Report of the
Skagafjörður Archaeological Settlement Survey

2004

by:
John M. Steinberg
Cotsen Institute of Archaeology at UCLA

With Contributions by
Antonio Gilman

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Kristín Huld Sigurðardóttir, **Forstöðumaður Fornleifaverndar ríkisins**

Under the guidance of
Þór Hjaltalín, **Þjóðminjasafn Íslands**
Ragnheiður Traustadóttir, **Þjóðminjasafn Íslands**
Gudny Zoega, **Þjóðminjasafn Íslands**

Additional copies of this report and other reports, as well as much of the raw data can be downloaded from http://sass.ioa.ucla.edu

Note to Readers

This an interim report on the majority of the activities of the Skagafjörður Archaeological Settlement Survey (SASS) during the summer of 2004. As it is an interim report, it is incomplete and unpolished. This report has several substantial and important omissions.

Introduction

As a followup to the SASS work in 2001 and 2002, John Steinberg & Antonio Gilman tested Getagerði and Haldórsstaðir to refine the dating. This was partially successful at Getagerði but unsuccessful at Haldórsstaðir. Two sites were cored, Ytra-Garðshom and Tindur in anticipation or remote sensing for pagan graves. At the same time, 3 sites (Svalbard, were remote prospected with the EM-31.

Test pits & profiles

As a followup to the SASS work in 2001 and 2002, John Steinberg & Antonio Gilman tested Getagerði and Haldórsstaðir to refine the dating. This was partially successful at Getagerði but unsuccessful at Haldórsstaðir.

Geitagerði

In previous work, Getagerði had been extensively remote prospected, cored and augered (SASS 2001) and no cultural remains were identified. Two areas were not investigated: the south side of the farm adjacent to the main road and the area immediately around the farm house.

Cores 1-9 were placed in the south area near the road form 0565338, 7282463 to 0565446, 7282552. These were characterized by good tephra preservation, and deep aeolian soil. No evidence of cultural activity was detected. Cores 10-17 around the modern farm house were indicated some activity.

At core 10 a test pit was excavated. The excavation largerly confirmed the core. It indicateds that most of the activity occurred after the 1766 tephra layer. There may be some very low intensity activity before that time, but the evidence is scanty.

Haldórsstaðir

Haldórsstaðir was investigated on July 18 and 21. Twelve cores were taken around the modern farmhouse and one test pit. Most of the cores indicated substantial bulldozing activity. Most of the area aound the modern house has been leveled and much of the soil and old cultural material removed. East of the house, there are preserved deposits, primarily midden deposits. These are capped by over a meter of bulldozed material. A test pit was excavated at 0569086, 7276674 through bulldozed gravel and mixed Aeolian/bulldozed deposits. Between 60 and 80 cm bgs a preserved peatash midden was encountered. The midden did not have any preserved tephra.

Because of the substantial bulldozed gravel and turf overburden it will be necessary to use heavy equipment to expose enough midden to identify tephra layers or encounter material suitable for AMS dating.

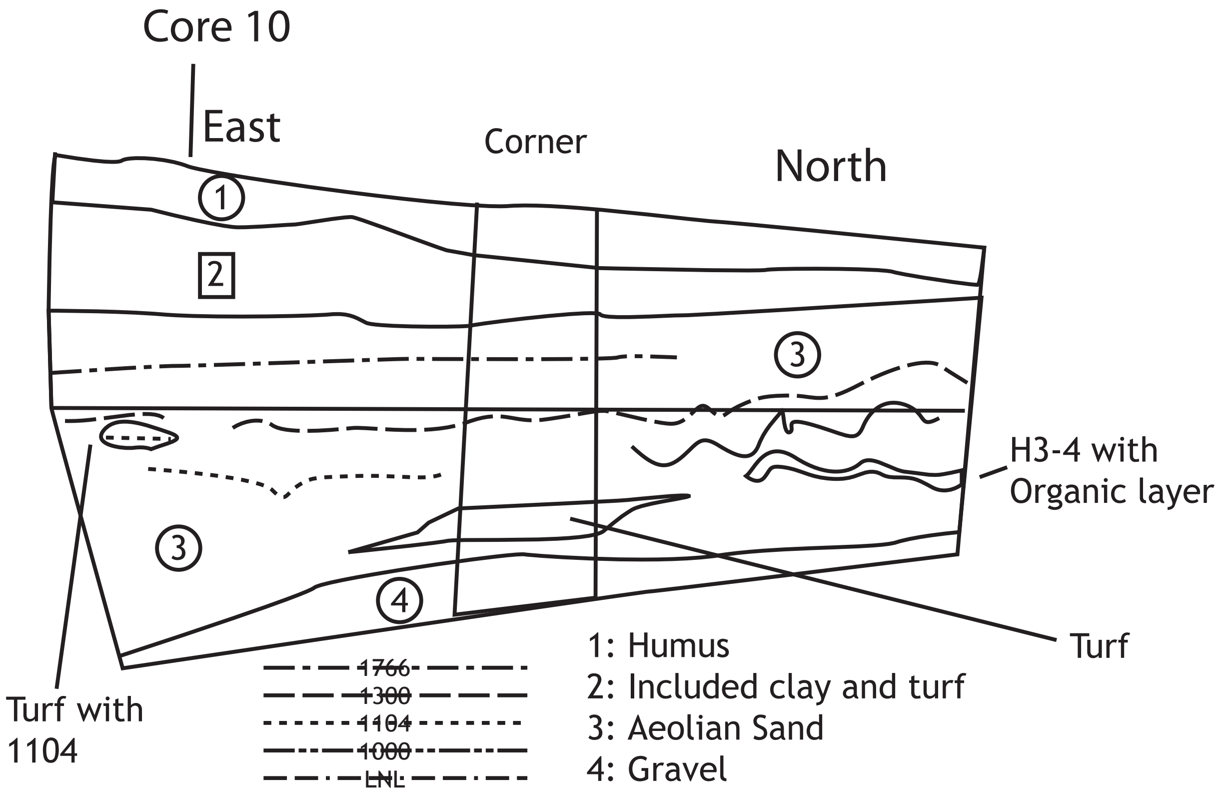
Reynistaður

A profile on the side of the main farm mound at Reynistaður was cleaned, drawn and photographed. The profile was under threat from Sæmundar creek which was stabilized by the addition of a bolder dyke put in in the last year. Vegation has started to regrow and the profile will probably stablize. The profile indicates intensive and continuous cultural activity following the LNL deposition.

Two profiles were drawn and photographed. They are consistent with each other. The east profile (below) is the only one with the 1776 layer. In both profiles the 1000 and 1104 (H1) were present. The 1300 did not appear in either, although it is possible that the tephra identified as the 1766 is the 1300.

Geitagerði cores 10-17

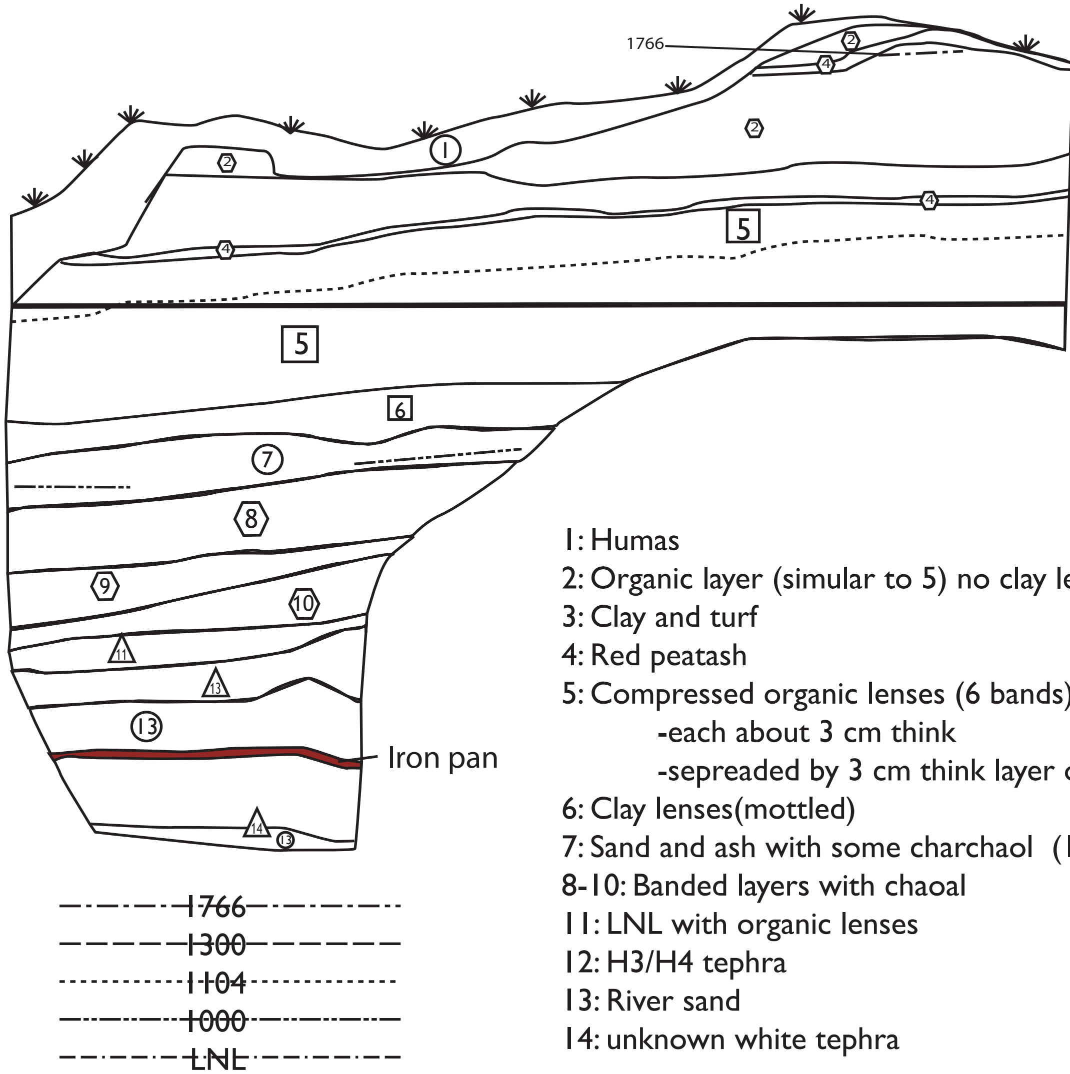
Location	Sequence (depth in cm below ground surface)
565455	0-20 humas
7282568	20-75 turf fall
(Core 10)	75-95 very low density cultural deposit
	78 1300 teprha
	85 H1
565498	0-60 Humus
7282564	60-80 low density cultural deposit
(Core 11)	75 H1
	80-85 aeolian soil
	85-90 H3/H4
565492	0-75 buldozed material
7282551	75-85 very low density cultural deposit
(Core 12)	85 H3/H4
	85-90 aeollian soil
565466	0-85 buldozed material
7282546	85-90 very low density cultural deposit
(Core 13)	
565478	0-65 Buldozed material
7282607	65-70 H3/H4
(Core 14)	70-90 Aeolian soil
565458	0-40 Ash midden
7282584	40 gravel
(Core 15)	
565448	0-80 Turf fall
7282516	80-95 very low density cultural layer
(Core 16)	95 1300 tephra
565459	0-50 truf fall
7282564	50-65 very low density cultural layer
(Core 17)	65 gravel



Geitagerði 0566455, 7282568

Geitagerði 0566455, 7282568 east wall

Reynistaður east profile



1: Humas
2: Organic layer (simular to 5) no clay lenses
3: Clay and turf
4: Red peatash
5: Compressed organic lenses (6 bands)
-each about 3 cm think
-sepreaded by 3 cm think layer of clay
6: Clay lenses(mottled)
7: Sand and ash with some charchaol (1000 within)
8-10: Banded layers with chaoal
11: LNL with organic lenses
12: H3/H4 tephra
13: River sand
14: unknown white tephra

Reynistaður east profile

Reynistaður west profile

Coring

Two sites were cored, Ytra-Garðshom and Tindur in anticipation or remote sensing for pagan graves. Ytra-Garðshom is an outstanding candidate for GPR testing while Tindur has been compleaty deflated.

Ytra-Garðshom

8 cores were taken at Ytra-Garðshom, which is today a golf course. The land alteration to create the golf course seems to have been minimal in the area of pagen graves, affecting only the first 20 cm in a few locations. The cores also suggest that there has been some erosion and soil deposition over the last 1000 years. The suggest that there has been some errosion

Ytra-Garðshom cores

Location	Sequence (depth in cm below ground surface)
	Leveled (gravel at 15)
7311328	
609914	Gravel at 30
7311318	
609937	0-15 humus
7311315	15-20 aeolian sand
	20 gravel/rock
609950	0-15 Humus
7311323	15-30 Low density cultural
	30 organic layer
	31-35 H3/H4
	35-40 Aeolian sand
609960	gravel
7311307	
609964	0-30 humus
7311302	30-40 organic layer
	40-60 aeolian sand
609951	0-30 humus
7311291	30-40 organic layer
	40-55 aeolian sand
	55 gravel
609966	0-10 humas
7311354	10-20 organic layer
	20-30 aeolian sand
	30 gravel

Tindur

Eight locations were sampled at Tindur. The region ranged from 0540486, 7272222 to 054461, 7273256. In most cases, H3/H4 was encountered at about 40 cm overlain by aeolian sand. The area alternated between bog and abandoned field. The surface seems to be heavly eroded with

Remote Prospection

EM-31

The EM 31- MK2 is an updated version of the standard EM 31, with which we had great success in 1999. The MK2 incorporates the data logger into the control console, which can be removed for easy data handling, or hand carried during the survey. Real-time logging is available by connecting a computer directly to the RS-232 output port on the front panel. The EM 31-MK2 maps any subsurface feature associated with changes in the ground conductivity using a patented electromagnetic inductive technique that makes the measurements without electrodes or ground contact. With this inductive method, surveys are readily carried out in all regions including those of high surface resistivity such as sand, gravel, and asphalt. The effective depth of exploration is about six meters, making it ideal for archaeology.

Following Bevan (1983) we used a grid spacing of 2 m. While it is possible to do both EM and magnetic prospection with the same machine (e.g., the EM-38, Tabbagh 1984, 1986:580), the ability to measure conductivity at a greater depth argued for the EM-31 in Iceland (*cf*. Rapp and Hill 1998:188). Clark (1990) does not recommend The EM-31 for archaeological investigations because the long (4m) boom, theoretically makes for a relatively coarse (0.8m) resolution, but excellent depth (about 3 m, depending on conditions). However, we have found that the at depths of 1 m, the EM-31 is sensitive to changes over distances of less than 50 cm.

All readings are of apparent ground conductivity using the quadrature component. Negative numbers in the survey data are due to the height and surrounding conductivity at which the instrument was calibrated. While the readings (including negative numbers) are not absolute conductivity readings, the distance between any two numbers is consistent (i.e., a conductivity change of 3 millisiemens is a constant difference, even between sites).

The goal of the survey was to identify buried turf walls, which are slightly resistive linear targets. As it turns out, natural conductivity changes in most fields in Iceland are as strong or stronger than most human-induced changes; but the natural changes typically take place over greater distances. The range of readings used in displaying remote sensing data can be a determinant in the identification of anomalies (Zhurbin and Malyugin 1998). All scales for conductivity were created with a basic box-and-whisker algorithm in which the display range does not extend to the extreme readings. That is, the scales cover the box-and-whisker portions of the range. The upper end of the display scale was set to the median plus the sum of quartile 3 and 1.5 times the interquartile range. The lower end of the scales ranges from the median down to the sum of quartile 2 and 1.5 times the interquartile range. Colors or shades of gray for the scales were determined by:

$$x - lw / wr = c \qquad (1)$$

where *x* is reading, *lw* is the lower whisker, *wr* is the whisker range and *c* is the color or shade of gray. The spectrum for each graph is the total length of the interquartile range plus the two whiskers. This range is spread over 60 different colors or shades of gray. It should be noted that because of the dramatic differences between the base readings at different sites, colors or shades of gray from one site to the next are not comparable.

The Graphs were created in SYSTAT 5.0 for the Macintosh. The colors on the maps use a wavelength scale (nanometers) from 400 (purple) to 700 (red), in which each increment is an increase of 5. The lower whisker is 400 and the upper whisker is 700. Gray scale maps use a corresponding scale of 0-100% with 60 increments of gray, with each stop increasing by 1.66%. Magnetic gradient, raw conductivity scores and the maximum difference in conductivity were converted using the following equation:

$$\left(\frac{(c-lw)}{wr} * 300\right) + 400 \qquad (2)$$

Where *c* is the conductivity (or the maximum difference in conductivity), *lw* is the lower whisker, and *wr* is the whisker range.[1] Readings smaller than the lower whisker are purple and readings greater than the upper whisker are dark red (for similar shortenings see Ladefoged et al. 1995). In accordance with identifying our turf wall-eolian soil interface, this scale emphasizes variation with the main reading range.

Results from Svalabard

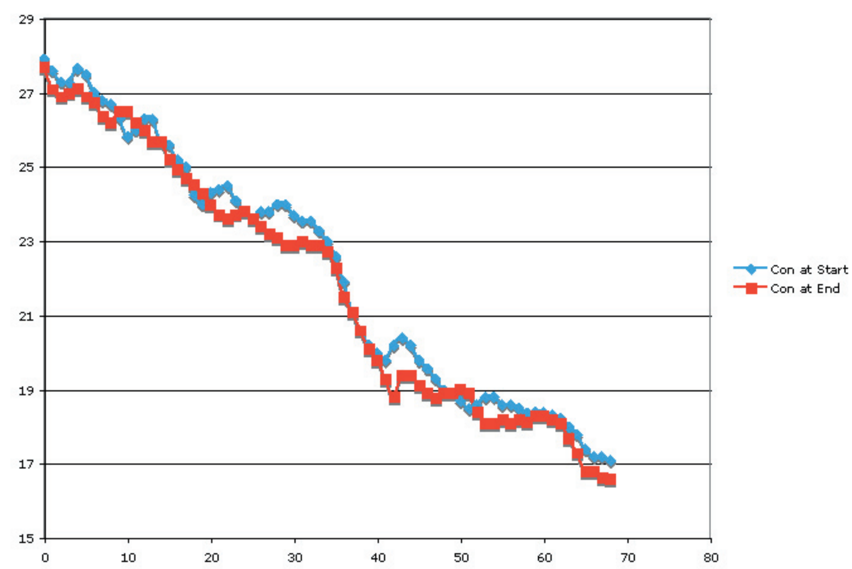
At the request of Sigurður Bergesteinsson (Minjavörður Norðurlands eystra) a small survey was conductited at Svalbard in Eyjafjörður on July 12, 2004. The afternoon was sunny and warm and there had not been substantial precipitation for over a week.

The grid is unusual: it is lowest in the northeast corner (rather in the southwest). The maps and graphs have been changed to reflect that orientation.

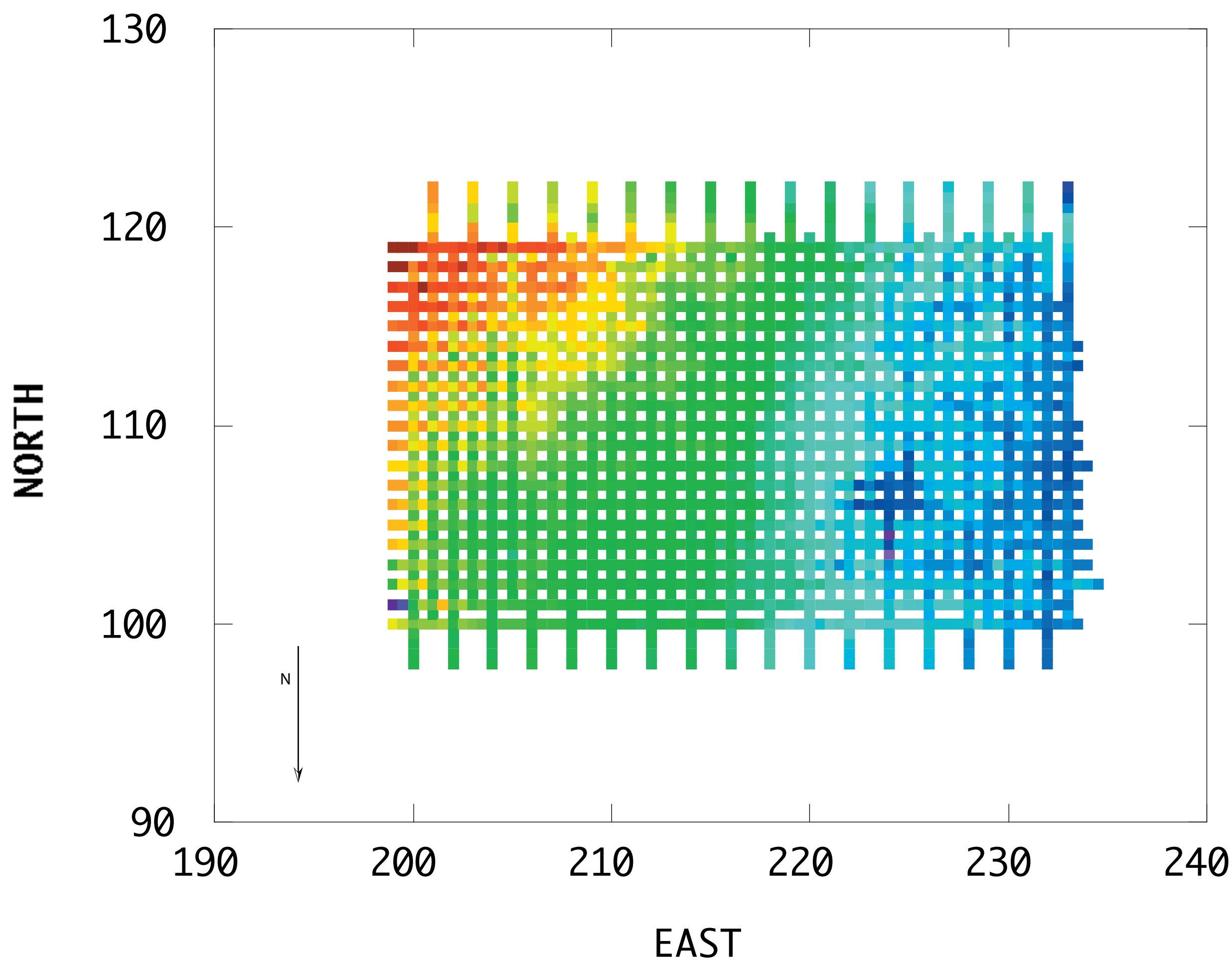
The instrument was calibrated on the ground before and after each use at E200, S100. A quality control line was also usually run. The general conductivity was relatively noisy and could fluctuate between 34.8 and 37.2 at the calibration location. However, no trend was observed. No electric fences or other sources of disturbance were identified.

Date	Time	Reading (ms/m^3	QC line
12 July 04	1605	35.2	SV1
12 July 04	1653	35.2	
12 July 04	1732	36.1	SV2

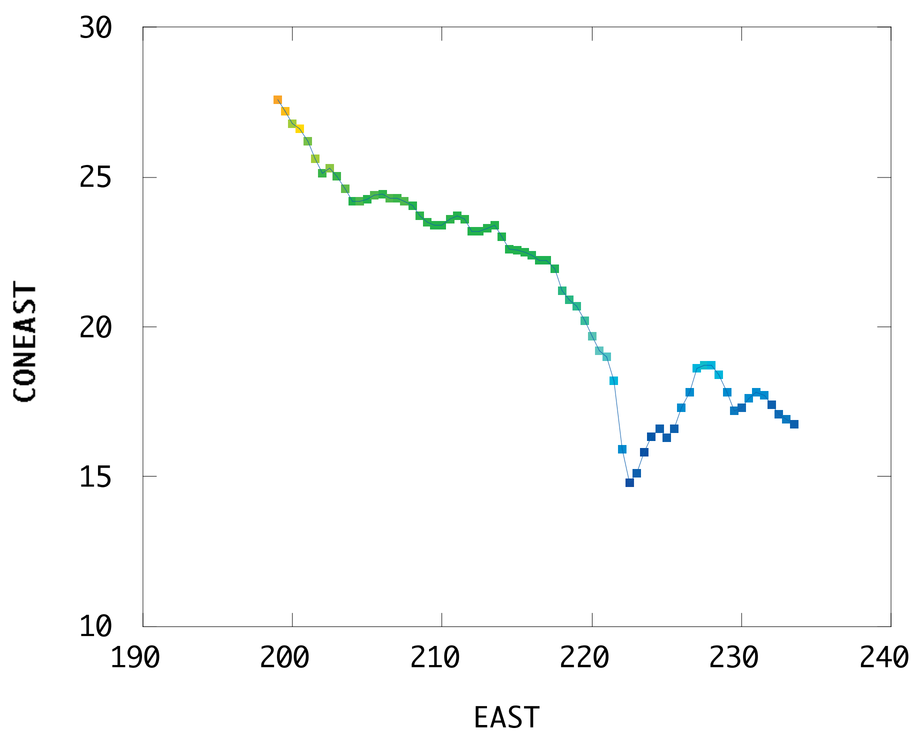
The results of the mapping indicate several anomalies that should be investigated. In general there is a high in the south east which drops off to the west. In particular, there seems to be a ring of low readings centered at 225, 105. This low point can be seen in the profile of the North 106 line at 222 through 224.



Svalbard quality control lines



Svalbard EM-31 map



Svalbard line N106 profile

Results from Skalholt

Antonio Gilman and John Steinberg surveyed the area around the excavation using the established grid. The grid was set up on July 8, 2004 and survey commenced on July 9 and 10. Both days were sunny and warm and there had not been substantial precipitation for almost a week. The Western section (<460 East) was surveyed on July 9 and the rest on the 10th.

The instrument was calibrated on the ground before and after each use at E470, N240. A quality control line was also usually run. The general conductivity was relatively noisy and could fluctuate between 19 and 26 at the calibration location. However, no trend was observed. No electric fences or other sources of disturbance were identified.

Date	Time	Readng	QC line
9 July 04	0910	23.4	SH1
9 July 04	1310	23.3	SH2
9 July 04	1445	23.5	SH3
10 July 04	1035	23.6	SH4
10 July 04	1130	23.6	
10 July 04	1220	23.6	SH5

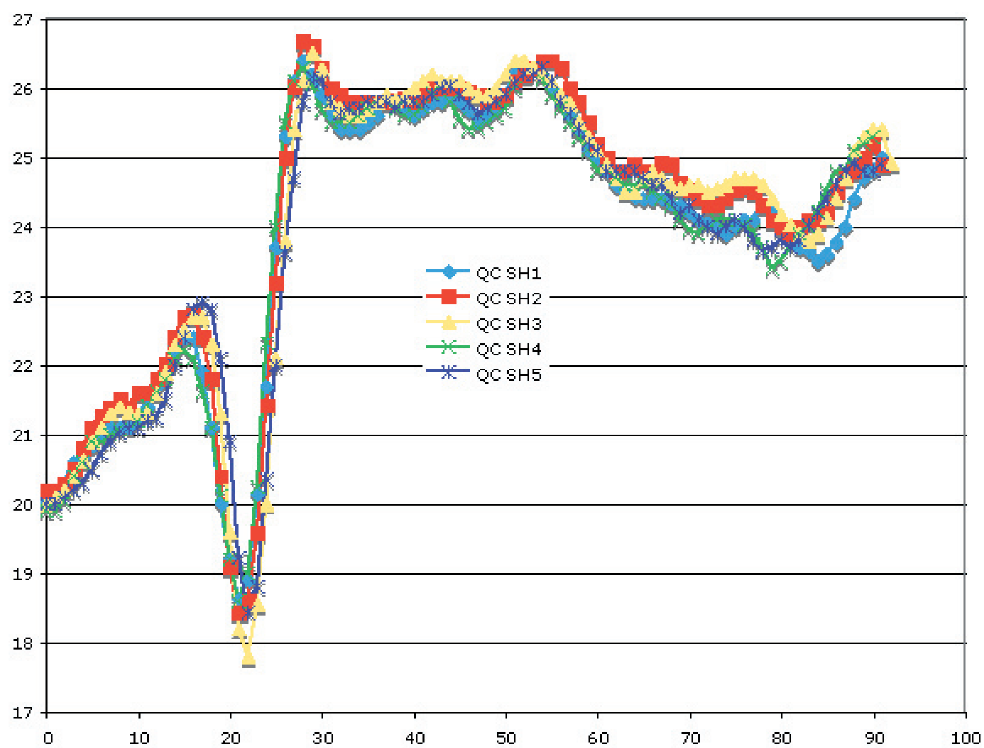
The results of the mapping indicate multiple walls running out of the area already investigated. These anomalies are substantial and overlapping. While the EM-31 can identify these walls, it is clear that the resolution needs to be finer to follow walls over any distance.

(Footnotes)

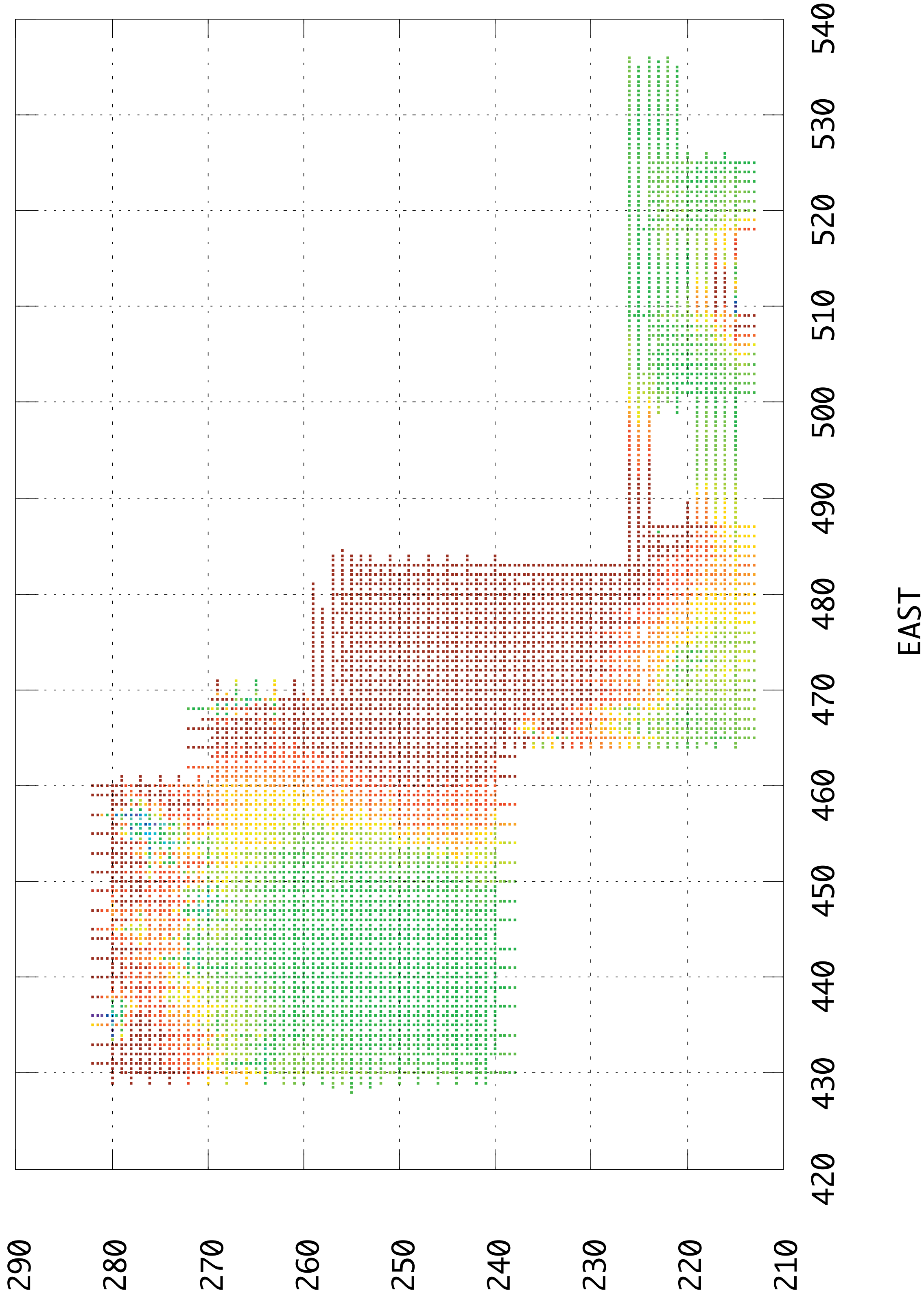
[1] The actual equation used in SYSTAT to generate the colors is:

((int(((*c*-*lw*)/*wr*)*60))*5)+400

Where int is an integer. This method rounds the output to the nearest 5.0.



Skalholt quality control lines


420
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520
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EAST
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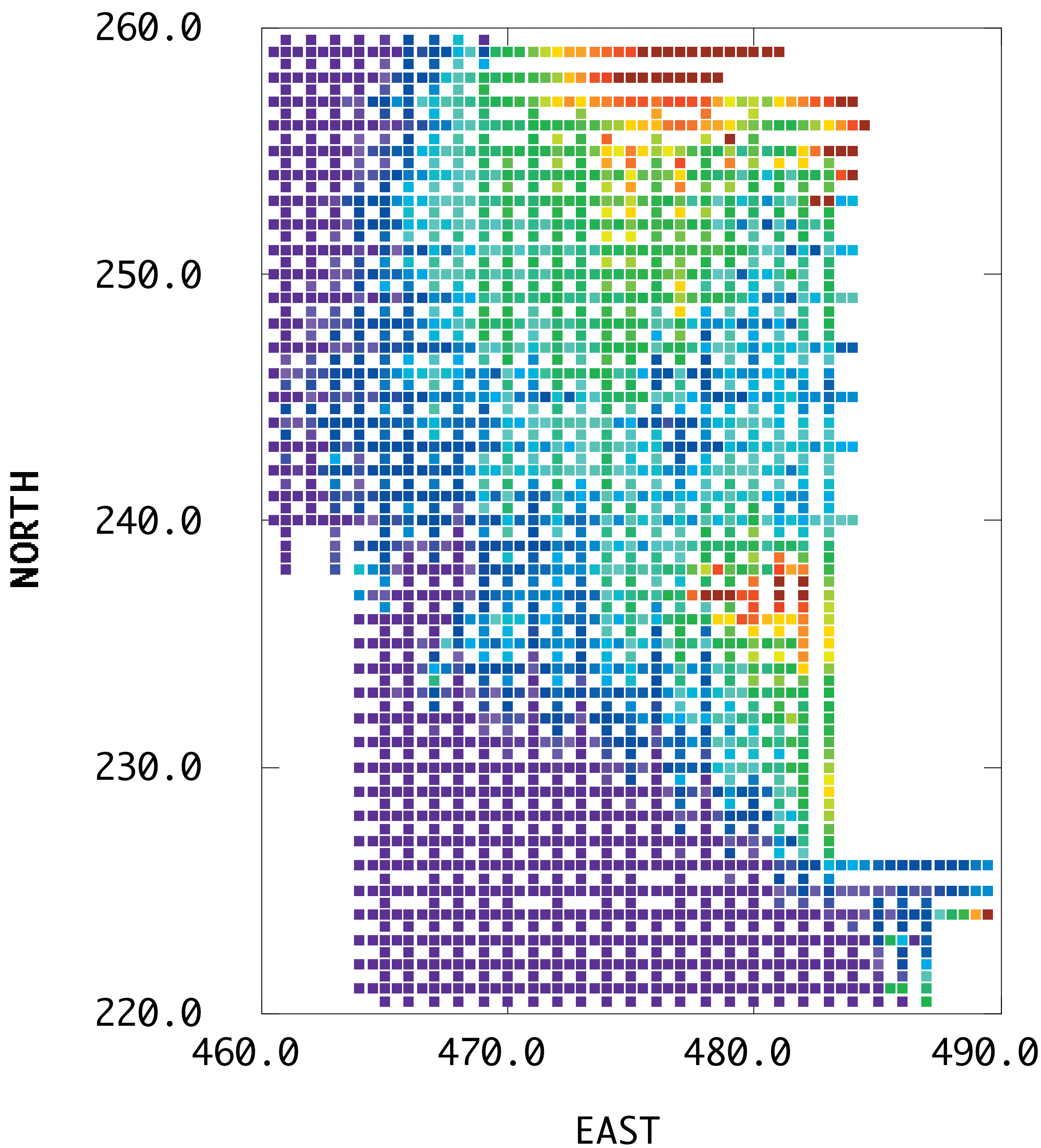
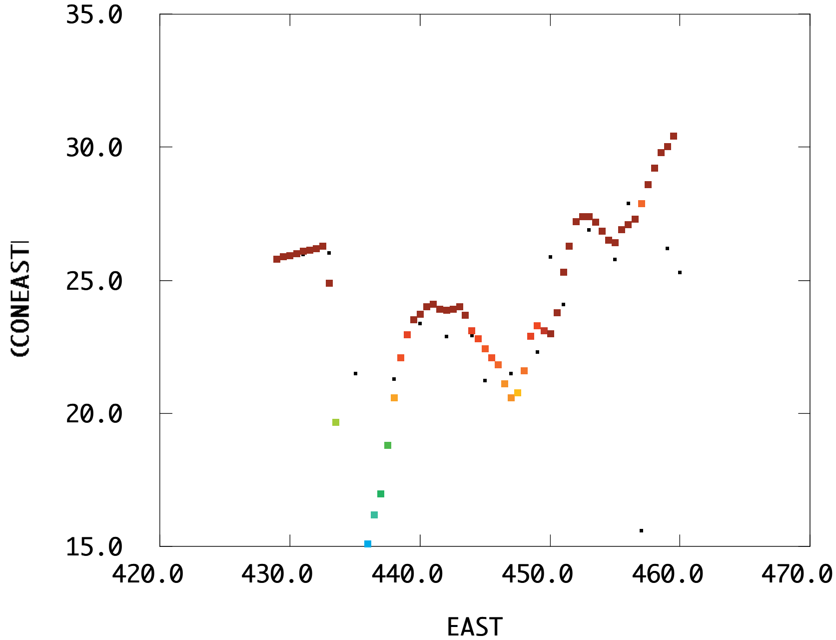
260
250
240
230
220
210

[redacted]

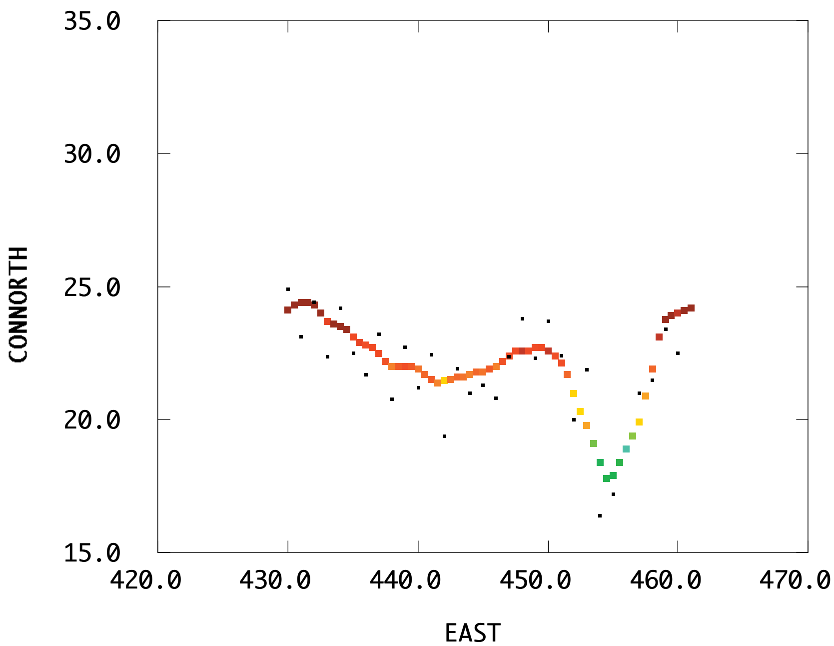


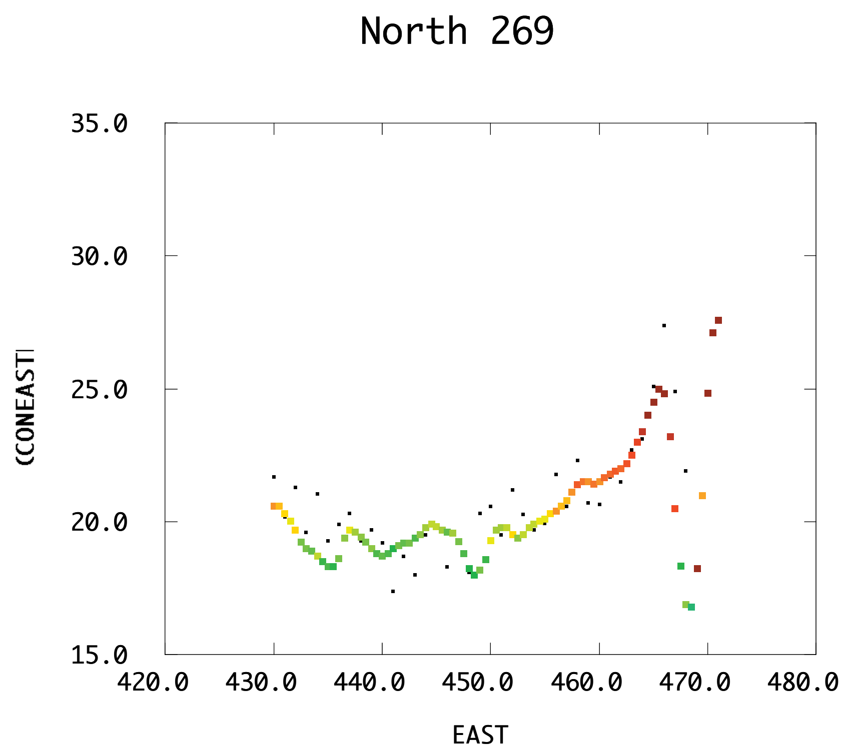
Skalholt map with finer contrast to bring out walls

North 280



North 275

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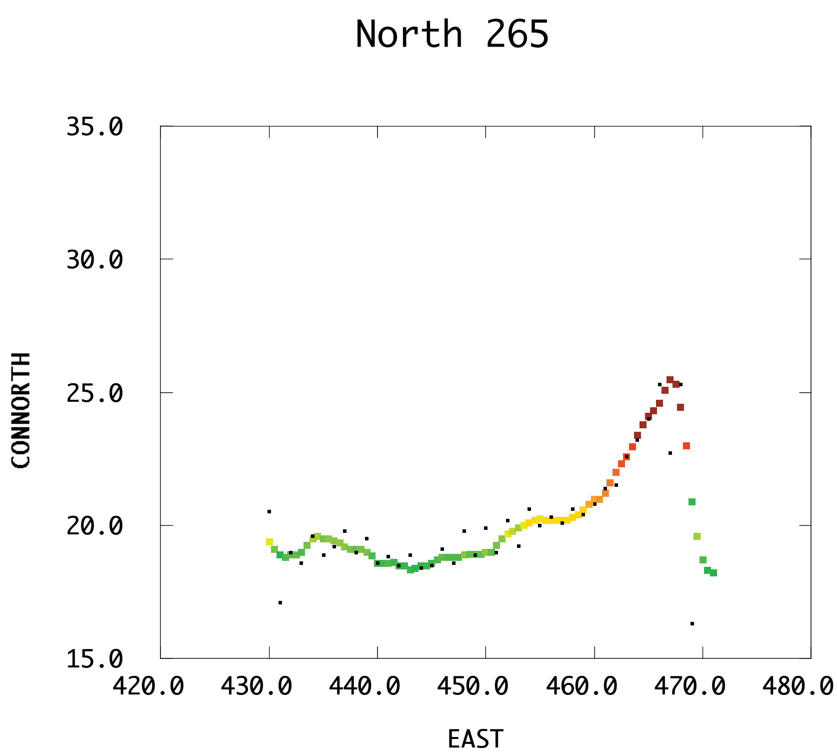
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25.0
20.0
15.0
CONNORTH
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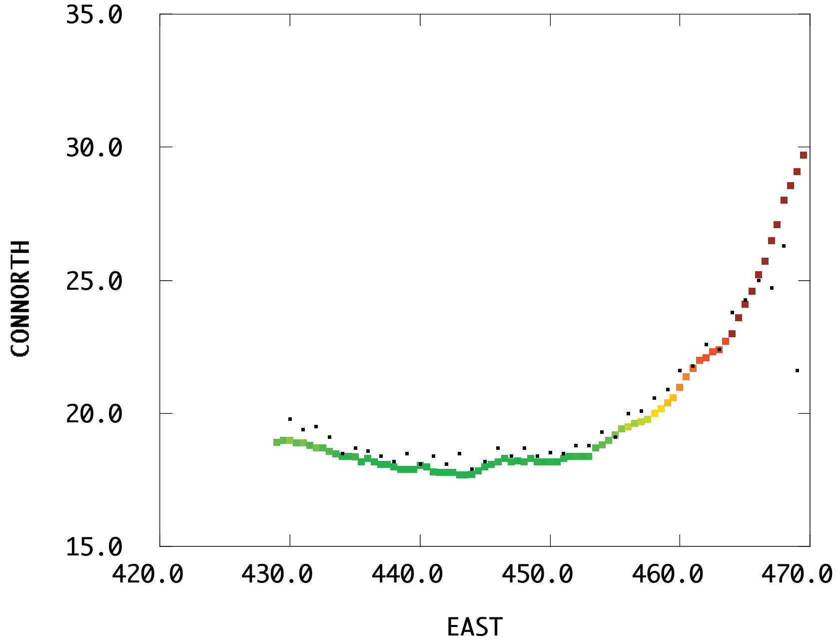
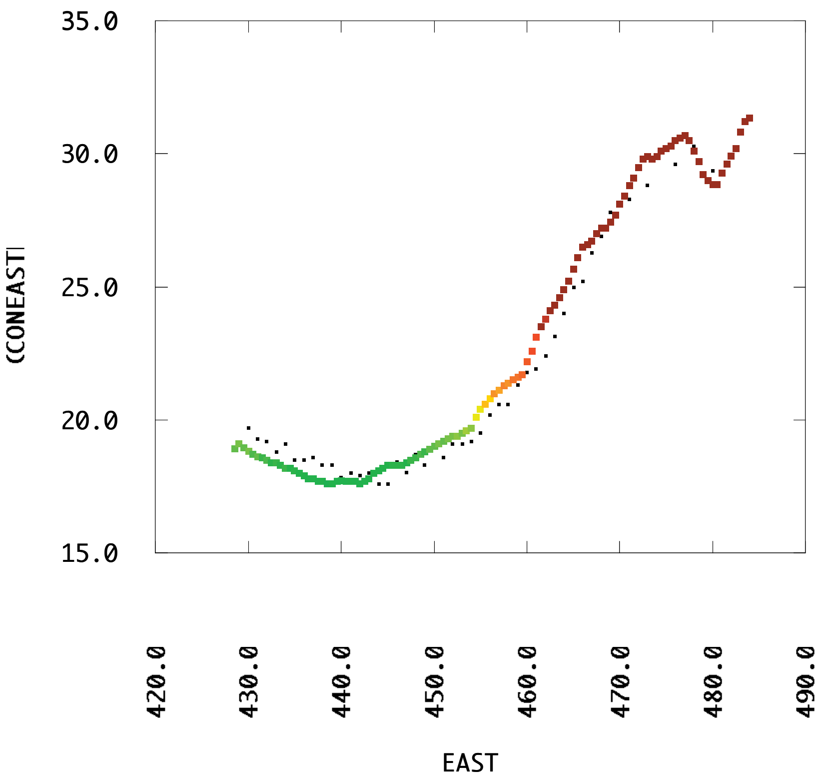
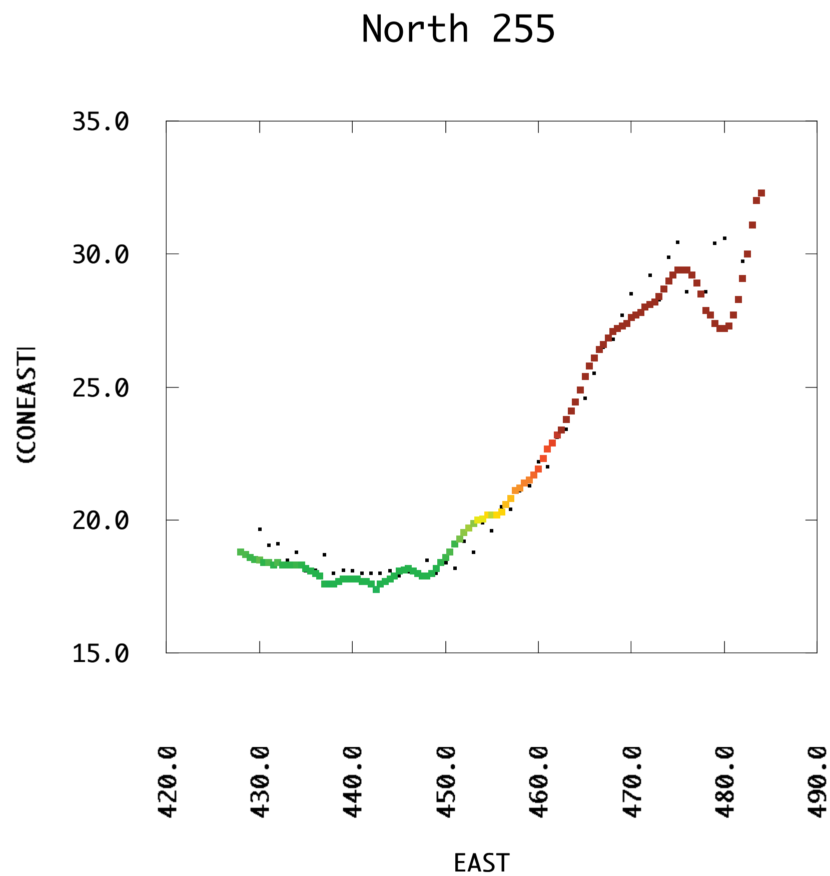
440.0
450.0
460.0
470.0
480.0
EAST

North 260



North 257

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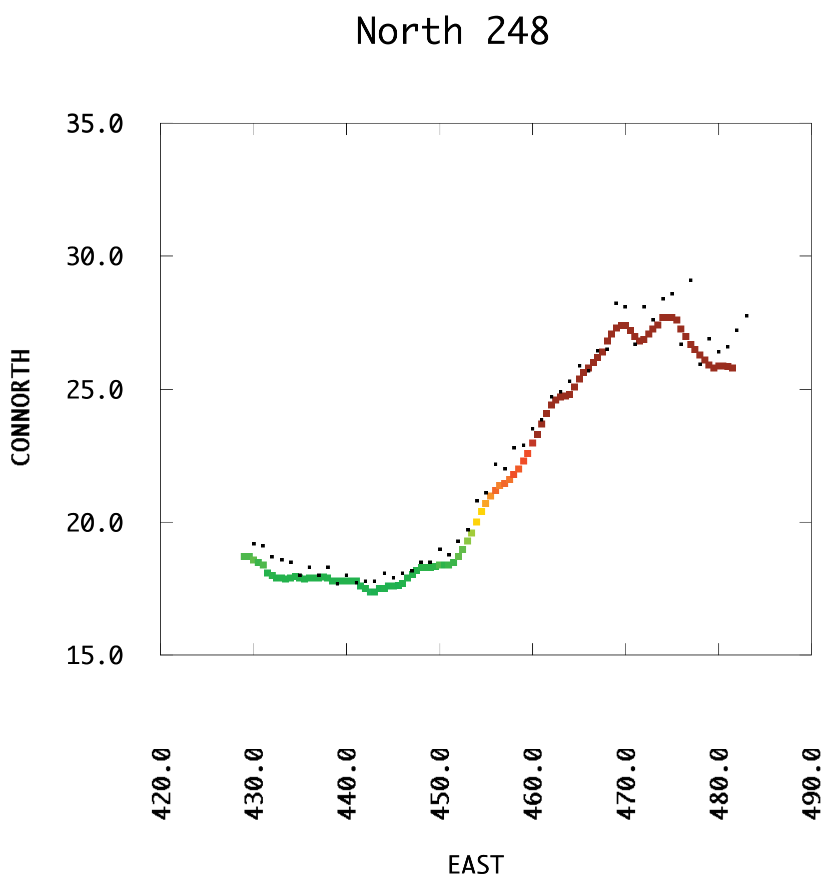
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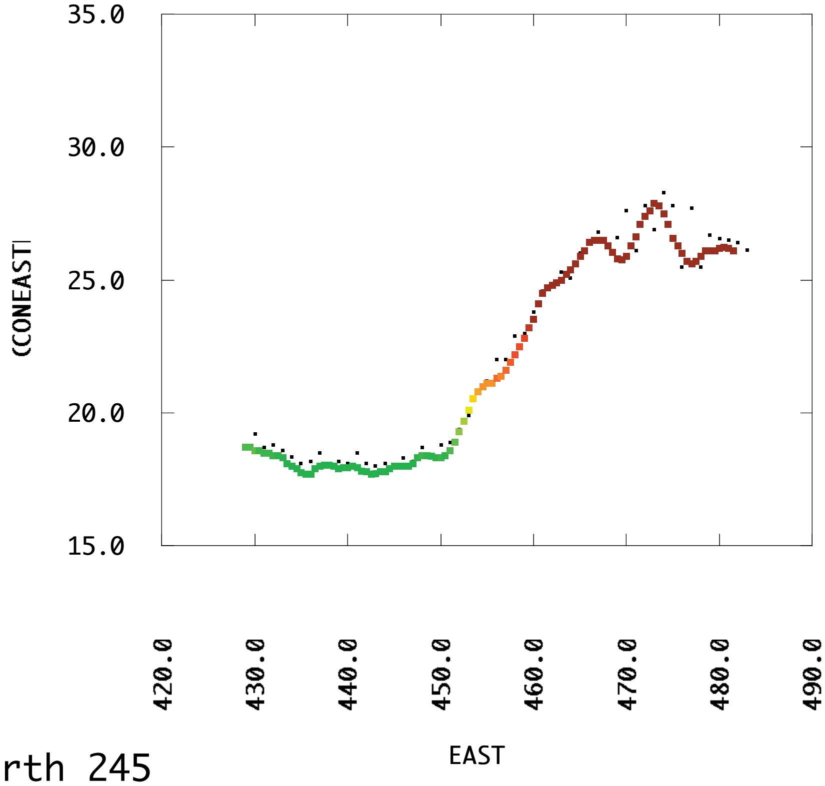
North 246



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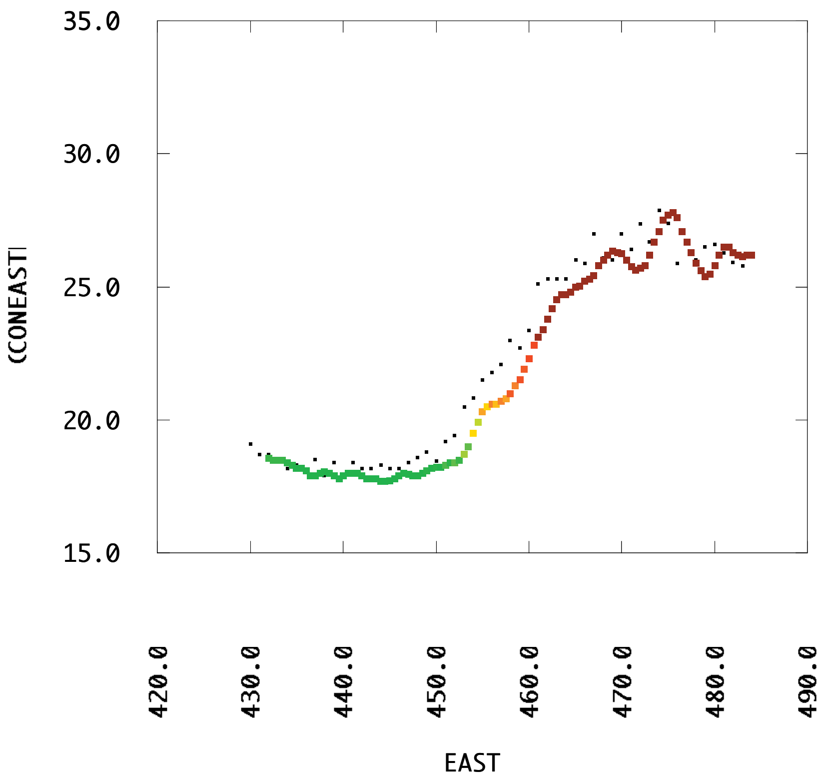

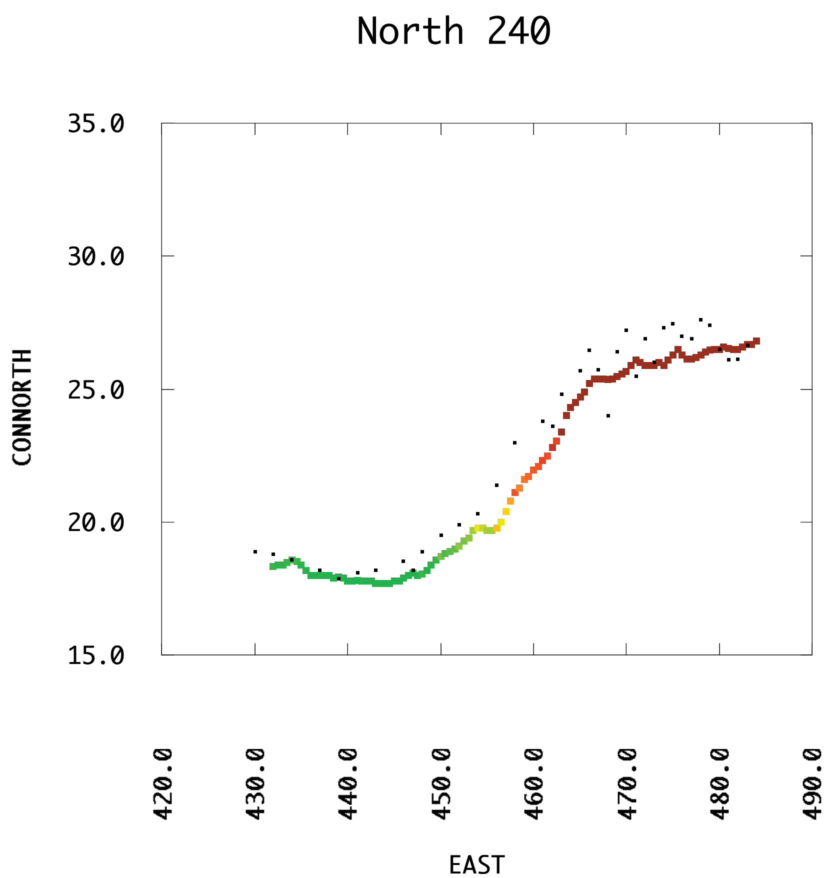
North 240
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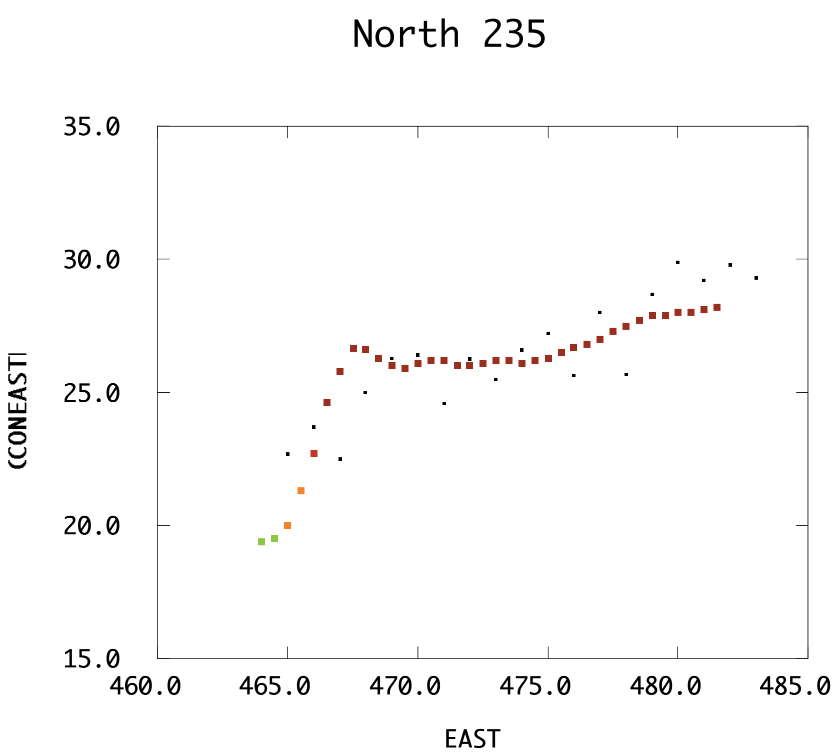
EAST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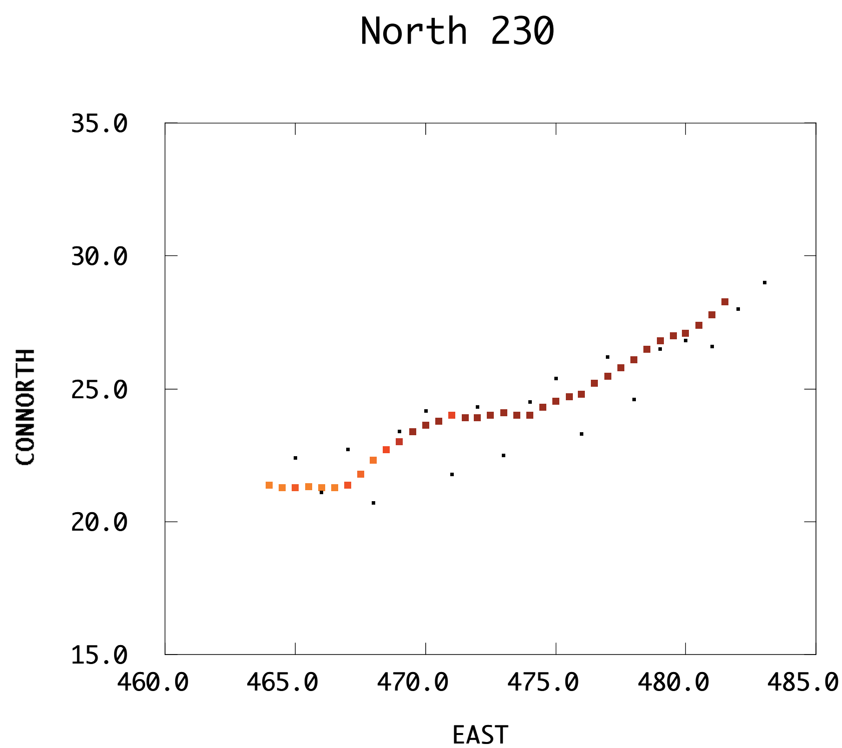
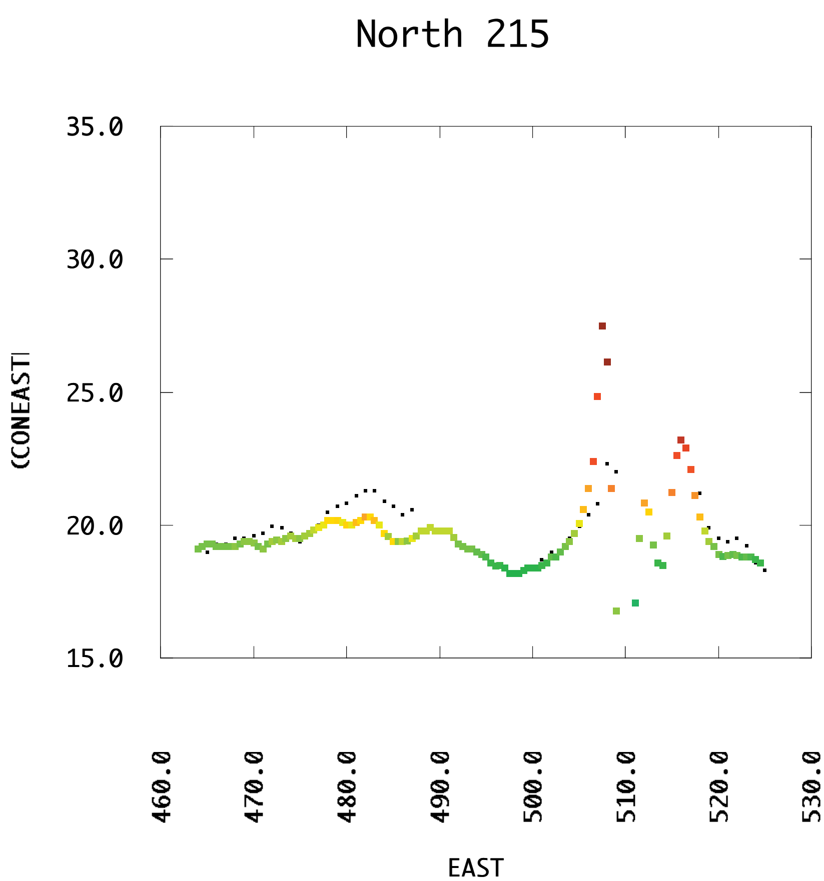
EAST





North 215 shows effects of metal trailer

SASS Profile Key

1 Soils

- Brown
- Gray
- Gravel
- Sand
- Sterile

2 Tephra or

1766
1300
1104
1000
LNL

5 Turf & Floor and other Direct cultural deposits

- Wall
- Wall Fall

- Tramped earth

- Hay

8 Midden

- Peat Ash
- Wood Ash
- Mixed

* Sample

R Rock
W Wood
C Charcoal