



## IASC-SCAR-IPA-GCOS-GTOS Workshop on the Global Terrestrial Network on Permafrost (GTN-P) user requirements definition Report

November, 10-11, 2011



The International Permafrost Association and the International Arctic Science Committee organized a workshop in November 2011 to encourage, facilitate and promote the first step in the realization of the GTN-P Strategy and Implementation Plan to be submitted to GCOS and GTOS focusing on

1. The definition of user requirements for an observing network on permafrost based on a broader stakeholder involvement.
2. the standardization of permafrost measurement methods at the international level

The GTN-P is the observing network for permafrost sponsored by GCOS and GTOS and managed by the IPA. It monitors the two Essential Climate Variables (ECVs), permafrost temperature and active layer thickness, through a series of sites (over 860 boreholes and over 200 active-layer monitoring sites globally) located in all permafrost regions. GTN-P has gained considerable visibility in the science community in providing the baseline against which models are validated globally and incorporated in climate assessments. It was significantly expanded during the IPY. Yet it was until now operated on a voluntary basis, and is now being redesigned to meet the increasing expectations from the science community. To highlight the network and deliver the best possible products to the community, the IPA organized a workshop to define the user needs and requirements for the production, archival, storage and dissemination of the permafrost data products it manages.

The workshop did bring together representatives of targeted communities (field scientists, policy makers, modelers and remote sensing specialists) to elaborate a set of requirements and make these communities to agree on a consolidated set of standards and products to be provided by GTN-P. In a second phase, the workshop did address issues spanning the whole spectrum of science communities involved in the workshop: Data

#### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitriy S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

#### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org

---

archival, data storage, data dissemination and visualization, search tools, online vs. offline data delivery, confidentiality, compatibility with existing ISO and PIC standards, etc.

## Output summary

The results of this stakeholder workshop was the formation of an interim executive committee chaired by Vladimir Romanovsky (UAF, USA) that, in partnership with the IPA secretariat, worked on refining the Strategy and Implementation Plan of GTN-P and worked towards the operationalization of the network.

The interim EC should focus on the implementation of the governance structure and the rapid nomination of EC members and national correspondents. To do this, several questions need to be addressed, and Terms of Reference written.

Several questions were submitted by the participants to the interim EC:

- Should there be regional networks?
- When should be the next workshop?
- Should there be a data embargo?
- Should the quality of the data be checked?
- What should be the data levels?
- What standard year should be used?
- How to incorporate existing networks?
- How frequent should the reporting be?
- How to create data citation?
- Can the database be connected to existing databases?
- What should be the end products (maps, timeseries, trumpets, MAGT, Arctic report card, State of the Climate, ESSD journal, etc.)?
- What should be the data policy?

The minutes from the breakout sessions as well as the program of the workshop are reported below.

## Breakout session reports

Each breakout session was attended by a rapporteur that reported on the discussions in the plenary and later provided the IPA Secretariat with the minutes of the breakout session. The main points stemming out of these discussions are summarized below, based on the reports from the rapporteurs.

### 1. Permafrost temperature: Product definition

Issues discussed:

- Location of boreholes

#### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitriy S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

#### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org

- Preferable depths
- Sensors (precision, accuracy and type)
- Technical details (e.g. installation)
- Reporting
- Mountain permafrost as a special case

#### Location of boreholes

- Gaps exist in our spatial network so new sites are still needed
- There will also be new needs in the future resulting from new questions
- Multiple boreholes would be a good idea if super-sites are developed and these should capture local spatial variability (e.g. unfrozen, isothermal and colder in the discontinuous zone, undisturbed and disturbed geomorphically with variable snow in the continuous zone, dry bedrock and ice-rich sediments in mountains) – possibly one deep borehole and shallower secondary boreholes
- The INTERACT project might help with locations of new super-site boreholes where there is other long-term data but no ground temperature information (also government climate station locations could be potential sites)
- Single boreholes should be in spatially representative sites to be most useful to the modeling community (but at present we do not have a good idea of spatial variability)

#### Preferable depths

- The depth spacing for a bedrock site would be different than for an ice-rich site near 0°C
- A typical spacing could be given but need not be followed to give useful information as mean annual temperatures can be calculated even from shallow measurements if made at least daily
- A functional characterization of boreholes with temperature measurements could be useful (active layer only; active layer and upper permafrost; reaches ZAA; includes temperatures to calculate geothermal gradient) [Not discussed – how do we cope with settling surfaces due to thermokarst]
- Modelers need sufficient temporal and depth resolution to calculate at least monthly means for identifiable ground layers; important that the site is representative for (perhaps) an area of 100 km<sup>2</sup> (what does this mean for discontinuous permafrost?)
- Transparency needed regarding meaning of term such as “ground surface temperature” – different inside and outside a borehole

#### Sensors (precision, accuracy and type)

- Should not approve only a certain type of sensor or logger but the logging system needs to be identified in the data-base

#### EXECUTIVE COMMITTEE

President:  
 Prof. Hans-Wolfgang Hubberten  
 Vice-Presidents:  
 Prof. Hanne H. Christiansen  
 Prof. Antoni G. Lewkowicz  
 Members:  
 Dr. Dmitriy S. Drozdov  
 Prof. Vladimir E. Romanovsky  
 Prof. Ma Wei

#### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
 Alfred Wegener Institute for Polar and Marine Research  
 Telegrafenberg A43  
 14473 Potsdam, Germany  
 Tel: +49-331-288-2216  
 Fax: +49-331-288-2122  
 contact@ipa-permafrost.org  
 www.ipa-permafrost.org

- Accuracy of  $\pm 0.1^\circ\text{C}$  (with higher precision) is ideal but lesser accuracy could still provide useful data, depending on the site and the use (and some loggers give better accuracy than is advertised by the manufacturer)
- Precise details of measurement methods and what they might do to affect readings are needed (e.g. large diameter open boreholes vs. small diameter oil-filled boreholes) but there should be an approved approach
- May want to develop a tiered approach to standards which would be transparent to users about the degree of accuracy (not clear who should do the evaluation – data-collectors, national representatives or GTNP central)

#### Technical details

- A method to pass on experience to neophytes who may not be permafrost specialists would be useful
- GTNP could develop a mentors list (1 on 1 help) or distance-based training seminars (or on-line training videos)
- Equipment (e.g. drills) that is available for loan/rental (perhaps only if free?) in a given geographic region could be listed

#### Reporting

- Little discussion of this point but preference to have open reporting for data access

#### Mountain permafrost as a special case

- The potential for high spatial variability in discontinuous lowland permafrost applies at least as much to mountain permafrost
- Additional problem is interpretation of thermal profiles in boreholes on or into very steep (rock) slopes (perhaps this could be fitted into the tiered approach to standards which would favour boreholes in low gradient slopes?)
- Expansion of GTNP to monitor other variables (e.g. rock glacier movement) in mountain areas is not possible at present as GTNP is limited to ECVs

## 2. Permafrost temperature: Format definition

#### Identification of users

- GTNP data expected to be used for permafrost science, modeling, ecology, education, outreach...
- GTNP should know who is using its data to better adapt what is provided and also justify why data providers supply to GTNP
- May need a license agreement which can be a disclaimer for GTNP, a means to track users, and would allow GTNP to produce an annual citation report (discussed later)

#### Time Resolution

#### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitriy S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

#### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org

- Data should be made available at the best available time resolution (i.e. original, usually hourly) as this gives the greatest flexibility for use – remote sensing for example may need this
- Mean temperature profile with annual range would be a good product – is the secretariat going to produce reports with such results regularly? (GTNG produces reports with a few key variables such as mass balance)
- Is GTNP about data storage or generating derived variables?
- Should additional measurements, such as site air temperature or snow, be included?

### Spatial Resolution

- The representativeness of boreholes is very important because of poor spatial resolution
- But do we have a way to assess this? Goes back to issue to potential super-sites
- On a technical point, co-ordinates of boreholes should be recorded to allow their location within 5 m and datum should always be specified; old co-ordinates (pre-GPS) must be updated (current meta-data form thought to be OK for this)

### File Format

- User needs have to be clear for those delivering the data
- But amount of processing prior to submission should be minimized for the data provider
- Best way is to have one format for data submission and another for data delivery (software available to do this) – would resolve issue of prejudging what products are needed
- Needs are for a real data-base not just a data repository
- GTNP must be a one-stop shop for modelling community

### Credit for data suppliers

- Credit for those supplying data is important as it takes a lot to gather it (blood, sweat, tears and funds)
- However, it would be impossible to acknowledge data suppliers for more than a few boreholes
- Need to work out a citation protocol so that suppliers know how they will be acknowledged and that users will know how to cite and acknowledge the data sources
- For example, might say that any data presented from a single borehole will be acknowledged individually but that using all data in the data-base would not (citation would be GTNP itself)
- This is a big issue for network data from countries as the network needs to be acknowledged for funding purposes

#### EXECUTIVE COMMITTEE

President:  
 Prof. Hans-Wolfgang Hubberten  
 Vice-Presidents:  
 Prof. Hanne H. Christiansen  
 Prof. Antoni G. Lewkowicz  
 Members:  
 Dr. Dmitriy S. Drozdov  
 Prof. Vladimir E. Romanovsky  
 Prof. Ma Wei

#### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
 Alfred Wegener Institute for Polar and Marine Research  
 Telegrafenberg A43  
 14473 Potsdam, Germany  
 Tel: +49-331-288-2216  
 Fax: +49-331-288-2122  
 contact@ipa-permafrost.org  
 www.ipa-permafrost.org

- Probably need to require that users of GTNP data send a reference to where they are using it– could be part of the license agreement- and in turn GTNP makes available an annual citation report for individual data suppliers and especially networks

### Sensitivity of Data

- Some data may be sensitive and may have to be embargoed for a period or may be available only in an aggregated form
- May need a two-step process with a release of key parameters and then a full dataset at a later date (e.g. to protect students)
- Is there a maximum embargo time?
- Experience to date with permafrost data has been positive (users can help find problematic data)
- Need a data policy!

### 3. Active Layer depth: Product definition

The active layer session began with a discussion of what people measure when defining the active layer and some of the issues regarding measurement of active layer depths.

- Current CALM measurements have evolved from simple measurements of active layer thickness to include other variables such as soil moisture, landscape characteristics, and ground heave/subsidence.
- Active layer measurement is seen as requiring regular “boots on the ground” types of measurement i.e. probing etc.
- There was a desire for the measurement to be spatially and “statistically” representative. The result is that there are 220 sites currently measuring active layer thickness.
- A large sample creates problems in terms of the timing of measurements. If measurements of active layer thickness are to represent the maximum thaw penetration, they must be made late in the season (for Alaska, the second part of November). Currently, no protocol exists for estimating active layer during the time of maximum thaw penetration.
- There is a question of when we should stop measuring active layer thickness. As permafrost warms, a number of CALM sites have developed active layers that are greater than measurable thickness. When should we stop monitoring those sites?

The second phase of discussion focussed on the active layer of mountain permafrost

- It was noted the key CALM method for determining permafrost thickness (i.e. probing) was not effective in coarse mountain soils.
- This community supported the need for including thermal profile data for estimating active layer thicknesses. However, there is considerable debate as to how to define

#### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitriy S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

#### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org

---

the active layer, so it was suggested that providing the raw temperature data should be sufficient to allow end users to interpret their data

- There is a difficulty in mountain permafrost setting measuring spatial variability in the active layer (due to the problems above). Currently this means that estimates of active layers are not included in CALM, which requires spatial variability and direct measurements of active layer, is that a good idea?

Then there was a discussion about what modellers (as end users) require for their models.

- It was highlighted that most models focus on the temperature data, as this is the direct output from most models and is used to infer active layer
- There was a desire to see the debate about active layer thickness resolved, such that the GTN-P interprets an active layer that modelers can then use.
- There was also a desire to produce a consistent product. It was noted that Alaskan sites have a lot of detail that other sites lack (i.e. Siberia). There was a desire for keeping the data consistent.

The discussion then moved to ECV's

- In one camp, there was a group that made the point that active layer alone was the ECV, therefore the main focus should be on measuring this parameter effectively.
- However, some forms of auxiliary data may be useful to the community as they may help to standardize the main output. ECV's were created because they are global datasets, however, a small, standardized set of auxiliary data may enhance the utility of the active layer data.
- This area is seen as the essential link between TSP and CALM and careful thought should be taken to ensure that the network works at a practical level.

#### 4. Active Layer depth: Format definition

Who is the end user?

- Originally this was divided into scientists and general users. There was some discussion of the scientists that would likely use these data (modelers, ecologists, permafrost scientists). The more detailed discussion was what counts as a "general user". The following groups were identified as possible users of these data
  - Communities living on permafrost
  - Industry, mining and oil industries in particular
  - Engineers, i.e. anyone building on permafrost
  - Policy makers
  - People interested in understanding climate change

What are the applications?

#### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitriy S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

#### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org

- 
- The key application identified was the use of data for the modeling and remote sensing communities. Creating data formats for these communities was seen as being key
  - There is also a secondary use of the data by the “general user” communities for making decisions about permafrost usage.

#### Comparability

- Two issues were discussed at this point. (1) Many users are inputting their data into already existing databases (e.g. CALM) so minimizing formatting time should be important. (2) There was discussion about the relative merits of open source vs commonly used programmers (Excel, ArcGIS).
- The consensus was that simple formats were the best. CALM already has a very simple spreadsheet format that could act as the basis for the first version of the database.

#### File structure/format

- There was a discussion of both output products and data products, however these were convolved in our conversation.
- The key discussion here was that we should focus in the first instance of getting a consistent output that can be used by the “scientific” community. This was seen as being a data file that contains the raw data with both metadata and companion data.
- From there a number of products were identified that could help with dissemination of outputs. The first was a set of spatial data (e.g. shapefiles) that contain spatial information about active layer depths. It was thought that a product that could be used by people who did not necessarily want to wade through data or download spatial data would also be important. Spatial data may be presented in a .pdf or .jpg format as well.

#### Metadata/Companion Data

- This was seen as an area of greatest need within the current network. CALM metadata is inconsistent (particularly in Russia) and it was seen that there needs to be a “carrot and stick” approach to improving this. Hugues suggested that this may be a role for the new secretariat to travel to these sites and make sure that the metadata is consistent.
- The discussion of exactly what metadata to include was linked to the discussion in the product definition, and no clear ideas of what the metadata that should be included were discussed
- It was seen that every site should have a minimum amount of companion data before being included in the network, what exactly this should be was not discussed.

#### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitry S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

#### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org

---

## 5. Reporting strategy: Timing and products

1. There exists a unanimous agreement amongst the members of breakout session 3 that numerous products need to be created for the public. These products should not only be focused on the spatial trends in permafrost but also the temporal trends. The GTN-P should focus on creating material that scientists would be interested to see yet would also be easy enough to understand as a lay person. Of these materials (e.g. publications, bulletins, web graphics etc.) it was decided that there should be one “Annual Key Report” which is a summary in short of the changes for the respective year. This summary should have a spatial variability map of the mean annual permafrost temperature (or if the IPA would be willing to decide on a different variable that would suffice) and also a simple analytical explanation of how many sites have increased in ground temperature or vice versa. It was also decided that there would be a longer, more comprehensive report every two years.
2. The GTN-P must focus on creating products that emphasize the connection between permafrost and people. Information can be put into the database using news articles showing how the thawing or degradation of permafrost adversely affects the public.
3. It was decided that the data being fed into the database need to be screened for errors. Therefore it is the duty of not only the contributor to give an initial check, but also the GTN-P secretary to perform quality control. Most of the participants in the breakout session agreed that implementing a data visualization option into the database, allowing for uploading of data and then viewing in graphical form, would allow them to easily check for errors right away. From this the participants also agreed it would be beneficial to have something for the users of the database that would allow the same type of visualization, but also the ability to compare different datasets. If this is the case a system allowing for the selection of multiple datasets will have to be implemented and this might also allow for the downloading of numerous selected datasets.
4. Uploading of datasets from contributors to the GTN-P database will take place annually by the national correspondents. It is understood by the organization that there is a high variability in the times at which data are gathered from the field and also how much data are generated. It is left to the contributor to upload their data as soon as possible if they wish for it to be a part of the annual key report. While this caused a bit of concern, mainly due to the time it might take to upload data, it was decided that having the interactive database interface, as mentioned in section 3 above, would make this easier and less time consuming. It has been left up to the EC to decide on how the contributed datasets will be cited or acknowledged.
5. The GTN-P, while connected to the IPA, needs to maintain a separate structure from the IPA. It needs to focus on attracting funding, building links with key networks,

### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitriy S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org

---

maintaining a clear goal of providing quality information to scientists and the public at a one stop shop.

## 6. Reporting strategy: Feed in international networks

Initial discussion:

- Discussion about the scientists ('the underground') involvement in GTN-P.
- The WMO case: Creditability factor. Solid scientific ground. Establish similar mechanism for GTN-P.
- GTN-P has to be supported by the nations. The international organizations are not funding bodies. May help establish links to resource mobilization bodies.
- What should be done in order to establish incentive? An international body can help to make the nations accept scientific activities.
- It should also be noted that only part of the scientific work contribute to the ECVs and GTN-P. A principle should be to use a measurement as well as possible, but not limit to present days scientific questions.
- How can GTN-P be so attractive that 'everybody' wants to be a part? A driving force is that funding organizations today request that data feed into international organizations like GCOS.
- The community says what must be done – not the other way around

1. Question: Should the reporting system be aligned with an international program(s)/organization(s)? What are the benefits in doing so?

- Answer: Through GCOS/GTOS, GTN-P already is aligned.

2. Question: Should there be more direct interaction between GCOS/TOPC and GTN-P?

- Answer: Has not been strong in the past. GTN-P can develop/serve as this.

3. Question: Should IPA/GTN-P be a lead permafrost contributor to development GCW (Global Cryosphere Watch). How can GCW help GTN-P?

- Answer: For further consideration. A reporting case – the process can be started.

4. Question: Can WMO and its programs help to develop and sustain the 'new GTN-P'.

- Answer: Yes

5. Question: Should open data access and sharing be fundamental principle of GTN-P not only for research but also for everyone. What should be the acceptable 'delay' for submitting data to GTN-P. What will motivate the scientific community?

### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitriy S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org

- Answer: A one year delay for submitting, and a one year delay for publishing can be a solution. Is often linked to requirements of the funding programs. A 'clearing house' could be a solution. Citation aspects were discussed. Strive for open data access. A culture shift, that takes time.

6. Question: Can GTN-P contribute to development of guidelines and standards of measurements required by some international organizations – this impacts the many international projects that contribute GTN-P data.

- Answer: Yes: Question: Could GTN-P meet ISO standards - does it need it? Answer: Strong resistance. ISO standards are all about processes, but not something about where and how. GTN-P should establish their own guidelines/standards. In national programs, the use of international standards is often a requirement. A task for GTN-P.

7. Question: Should GTN-P move from largely voluntary basis to a more sustained, operational basis.

- Answer: For further consideration. A solution is to link this to other programs (e.g. MET stations). Sustainability is related to funding. GTN-P is a SAON task. An approach is to consider the scientific basis: Do the few things that can be done well and with good quality. International organizations can help the sustainability process by making reference to the long-term aspects. It is a strength that individual research sites are linked together. GTN-P will demonstrate that there is still a value of working together – "institutional memory". The mechanism of support letters by WMO could be a model for inspiration. A similar case was described for GCOS. GTN-G could serve as a model for inspiration.

8. Question: Should GTN-P work with GCW in establishment of new reference sites, including establishment and standards.

- Answer: Yes – not necessarily in the context of GCW – but in general. 'Reference' is a powerful term - a valuable outcome of GTN-P.

## 7. Implementation: Management structure

This discussion revolved around a number of key areas, particularly the makeup and shape of the executive and the role of the National Correspondent.

Executive makeup

- First, an alternate name was proposed (consistent with GTN-G) for the executive committee. Should it be a Scientific Advisory Board
- What is the role of the IPA in the executive of GTN-P
  - First it was agreed that the IPA and GTN-P are closely linked, with GTN-P seen as being integral and essential to IPA working, but not the only part of the

### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitriy S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org

- 
- IPA's work. Therefore election of the executive should come from within the network, via a nomination process, rather than being dictated by the IPA
- In the GTN-G, the relationship between the network and their governing body is as follows
    - A member of the governing body executive chairs the GTN-G executive committee
    - The advisory panel is derived from the scientific community
    - The advisory panel is small, 5 members
    - They have an Executive Board that is equivalent to the secretariat
  - The IPA executive was suggested as being the body that approves nominations to the GTN-G executive. Nominations for the executive should come from within the GTN-P community.
  - It was suggested that the Chair of GTN-P should sit, ex-officio on the IPA executive. This way there are no issues of governance (i.e. the GTN-G chair influencing GTN-G executive nominations).
  - An issue was proposed that there may be a problem of dual governance with GTOS and GCOS, Han suggested that this would not be the case.

#### What is the role of the national contact?

- To coordinate and collect permafrost data
  - It was questioned whether the coordinator needed to be directly involved in the uploading of data or whether they should be facilitating this process
  - It was agreed that the uploading of data should be handled by those who collect it as they are best equipped to do it. This would minimise the burden of time on the national coordinator.
- This person needs to interface with the whole community, should be a good person
- Should the coordinators only be interested in coordinating data or publications as well?
- The coordinator role also requires an element of reporting to the secretariat
- The role also needs to involve coordinating between different agencies within a country.
- National networks
  - These will likely be the source of national coordinators
  - They should be utilized in the best way possible.
- Lessons from PERMOS
  - Much of the work of the secretariat is in coordination of the network (i.e. making sure that everything is running continuously), the national coordinators should eliminate the pressure on the secretariat by overseeing parts of the network and acting as points of contact

#### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitriy S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

#### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org

- There should be a carrot so that there is an advantage for submitting material to GTN-P, there should be a clear citation/publication/letters of support for funding bodies that national coordinators can use to encourage submission
- How much time would you like a national correspondent to spend on their work vs how much time this person is likely to have.

How would you nominate the national contact?

- There was discussion about the role of GTOS/GCOS and the IPA. As discussed above, it was thought that the IPA should have governance over the National Correspondents
- There was discussion as to whether the Correspondents should only be from countries that have permafrost or countries with a scientific interest in permafrost.
  - The argument for permafrost countries only being involved is that it would be possible to facilitate and coordinate activities within a single country.
  - The argument against, is that it may isolate some scientists/funding agencies from countries that work in permafrost areas but don't have permafrost.
- The network is seen as a bottom up process, therefore it was seen that individual countries should be left to nominate their own national correspondent. Each country has their own specific issues with this process and it was viewed as easier to let each country deal with it in their own way rather than imposing a single method on all.
- GCOS is not in a position to nominate national contacts, this should be done within the network.
- How do CALM and TSP fit into this governance structure? They coordinate between many countries so do not necessarily fit into the National Correspondent structure.

Some of the wording regarding National Correspondents in the working document may need revising

- "They should be approved by the committee" maybe this should be removed
- "Shall maintain tight contacts with institutions..." maybe shall should be replaced with "must try" or "the objective is"

## 8. Implementation: Feeding data to a central database

1. The database created by the GTN-P needs to be durable, manageable, user-friendly and must be able to adapt to changing technologies. These are the main goals in the development period of the database. Members should take an active part in the development of the database and should voice their opinions on what they would like to see.
2. The database should follow a set of data standards.
3. If it possible the database should be connected to (or at least linked to) other key databases (e.f. NORPERM, CALM, PERMOS etc.).

### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitriy S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org

- 
4. Initially the database will use a method of uploading the data in a preformatted excel file, following the guidelines set forth by the contributors. If this method is accepted and works well then it may be continued. However another suggestion was to have the uploading template online, allowing the options to be chosen and the data submitted. This will need future discussion.
  5. The database system should be setup in a logical fashion (e.g. DUE database structure) moving from large scale regions to small scale sites. It would be left to the EC to come up with the classification of what the larger regions are.
  6. Initially the site will be written in English. If possible and funding allows, the site can be developed in other languages.

#### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitriy S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

#### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org

---

## Program

The program of the workshop is provided below.

### Thursday 10 November

Lecture Room, AWI Building A43

- 09:00-09:30 Registration
- 09:30-10:30 Plenary Morning Session 1 – Chairs: *Hanne Christiansen, Hans-Wolfgang Hubberten*
- 10 min. Welcome address by the IPA president – *Hans-Wolfgang Hubberten*
- 10 min. Introduction to IASC and activities of the IASC Cryosphere Working Group – *Georgia Destouni*
- 15 min. Status of permafrost data before and after the IPY – *Vladimir Romanovsky and Nikolay Shiklomanov*
- 15 min. Presentation of GTN-P Strategy and Implementation Plan – *Hanne Christiansen*
- 10 min. PAGE21 data management system and support for GTN-P – *Hugues Lantuit and Halldor Johansson*
- 10:30-11:00 Coffee Break
- 11:00-13:00 Plenary Morning Session 2 – Chair: *Hugues Lantuit*
- 10 min. GTN-G and WGMS: Lessons learnt and advice for GTN-P – *Michael Zemp*
- 10 min. Global Cryosphere Watch and GTN-P – *Barry Goodison*
- 70 min. Regional and national reports from national representatives- *All – 4 mins. each*

Trombotto	Dario	Argentina
Kellerer	Andreas	Austria
Lewkowicz	Toni	Canada
Jin	Huijun	China
Schoeneich	Philippe	France + PERMANET
Krautblatter	Michael	Germany
Guglielmin	Mauro	Italy
Ishikawa	Mamoru	Japan
Duishonakunov	Murataly	Kyrgyzstan
Ishikawa	Mamoru	Mongolia
Van Huissteden	Ko	Netherlands
Mertes	Jordan	Norway
Przybylak	Rajmund	Poland
Abramov	Andrey	Russia
Romanovsky	Vlad	Russia
Delaloye	Reynald	Switzerland
Johansson	Margareta	Sweden
Hales	TC	UK
Nelson	Fritz	USA

#### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitriy S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

#### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org

Dolman	Han	TOPC/GCOS
Topp-Jorgensen	Elmer	INTERACT
Guglielmin	Mauro	ANTPAS
Mertes	Jordan	NORPERM + DEFROST
Heim	Birgit	ESA DUE PERMAFROST
Nötzli	Jeannette	PERMOS

13:00-14:00 Lunch Break

14:00-14:15 Plenary Afternoon Session 1 – Chair: *Vladimir Romanovsky*

14:15-15:30 Breakout Sessions 1

Permafrost temperature: Product definition – Chair: *Vladimir Romanovsky*

Active Layer depth: Product definition – Chair: *Nikolay Shiklomanov*

15:30-16:00 Coffee Break

16:00-17:00 Breakout Sessions 2

Permafrost temperature: Format definition – Chair: *Gerhard Krinner*

Active Layer depth: Format definition – Chair: *Dmitry Streletsy*

### Friday 11 November

Lecture Room, AWI Building A43

09:00-09:30 Plenary Morning Session 1 – Chair: *Jeannette Noetzli*

Reports from Day 1

09:30-11:00 Breakout Sessions 3

Reporting strategy: Timing and products – Chair: *Hugues Lantuit*

Reporting strategy: Feed in international networks – Chair: *Barry Goodison*

11:00-11:30 Coffee Break

11:30-13:00 Breakout Sessions 4

Implementation: Management structure – Chair: *Vladimir Romanovsky*

Implementation: Feeding data to a central database: *Hugues Lantuit*

13:00-14:00 Lunch Break

14:00-15:30 Plenary Afternoon Session 1 – Chair: *Hanne Christiansen*

Summary from morning breakout sessions and open discussion

15:30-16:00 Coffee Break

16:00-17:00 Joint meeting of the GTN-P and IPA Executive Committees (closed meeting)

#### EXECUTIVE COMMITTEE

President:  
Prof. Hans-Wolfgang Hubberten  
Vice-Presidents:  
Prof. Hanne H. Christiansen  
Prof. Antoni G. Lewkowicz  
Members:  
Dr. Dmitriy S. Drozdov  
Prof. Vladimir E. Romanovsky  
Prof. Ma Wei

#### INTERNATIONAL SECRETARIAT

Dr. Hugues Lantuit  
Alfred Wegener Institute for Polar and Marine Research  
Telegrafenberg A43  
14473 Potsdam, Germany  
Tel: +49-331-288-2216  
Fax: +49-331-288-2122  
contact@ipa-permafrost.org  
www.ipa-permafrost.org