

IASOA Arctic Flux Working Group

Dec 3, 2014 Meeting Notes

Participants

NOAA: Sandy Starkweather, Taneil Uttal, Chris Fairall, Andry Grachev, Ola Persson, Elena Konopleva, Chris Cox, Nat Miller

Phone: Glen Lesins, Eugenie Euskirchen, Ralf Staebler, Dave Billesback, Mike Aurela, Irina Repina.

1. Sandy's initial comments

We can build on ideas from earlier flux group meetings (see IASOA's Prospectus from Jan 2014).

<http://www.esrl.noaa.gov/psd/iasoa/node/133>

One goal is to compare flux tower data and develop a best practices approach for flux measurements and analysis. Can we develop an interoperable network of Arctic flux towers?

We need to find the appropriate balance between terrestrial and atmospheric interests and overlap. These communities can help each other with scaling issues.

2. Andrey's presentation of flux tower data from Tiksi

Andrey gave an excellent summary of the measurements taken since April 2011. He will also present this at the Fall AGU and I understand that a paper is in the works.

It is wonderful that the Tiksi tower is able to collect nearly year-round continuous data.

3. Group Discussion Summary (including questions on Andrey's slides)

There is a collaborative opportunity for the terrestrial community (of which Eugenie was our principal representative today) to develop some common practices for site characterization. This would be a great thing to move towards standardization across the sites. Perhaps Eugenie could prepare a simple list of measurements or ecological specifications needed to properly evaluate and describe the surface at a flux tower site.

Dave Billesbach had an excellent suggestion about using the Ameriflux goal files. It would be interesting to pick a summer/winter month from a few sites (perhaps start with Tiksi since Andrey and collaborators have just finished a comprehensive analysis there) and compare NOAA-ESRL, Ameriflux, NEON, ICOS methodologies, including quality control procedures and criteria for data rejection. We should examine whether analysis in the frequency domain has any advantages or disadvantages compared to the time domain. These comparison ideas alone would make for a very interesting learning experience and help us to move forward in a networked approach.

There is also a good opportunity at Tiksi to explore the spatial variability in the measurements between NOAA-ESRL and FMI. This opportunity might also exist at Barrow and Pallas-Sodankyla as well. I believe it might have been Eugenie who mentioned north-south transects of flux towers can be looked at in Alaska.

Taneil raised a great point about closure experiments and understanding the role of the landscape in that process. We have made some nice connections to the permafrost community and can strategically entrain more of them into discussions where this is the focus. We need to think about the time scales at which we wish to validate energy closure (it might be hard to do on scales of hours but easier on a monthly basis). Also we will need to work closely with the IASOA Radiation Working Group to pursue closure. There are also challenges with soil heat fluxes which gets complicated when water phase changes are occurring.

We may wish to evaluate the role of synoptic-scale atmospheric activity and boundary layer static stability on the micro-meteorology and fluxes. We may find that some sites are strongly influenced in ways that others are not. This will help us keep a good issues balance between gas and energy fluxes.

Some issues were raised concerning the Licor instrument. These include water vapour cross-talk and reliability issues in very cold conditions. We should follow up on this. Taneil commented that some sonics have had quality issues.

We should not downplay the importance of winter measurements even though gas fluxes appear to be very small in that season and hard to separate from the noise level of the measurements. The high static stability of the boundary layer makes for some challenging issues in turbulent flux calculations. For example at Eureka the surface winds are “calm” about a third of the time. CO₂ and CH₄ fluxes will not stop being emitted from the surface under the snow just because the winds are calm. Perhaps we can discuss this in future telecons.

The SHEBA experiment was mentioned a couple of times and with good reason as it represents one of the best data sets we have in High Arctic air-sea ice interactions over an entire year. We should continue to learn and build from SHEBA.

A suggestion was made that Arctic ozone fluxes might prove interesting although this might be outside our current scope.