

PUB Working Group 16 (WG16): IP3 - Improved Processes and Parameterisation for Prediction in Cold Regions

Objectives:

IP3, supported by the Canadian Foundation for Climate and Atmospheric Sciences, was established with the following objectives:

- Improve understanding of key climate system processes relating to the hydrometeorology of cold regions
- Improve the parameterisation of land surface hydrology processes controlling the coupled atmospheric-hydrological system in cold regions
- Validate and improve models for weather, water and climate systems, leading to better prediction and simulation of related atmospheric impacts on water resources and surface climates in cold regions.

The IP3 working group has improved understanding of - and tested advances in - atmospheric and hydrological prediction in cold regions in a set of instrumented research basins along a transect of Canadian high latitude and high altitude landscapes. The Group focuses on advancing understanding and quantitative characterisation of land surface cryospheric hydrometeorological processes, and on improving the parameterisation and predictive capacity of atmospheric and hydrological models at small to medium scales in cold regions.

The primary subjects addressed by the Group through field investigations have included snow, open water, and frozen ground: these studies have been integrated by developing a comprehensive numerical description of processes acting on the complex land-cryosphere-atmosphere system.

Hydrological models used by the working group to test the new algorithms include the Cold Regions Hydrological Model (CRHM), and Environment Canada's MESH land surface hydrological model.

This approach cuts through the following PUB themes:

- Theme 2 - Conceptualisation of process heterogeneity
- Theme 3 - Uncertainty analysis and model diagnostics
- Theme 5 - New hydrological theory
- Theme 6 - New model approaches

Partners and user groups include a wide range of federal and provincial government agencies, representatives from power-generation and natural resources industries, conservation organisations and academic institutions.

Whilst IP3's interest focus on the Canadian context, strong international linkages for parameterisation and model intercomparisons have also been formed to Europe, China, South America and elsewhere.

IP3 forms part of the terrestrial cryosphere component of the Cryosphere-Climate Study CLiC, and is a major component of Canada's contribution to the International Polar Year (IPY) in 2007 and 2008. Two of the research basins are part of the North American Cordilleran Experimental Basins Transect. The Group is affiliated with the International Association of Cryospheric Sciences project on 'Intercomparison of Forest Snow Models' SNOWMIP2. International linkages have also been made through the International Hydrological Programme's Regional Working Group on Northern Research Basins (NRB).

More details are available from the [IP3 website](#).

Key Participants:

- **John Pomeroy**, University of Saskatchewan
- Sean Carey, Carleton University, Ottawa
- Masaki Hayashi, University of Calgary
- Phil Marsh, Environment Canada, Saskatoon
- Scott Munro, University of Toronto
- Alain Pietoniro, Environment Canada
- Bill Quinton, Wilfred Laurier University
- Christopher Spence, Environment Canada
- Diana Verseghy, Environment Canada