



## *Action Group:*

### **A Frozen-Ground Cartoon: Explaining international permafrost research using comic strips**

#### **Date:**

01 February 2016 to 31 January 2018 (2 years)

#### **Action Group Contact:**

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#### **Objectives and scope of the Action Group:**

##### **Background:**

More than twenty million square kilometres. That is a huge area. And that is the land surface occupied by permafrost in the Northern Hemisphere. Large stocks of carbon are actually stored in frozen ground. These stocks could be released to terrestrial and aquatic ecosystems through permafrost thawing and erosion, with a significant impact on global climate via greenhouse gas emissions.

So this should be a concern for everyone at the global scale, right?

Well, apart from people in northern communities and a small – although steadily growing – scientific community, the general public knows very little about permafrost properties, its dynamics in response to climate change, and the research going on in the field. We want to address this by making permafrost science accessible to kids, youth, their parents and teachers. We propose a 100% outreach-related project that aims at 'Fostering permafrost research to the ends of the Earth' (<http://ipa.arcticportal.org>), but with a casual approach via a series of comic strips.

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## Objectives:

The main objective is to present permafrost research conducted in the field with thematic comic strips. Specific objectives include:

- Developing outreach activities in permafrost research ('coming soon' on the IPA website)
- Presenting permafrost research from the perspective of early-career scientists;
- Providing a scientific 'product' that is useful for educational outreach worldwide;
- Contributing to the recruitment of the 'next generation' of permafrost researchers.

## Significance:

We sense that outside academia, permafrost research could be better understood by the general public, particularly policy-makers and younger generations. A few initiatives of communicating science, promoting research priorities, and working with local communities have recently emerged (Tondou et al., 2014; Callaghan and Savelle, 2015; Fritz et al., 2015). There have also been some inspiring outreach initiatives targeted at the general public, such as the Tunnel Man (K. Yoshikawa). Cartoons are excellent ways to communicate messages in today's media landscape: they are graphic, funny and direct, and can rapidly be shared via social media to reach many people. Our outreach project targets the general public, focusing on young students who have to choose career paths at the high school or college levels. By introducing them to permafrost research activities, particularly fieldwork, our 'Frozen-Ground Cartoon' will enhance the dissemination of permafrost knowledge and broaden the international community of permafrost 'lovers'.

## Steps:

The project will be chaired by Frédéric Bouchard, and the scientific aspects will be coordinated by a core group of Permafrost Young Researchers (YRs) from Canada, Germany, Sweden, and Portugal. The drawings will be realized by a team of 2-3 artists from Montréal (Canada), with inputs from the Action Group members.

The first step will be to gather the basic ideas for the main characters, action places, and comic-strip themes. This will be done by the Scientific Core Group, in collaboration with the artists. A series of 'scientific inserts', giving more details about chosen concepts and methodologies, will be drafted at this step to accompany each thematic story.

The second step will be the drawing process itself, completed by the artist team and inspired by the scenario ideas generated earlier. This will be an iterative process, with feedback from all the Action Group members. Pieces of text will be written and inserted along these drawn 'working drafts'. A side meeting will be organized before/during ICOP 2016, during which the working drafts will be reviewed and enhanced by comments/suggestions from everyone present.

The third step will be to compile, correct and edit text and drawings. This will be done by the artists, with help from anyone interested. Final proofs will be circulated among the Action Group members. A special 'prerelease' event could be organized during the AGU Fall Meeting in December 2016.

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The fourth step will be to release the comic strips, both electronically and on paper media. We aim to provide a full series of comics that can be offered to newspapers, magazines, schools and different popular science media. All generated material will be released under a creative commons licence (CC) and made available to the public.

**Benefits:**

Our comic strips will be disseminated through our national/international research networks (ADAPT, PAGE21, PYRN, APECS). We will contact local high school teachers and librarians to involve their students. We will also use existing social media channels (Facebook and Twitter) of our supporting networks. Our primary outcome will be educators and a generation of future scientists possessing basic knowledge of permafrost science, in addition to their present education in traditional scientific disciplines (e.g., physics, chemistry).

**Timeline:**

Step 1 (development of story plot, preliminary texts) = February to April 2016  
Step 2a (drawing, main characters/places, thematic strips) = April to June 2016  
Step 2b (draft review) = Late June 2016 (before/during ICOP 2016)  
Summer break (field work, holidays) = July-August 2016  
Step 3a (compilations, corrections, proof reading) = September to December 2016  
Step 3b (prerelease special event) = December 2016 (before/during AGU Fall Meeting)  
Step 4 (publishing, writing of reports for sponsors) = January 2017 to January 2018

**Deliverables:**

There is one main deliverable, fully dedicated to education and outreach: a series of comic strips presenting permafrost research across the circumpolar regions. These will be disseminated as: a web site, on social media, and in the form of posters and graphic novel magazines for schools and libraries. If additional funding can be leveraged (e.g., APECS), reports to the sponsors will be written during the second year of the project (Jan. 2017 – Jan. 2018).

**Support of Interest groups:**

This project is supported by the IPA Standing Committee on Education and Outreach, chaired by Dr. Kenji Yoshikawa

We also have the support from the following YR networks:

- Permafrost Young Researchers Network (PYRN) - Michael Fritz Association of Polar Early Career Scientists (APECS) – Ylva Sjöberg
- ADAPT Early Career Researchers Association (AECRA) [ADAPT: Arctic Development and Adaptation to Permafrost in Transition] – Ashley Rudy

Note that these YRs are also members of the Scientific Core Group (see below).

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### **Other Action Group Members:**

Our proposed Action Group brings together YRs and artists from 4 different IPA member countries: Canada, Germany, Sweden, and Portugal. All the scientists in this project (except a special 'external senior advisor', see below) are young researchers involved in one or more international network(s).

#### Scientific Core Group:

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External senior advisor:

- Harbor, Jon; jharbor@purdue.edu; Dept. of Earth, Atmospheric, and Planetary Sciences, Purdue University, West Lafayette IN, USA.

Jon Harbor is a Professor and award-winning teacher at Purdue University, USA. He has over two decades of experience in multiple countries working to bring research and researchers to teachers, children, and the general public in ways that enhance broader understanding of science and its methods and implications. As an 'external senior advisor' in this project he will provide advice and help facilitate discussion.

### **International dimension:**

The Scientific Core Group includes YRs from 4 different countries in Europe and North America, which conduct permafrost research in Canada, Russia, Scandinavia, and Antarctica. The YRs forming the Group are all members of one or more international networks of permafrost scientists (PYRN, APECS, PAGE21 in Europe, and/or ADAPT in Canada). Most of them have already collaborated during the past two years for organizing international networking meetings and a brief communication paper highlighting the priorities for permafrost research in the future from an early career perspective (Fritz et al., 2015).

### **Cited references:**

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