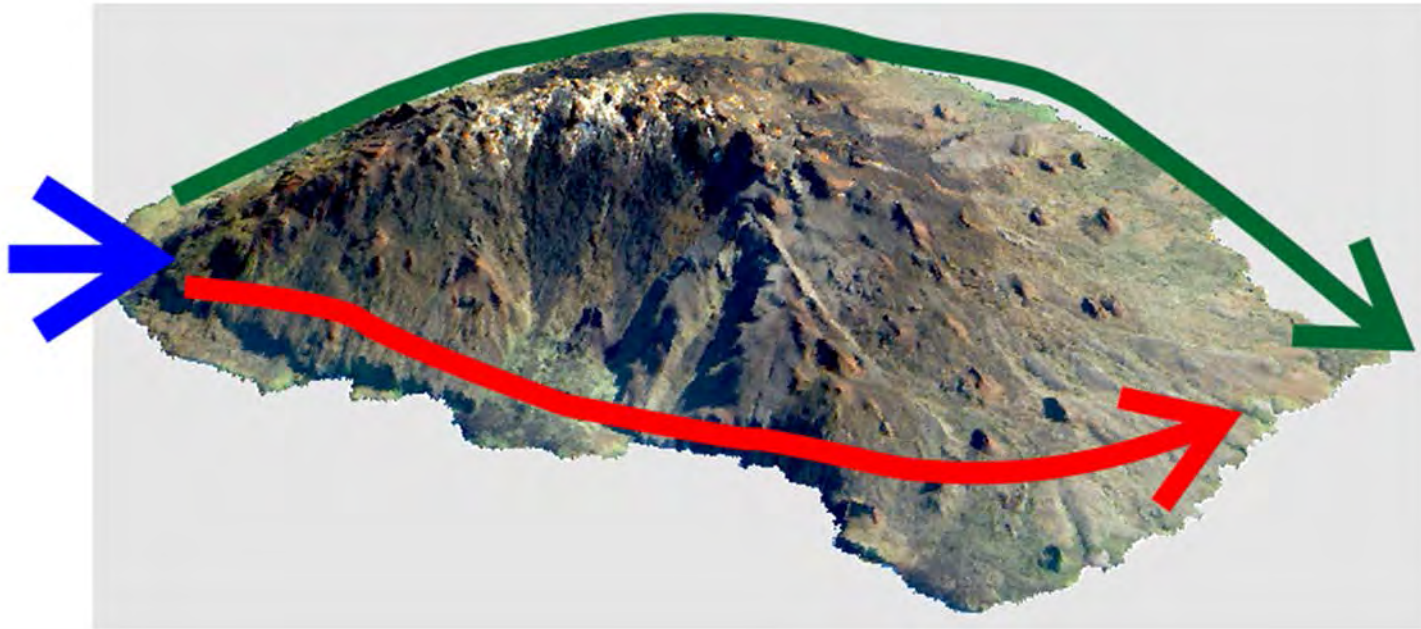


- SLAT -46.88
- SLON 37.86
- SELV 21.00
- SHOW 11.94
- LIFT 12.24
- LFTV 12.30
- SWET 92.00
- KINX -0.70
- CTOT 8.30
- VTOT 23.30
- TOTL 31.60
- CAPE 0.00
- CAPV 0.00
- CINS 0.00
- CINV 0.00
- EQLV -9999
- EOTV -9999
- LFCT -9999
- LFCV -9999
- BRCH 0.00
- BRCV 0.00
- LCLT 276.0
- LCLP 688.5
- MLTH 285.4
- MLMR 5.32
- THCK 5508.
- PWAT 16.93



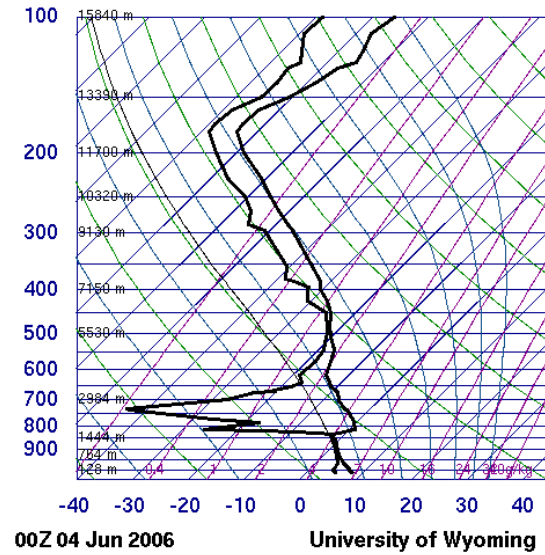


# Wind Directions: Marion



# Tephigram

68994 FAME Marion Island



SLAT	-46.88
SLON	37.86
SELV	21.00
SHOW	11.13
LIFT	11.67
LFTV	11.82
SWET	179.9
KINX	-2.60
CTOT	18.90
VTOT	19.20
TOTL	38.10
CAPE	0.00
CAPV	0.00
CINS	0.00
CINV	0.00
EGLV	-9999
EGTV	-9999
LFCT	-9999
LFCV	-9999
BRCH	0.00
BRCV	0.00
LCLT	276.7
LCLP	953.0
MLTH	280.6
MLMR	5.24
THCK	5402
PWAT	13.92





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