FRAM - 2014/15

A Norwegian ice drift 118 years later

The eighteenth week of ice drift (29 Dec. 2014 - 05 Jan. 2015)

Ice drift

The ice camp moved about 27 nautical miles (50 km) during the week (Fig. 1). The drift was slow all week and stopped completely on Saturday. The wind speeds have been less than 7 knots except mid-week (21 knots). There was high surface air pressure over Beaufort Sea (winds from the NW) on Monday changing to an elongate high region between the Siberian coast and the Beaufort Sea mid-week (winds from the ENE) and at the end of the week again centered over the Beaufort Sea.

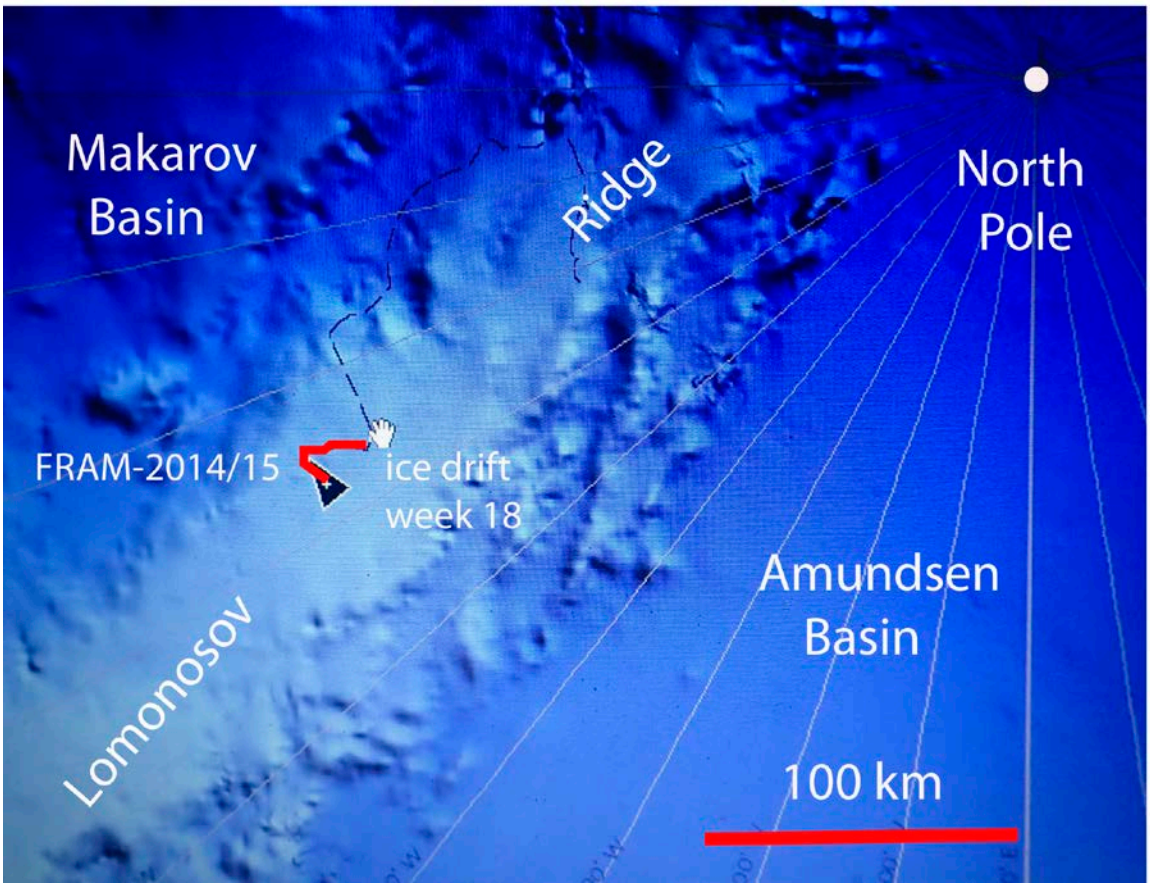

Fig. 1. Drift track (red) of FRAM-2014/15 during week 18 (29 December 2014 - 05 January, 2015).

Sea ice dynamics

We observed intense pressure ridging about 250 meter to the north of our camp during Friday and Saturday. The noise was like being close to a large water fall, but no cracks discovered in our neighborhood

Camp life

Temperatures were below -40° C Monday afternoon until Wednesday morning (Fig. 2), but got 10° C warmer during the rest of the week except Saturday (-35° C). It was a quiet week as it was too cold in the beginning for outside work and we spent the time getting the items in place received by the air drop. Also a summary report for the activities during the first four months of drift was being drafted. The air dropped pork roast courtesy of TV2 was prepared for a New Years Evening meal guided by instructions from home. To our great relief, the result was a success (Fig. 3).

The problem with loss of power from the generator kept us busy for two days as well as a faulty fan heater for the compressor, but the problems got solved. The air drop was also to include another spare generator, but was decided against by the 333 Sq. as the heavy item (20 kilo) would most likely be demolished upon impact.

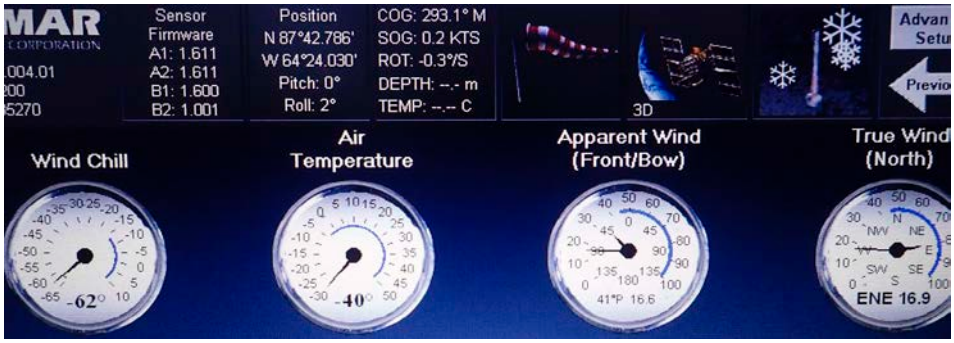

Fig. 2. Screen shot of the weather station before it goes off scale (i.e. below -40° C).

Fig. 3. Enjoying the pork roast dinner on New Years Eve.

Science

This week, the following suite of continuous measurements has been operating:

Bathymetry and sub-bottom profiling:

- four active autonomous echo sounder buoys reporting to shore via Iridium
- continuous seismic reflection measurements (2 km sub-bottom penetration)

Oceanography:

- two Aanderaa current meters at 800 and 1050 meter depth, respectively.

Atmosphere:

- measurement of incoming and outgoing radiation from the ice surface
- surface infrared skin temperature
- sun time
- Aanderaa weather station

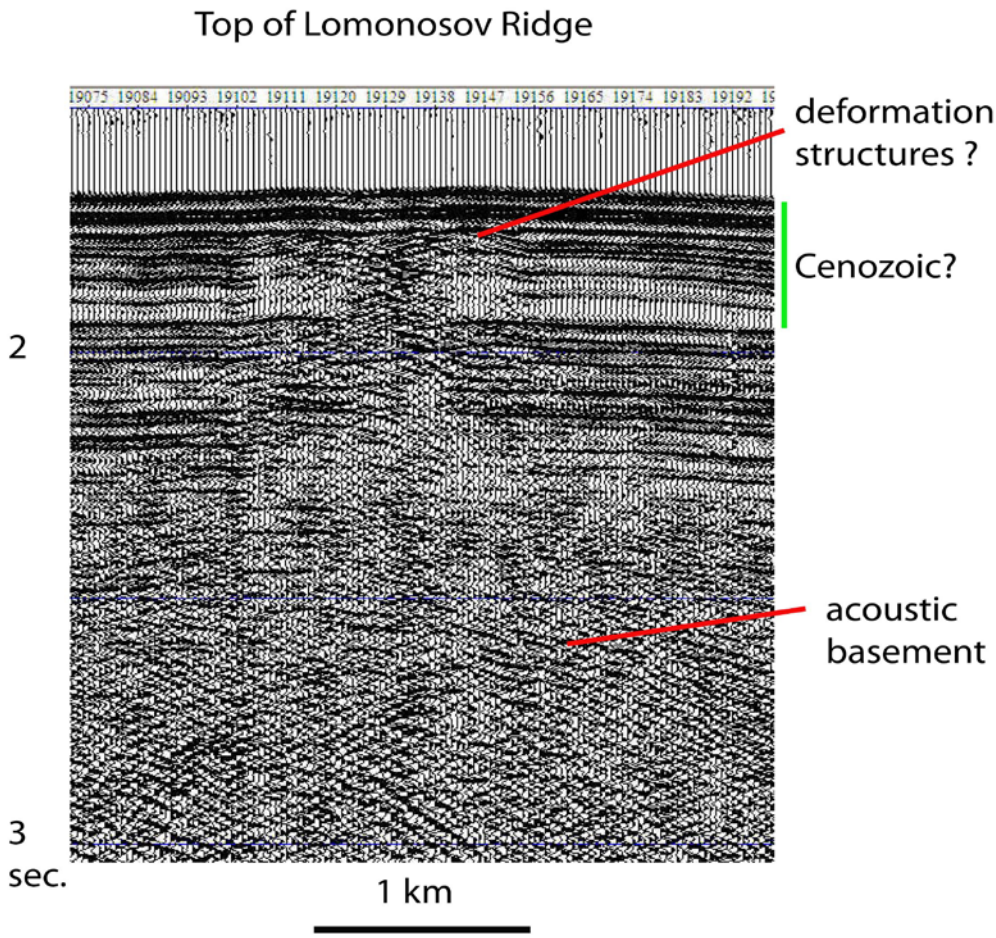

Fig. 4 Screen shot of seismic record from the top of Lomonosov Ridge

The seismic data acquisition has been going well even if the air temperature goes below -40° C. The key is keeping the compressor and hydraulic reservoir heated.

Lomonosov Ridge is considered an aseismic continental fragment. A more than fifty year long instrumental record shows no evidence of earthquakes occurring on this ridge. However, a number of major submarine slide scars have been observed along the edge of the ridge. Also, we have in a number of places observed vertical displacements in the flat lying acoustic section on top of Lomonosov Ridge - offsets which we consider not likely to be artifacts of the data acquisition, but vertical faults with small throws (<10 m). In Fig. 4 is another example of what may be a deformation structure. We would appreciate suggestions for other possible interpretations.

A summary report of the activity on FRAM-2014/15 in 2014 was distributed on January 7th 2015.

Below is an image by Audun of the ice drift station under the full moon at the end of 2014.

Life in the High Arctic is treating us well.

Yngve Kristoffersen & Audun Tholfsen

Daily reports

Monday 29 December.

Position: 87° 45.3' N, 63° 34' W, temperature - 35° C, air pressure 1026 hPa, wind 4 knots from NW. Ice drift 0.1 knots towards SSW. Shooting seismic reflection all day. Put up the inner tent and fired up the multi-fuel stove. Improved the heat box for the hydraulic oil reservoir and put in a fan heater

Tuesday 30 December..

Position: 87° 44.4' N, 63° 42' W, temperature - 43° C, air pressure 1026 hPa, wind 2 knots from the NNW. Ice drift 0.1 knots due south. Acquiring seismic reflection data all day. Too cold to do work outside.

Wednesday 31 December. New Years Eve

Position: 87° 40.7' N, 64° 47' W, temperature - 38° C, air pressure 1028 hPa, wind 12 knots from the ENE. Ice drift 0.2 knots towards the SSW. Acquiring seismic reflection data all day. Rigged up the electric oven in the new tent and called home for instructions on how to prepare a pork roast. Had a successful meal of pork roast, red cabbage and cloud berries for dessert.

Thursday 01 January 2015 New Years Day

Position: 87° 36.8' N, 65° 04' W, temperature - 28° C, air pressure 1020 hPa, wind 21 knots from ENE. Ice drift 0.2 knots towards southwest. Shooting seismic reflection all day. Problems with hydrophone noise in the early morning - recovered the hydrophone and put it out again.

Friday 02 January.

Position: 87° 34.2' N, 65° 05' W, temperature - 27° C, air pressure 1020 hPa, wind 10 knots from ENE. Ice drift 0.1 southeast. Shooting seismic reflection all day. Noticed strong jerks repeatedly over several hours. The reason was active pressure ridging about 250 meter to the north of us. The area seems otherwise intact. At 1400 hours the generator suddenly lost AC-power output. Hauled out the new spare generator and started. It run for about 2 hours and suddenly stopped. The cause is no compression as one valve lifting rod is unseated. This is not repairable here.

Saturday 03 January

Position: 87° 33.9' N, 64° 47' W, temperature - 35° C, air pressure 1023 hPa, wind3 knots from the NW. Ice drift 0.0 knots. Continued repair of the used generator and found the brushes worn. Replaced with brushes from the other newly broken one and we have power back again. Started heating the compressor again. Periods of intense pressure ridging sounds like standing next to a large water fall.

Sunday 04 January.

Position: 87° 33.9' N, 64° 34' W, temperature - 28° C, air pressure 1030 hPa, wind 7 knots from the NNE. Ice drift 0.1 knots towards the east. Resumed seismic shooting after midnight. Audun moved more fuel to the camp. Our inventory is about 7.000 liter left. Have finally thawed out my personal clothes after they got submerged by overwater on the ice when the ice hangar had to be abandoned in the beginning of October