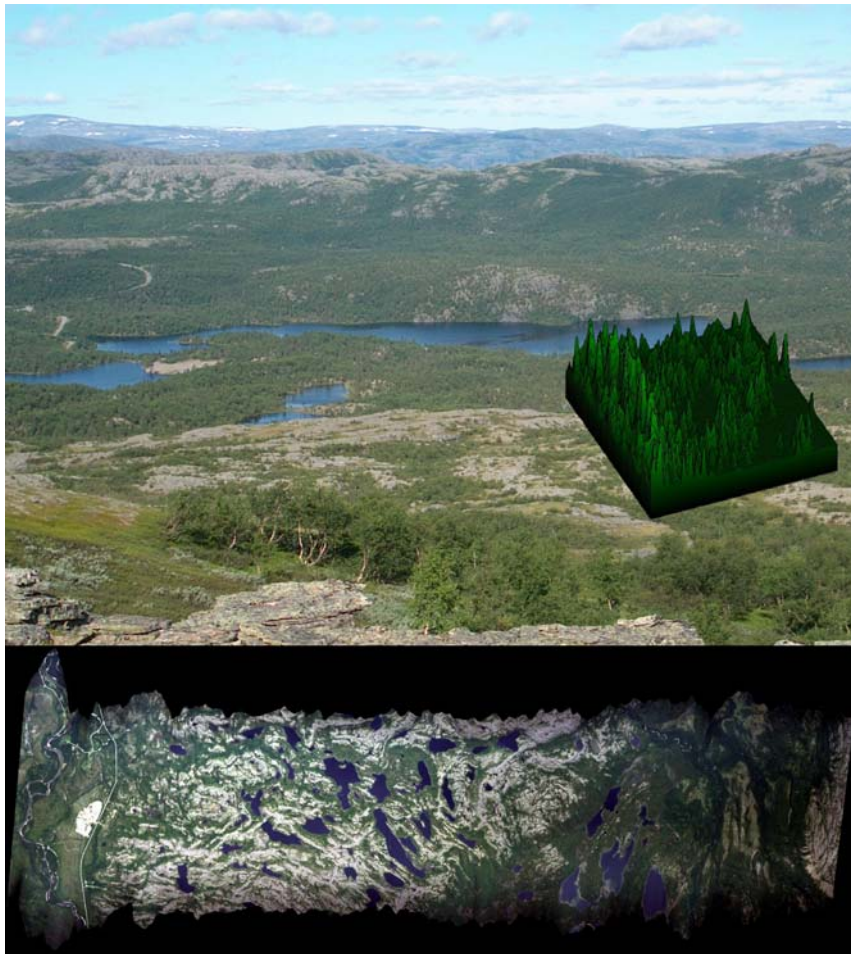


Tundra-Taiga Interface (TTI) – Annual Report 2006



Summary

The Tundra – Taiga Interface (TTI) is a project of the International Arctic Science Committee (IASC) dedicated to understanding the dynamics of the interface between the arctic tundra and the boreal forest in relation to global change.

Scientific background

The position and dynamics of the arctic-boreal boundary are major determinants for land atmosphere interactions at the circumpolar scale and for ecological and socioeconomic conditions at the local to regional scale. This zone, the ‘tundra-taiga ecotone’ varies dramatically in width (up to hundreds of kilometres) throughout the circum-arctic North and has thus a recognized exceptional importance, in terms of global vegetation, climate,

biodiversity and human settlement. The area covered by the tundra-taiga ecotone is compared with the area covered by Arctic sea ice and the circum-arctic zone of isolated to continuous permafrost, to which the ecotone has strong links. Position and response pattern to climate change varies strongly between oceanic and continental regions around the circum-arctic. The particular vulnerability of the zone to changes in climate and land use is recognized, along with concern for subsequent alterations and shifts of its position with consequences for the entire arctic region and the global climate through feedback mechanisms. Despite this recognition, comprehensive and large scale multidisciplinary scientific focus incorporating cause, effect, and importance of its past and present transformation to the biota and human societies, has been lacking.

Overview of scientific content

This multidisciplinary research field of TTI is in focus in the International Polar Year core project *PPS Arctic* (**P**resent day processes, **P**ast changes, and **S**patiotemporal variability of biotic, abiotic and socio-environmental conditions and resource components along and across the **Arctic** delimitation zone) and scientifically dealt with through four project modules: Global change effects on the arctic-boreal transition zone and modelling structural changes; Past history and broad-scale temporal variations of the transition zone; Classifying vegetation, land cover and land use, and their spatial variations, by remote sensing and landscape analysis; Land use and development of the Arctic-Boreal transition zone through the joint perspective of local traditional and scientific knowledge. The project currently includes 13 individual projects (more might be added en route towards the start of IPY). Unifying foci for projects and modules are: *Space* – the transitional zone between the boreal forest and the open treeless tundra; *Time* – the Holocene, the present and the next 100 years; *Scope* – interdisciplinary research, monitoring change, and sustainable resource use.

Objectives

- review and collate relevant existing research effort, expertise and programs
- bring researchers together in international workshops and conferences
- assess the state of knowledge at these meetings
- establish communication and networking between interest groups
- identify and prioritize relevant research and research consortia
- implement top priority projects

- publish reviews of the current knowledge

Work programme

The project was initiated in 1999 with the main aims to *i)* review and collate relevant existing research effort, expertise and programs; *ii)* bring researchers together in international workshops and conferences; *iii)* assess the state of knowledge at these meetings; *iv)* establish communication and networking between interest groups; *v)* identify and prioritize relevant research and research consortia; *vi)* implement top priority projects; and *vii)* publish reviews of the current knowledge. The results of the initial workshop, held in Abisko, were published in an *Ambio* volume in 2002: “*Dynamics of the Tundra-Taiga Interface*” (Report 12). In 2004 the direction of the project shifted from collating and synthesizing new knowledge to identifying and initiating priority research activities, with the science plan and implementation plan as central tools. At the start-up of activities directed towards the International Polar Year (IPY) the circumpolar and interdisciplinary approach of TTI and its focus on the southern delimitation zone of the Arctic formed the platform for a proposed IPY core project: *PPS Arctic* (#151, endorsed by IPY JC in November 2005).

Results and achievements

Achieved funding

Major funding applications have been made through national IPY calls in Canada and Norway, and the outcome of the Canadian call is awaited, and in Norway the project is funded with 9000 kNOK. The national IPY call in the UK predated the IPY JC's endorsement decisions so no funding application was possible in the UK. However, support in kind totalling £66,770 was obtained from the Airborne Research and Survey Facility (ARSF) of the UK natural Environment Research Council (NERC) to acquire airborne remote sensing data from experimental sites in Norway in 2004 and 2005. Funding for the TTI steering group during the period 2000-2006 has been provided by IASC.

Field activities

NERC ARSF remote sensing data were collected from four research sites in northern Norway in 2004, with simultaneous fieldwork on the ground. A repeat campaign in 2005

collected high-resolution LiDAR data from two of the sites, at Porsangmoen and Lakselv. These data will allow the three-dimensional structure of forest edge regions to be quantified at high resolution.

Publications

List under construction

Project workshops

Meetings of the TTI steering group were held in Québec (2001), Edinburgh (2002), Tromsø (2003) and Helsinki (2004). In February 2006 a meeting was held in Québec at which the IPY project PPS Arctic, and its Canadian subcomponent, were formally inaugurated.

Presentations at recent international conferences

- The IASC project "Tundra-Taiga Interface towards the future" was presented with a poster and the theme of a special meeting during the ICARP II meeting in Copenhagen, 10-12 November 2005.
- Links and collaboration possibilities between PPS Arctic and ITEX during IPY were presented at the 13th ITEX Workshop, Miami 13-15 January, 2006.
- Overview and future plans of TTI were presented at the IASC Council Open Session and at the International Permafrost Association IPY meeting during the ASSW in Potsdam 22-29 March 2006.
- The principles of PPS Arctic, and some of the preliminary results from the airborne remote sensing campaigns in Norway, were presented at the 9th Circumpolar Remote Sensing Symposium, Seward, Alaska in May 2006.
- The concept of PPS Arctic and possible links to other terrestrial IPY core projects were presented at the "Terrestrial ecosystems in Arctic and Antarctic: effects of UV light, liquefying ice, and ascending temperatures (TARANTELLA; core project #59)" workshop 9-11 October 2006 in Rilland, The Netherlands.

Other relevant information

TTI is planned to be part of Working Group 8 of ICARP II.

Contact information

Projects leaders

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Members of steering committee

During the IPY period the steering committee is identical to the board of *PPS Arctic*: Dr Annika Hofgaard (leader), Dr Gareth Rees (co-leader), Dr. David Cairns, Texas A&M University, US; Dr. Nancy Doubleday, Carleton University Ottawa, Canada; Dr. Karen Harper, Dalhousie University, Canada; Prof Bjartmar Sveinbjörnsson, University of Alaska Anchorage, US; Dr Tatiana Vlassova, Russian Academy of Science, Moscow, Russia.

Young scientists involved in the project

Dr. Karen Harper, Canada, was in 2005 invited on the IASC Young Scientist program and has since then taken on the responsibility for and construction of the Canadian project part *PPS Arctic Canada*. She has also become a member of the steering committee.

Link to project website

Under construction