

**IASOA Arctic Flux Working Group  
Feb 17, 2016 Meeting Notes**

**Participants**

NOAA: Sara Crepinsek, Andrey Grachev, Lori Bruhwiler

Phone: Glen Lesins, Gijs de Boer, Eugenie Euskirchen, Larry Hinzman, Dave Cook, Jennifer Watts, Sandy Starkweather, Taneil Uttal

**Summary of the Meeting**

Welcome to Jennifer Watts who joins us from the University of Montana. Jennifer partners with NASA and is looking for collaboration through this group.

**1. Planning for ASSW2016 (Euskirchen)**

The Organizational Committee for the Flux Workshop had a meeting a couple of weeks ago to begin planning for the workshop later this year, probably in October and perhaps in Finland (a group from the University of Helsinki has offered to host the meeting, which will make a convenient location in particular for Russian colleagues. The next organizing meeting will be at the ASSW2016 and all are welcome to provide input.

The Organizing Committee:

| Member                             | Affiliation                                     | Other e.g., other networks or activities   | Country | Career |
|------------------------------------|---|--|---------|--------|
| Eugenie Euskirchen (co-chair)      | University of AK, Fairbanks                     | PI: International Study of Carbon, Water and Energy Balances in the Terrestrial Arctic | US      | MC     |
| Sandy Starkweather (co-chair)      | NOAA-ESRL-CIRES (PSD)                           | IASOA  | US      | MC     |
| Luca Beletti Marchenisi (co-chair) | VU-NL   | Page 21  | NL      | EC     |
| Lori Bruhwiler                     | NOAA-ESRL (GMD)                                 | IASOA, AMAP  | US      | SS     |
| Roisin Commane                     | Harvard University                              | CARVE  | US      | EC     |
| Andrey Grachev                     | NOAA/ESRL-CIRES                                 | IASOA  | US      | SS     |
| Mathias Goeckede                   | Max Planck, Research Scientist                  |  | EU      | MC     |
| Elyn Humphries                     | Carleton University                             | Canada arctic flux observations  | CA      | MC     |
| Elchin Jafarov                     | University of Colorado, Boulder                 |  | US      | EC     |
| Markku Kumala                      | University of Helsinki                          | Offered to Host, PEEEX project   | EU      | SS     |
| Hanna Lappalainen                  | University of Helsinki                          | Offered to Host, PEEEX project   | EU      |        |
| Alexander Makshtas                 | Arctic and Antarctic Research Institute, Russia | IASOA, IASC  | RU      | SS     |

|                |  |   |    |    |
|----------------|--|---|----|----|
| Trofim Maximov | IBPC - Russian Academy of Sciences                                   | INTERACT and NERC-UK<br>iCollaboration with Japanese teams (Hokkaido and Nagoya universities) | RU | SS |
| Torsten Saches | Helmholtz Centre Potsdam, GFZ German Research Centre for Geosciences | AMAP, IASC  | EU | MC |

Funding requests were made for Elchin Jafarov (US), Luca Bellili Marchesini (Netherlands), and Trofim Maximov (Russia) to attend the ASSW meeting. Eugenie will send around an agenda and further details for the ASSW meeting.

## 2. Summary of IASOA Steering Group Meeting (Starkweather)

The IASOA SSC is meeting semi-annually. One meeting per year will focus on observatory updates. One meeting per year will focus on working group updates. We just had the working group update meeting.

Overall, the SSC is delighted with the progress that IASOA working groups have made. To build upon that success as we add new teams, they would like to see a degree more formality in how the groups plan their activities. This will help us track our accomplishments, allow new comers to understand where they can contribute, help our visibility with our funders, etc.

We are asking each team to identify a few research objectives and some deliverables that could go along with those objectives (data product, paper, etc.). It would also be helpful to understand what resources might be available from our collaborators to make progress. If there is a significant gap (e.g. we need a post doc or we need access to this data set) that would be valuable to understand as well.

Later this year, the US will host the first ever Arctic science ministerial (John Holdren, the science advisor to US President). At this meeting, a range of “deliverables” will be put forward for consideration by the science ministers. IASOA is part of the recommended deliverables. These research objectives will give us tangible items for the science ministers to consider (if we make the final cut for the meeting).

Lori raised the problem of Arctic flux data availability from different countries. The difficulty with creating an open and comprehensive database is related to issues of funding, personnel and data manager cooperation. This is a continuing struggle for us and we need to think of ways to encourage the ease of data access beyond the significant progress that IASAO has achieved for its own observatories.

## 3. Goals for this Year (Lesins)

We would like to build on our progress from last year. This includes more research presentations, creating our first Gold files, improving the state of winter flux measurements and working on a collaborative science project for eventual publication. Gold files are discussed further in the next agenda item.

We should try to work to reduce the large down times for fast flux instruments during the winter season. This is usually a result of riming or frosting on the sensors. For example during the last 9 winter months at Eureka the measurements for the ATI sonics were available for only 17% of the time (based

on a complete day of good observations) and most of this 17% is biased towards warmer and windier days. Taneil and Sara informed us that NOAA is planning to replace many of the ATIs with METEKs. It was suggested by Andrey that some of the ATIs should be kept in place to allow direct comparison with the METEKs. Taneil also reported on work being done to test frosting issues on radiometers and that some sonics are included in this field test. We may also have to modify the heating protocol used on the sonics to better deal with the harsh winter conditions. Perhaps maximum heat has to be applied for longer periods in between data collection time periods.

It would be nice to work on a modest collaborative project that could result in a publication. To involve as many people as possible it could consist of comparisons of fluxes amongst the various towers. One suggestion is to look at whatever available fluxes can be obtained during the winter season and discuss strategies for improving winter coverage. I would like to hear what ideas you might have for a project. Of course the main restriction is personnel to do the work.

It would be useful for us to work with the Radiation working group towards a surface energy budget closure experiment using a best fluxes data set that Taneil has been working on. Perhaps our group can contribute to that effort.

#### **4. Gold File Creation (Grachev, Lesins)**

Andrey and Glen have begun discussions on creating Gold files which will consist of “raw” measurements from flux instruments that are known to be performing well and with limited data interruptions. Users can test their analysis software to compare their derived fluxes with our result. This follows the recommendations from Ameriflux that uses Gold files as one component to their quality control. This additional level of quality control helps increase the confidence of outside users and should make our data products more appealing. Ameriflux typically has a couple of weeks of continuous high frequency data in their Gold files. We might have to relax that constraint to several days at most. Andrey has agreed to look for some good candidate periods in the summer at Tiksi and Eureka to get us going.

#### **5. Other Business**

Larry Hinzman suggested we recruit some NEON members to our group.

#### **Detailed Minutes**

Sandy – introduction of members

Watts – new member, University of Montana, partners with NASA, looking for collaboration through this group

Hinzman – suggestion that group should look to incorporate NEON into working group activities

Lesins – overview of agenda

Euskirchen – ASSW 2016, flux group workshop, goal to discuss interests and topics to include at the workshop in March 14<sup>th</sup> (workshop will likely take place this fall)

Starkweather – more detail of organizing meeting – Arctic flux network in Fairbanks, Alaska, suggestion that Andrey Grachev to participate in committee

Grachev – won't be able to attend organizing meeting due to other conference conflict (can participate via webinar)

Starkweather – Grachev to create a few slides on “Gold Files” to present shortly, mention of IASC support of organizing meeting

Euskirchen – to send out agenda of organizing meeting to entire working group

Lesins – keep IASOA working group updated with results of ASSW meeting to communicate what is priority to flux community, how we can collaborate with other flux communities

Starkweather – ASSW meeting is not planning to organize an additional Flux working group meeting at ASSW

Starkweather – summary of IASOA steering group meeting, discussion of working groups at the steering group meeting, questions and large level of interest in working groups from outside sources

Starkweather – working groups to draft a report of what each group is focusing on, will give transparency to outside sources, working group chairs to generate this report, looking for ideas to enhance with international support that IASOA can facilitate/bring forward

Starkweather – greater standardization of working groups, discuss potential to move group from 9am MST to 8:30am MST, what can this group accomplish in 2016 and who will lead each topic

Bruhweiler – whether cooperative among different countries could lead to better sharing of data, one limitation in trace gas budgets is not having availability of data from other countries?

Starkweather – this is a great point of interest as a result of these meetings and collaborations, working groups like IASOA can enhance publication of data

Bruhweiler – data is never even available after publications, would working groups help with this issue, also – could working group international countries be encouraged to help maintain station support to keep stations up and running

Starkweather – understands this long-term threat to observations and would hope that these working groups and steering committee agendas could promote this

Uttal – put together a data plan to encourage data availability to address root of the issue (shift responsibility of data to not only include who owns the instruments running), example of POP deliverables within our contracts, not all partners will have ability to do this so can provide additional support to make this happen

Lesins – invite managers of sites to become more involved in working groups, and this could promote openness to data sharing in the Arctic – example that not all Arctic stations are defined or included in IASOA observatories

Starkweather – could look into inclusion of other countries/stations into IASOA defined observatories, this could improve data availability/sharing/accessibility, IASOA would need more sustained funds to do more of this, but is still a valuable thing to reach for

Watts – acquiring data is difficult, and once have the data set still can't share that data, difficulty in even determining what flux towers are still running – suggestion of listing towers and heights, operating status, PI involved to see what data is available in the Arctic (even if not listed at a designated IASOA observatory)

Lesins – should we spread our geographic reach? Where is the Arctic cut-off?

Starkweather/Lesins – goal of working group to better define and discuss this topic and where we want to go in 2016

Lesins – mention of summary of what was accomplished in 2015, great presentations and gold file products on fluxes, get input from outside users of these gold files to see how we can make them better

Lesins – working on gold files in 2016 is a large priority, interest in quality of winter measurements in 2016 – there are many instrument issues when trying to operate in winter months, how can we address this issue, any suggestions of how to improve instrument operation (riming, icing), we should deal with measurements taken in winter seasons, we miss a lot of data during this time, how can we improve this and develop better practices

Starkweather – question: what kind of product would envision coming out of an effort like winter measurements? A publication? Inter-comparisons? Question: who in the group has the resources to move toward investigating this issue?

Uttal – POP group is investigating this for radiation measurements, site in Colorado has platform to work out this issue, example of literature review done by Crepinsek. Uttal suggests that we should make this a priority to investigate winter measurement issues and at least highlight these issues

Lesins – willing to take the lead on this winter measurement issue and then develop a procedure, discussion of sonic issue

Crepinsek – explanation of ATI and Metek instrument overview at Eureka and Tiksi, suggests doing a comparison of ATI and Metek instruments since there are benefits and drawbacks to both manufacturers

Grachev – agrees with Crepinsek and Lesins to run comparison of ATI and Metek sonics

Uttal – absolutely agrees that we should install both ATI and Metek sonics for comparison and to splice together data sets from both to get a good yearly product

Lesins – coordinate with Grachev, Crepinsek on working on winter measurement issue

Uttal – closure of surface energy balance is very hard to do observationally, show/include Lesins in what we have been doing with “Best of Flux” files, these files are for the entire year

Lesins – is interested in being included in this discussion of the “Best of Flux” group, could help review this product

Lesins – what group science product could this working group develop to publish in 2016... everyone to think about this and get back to Glen next meeting, could publish collectively

Uttal/Lesins – look to see if CANDAC has any young scientists who want to participate in flux projects

Lesins – update of what Grachev and Lesins have completed on Gold files, working to define best time period (probably summer and transition season), Grachev suggests to focus on slow data met measurements

Grachev – can make plots for Tiksi and Eureka to show summer results of Gold file products, there is a problem with fast/turbulent continuous measurements, but will also look into slow measurements

Lesins – wrap up