

# Identification of Changes in Flood Regimes in Canada Using a Peaks Over Threshold Approach

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## Research Summary

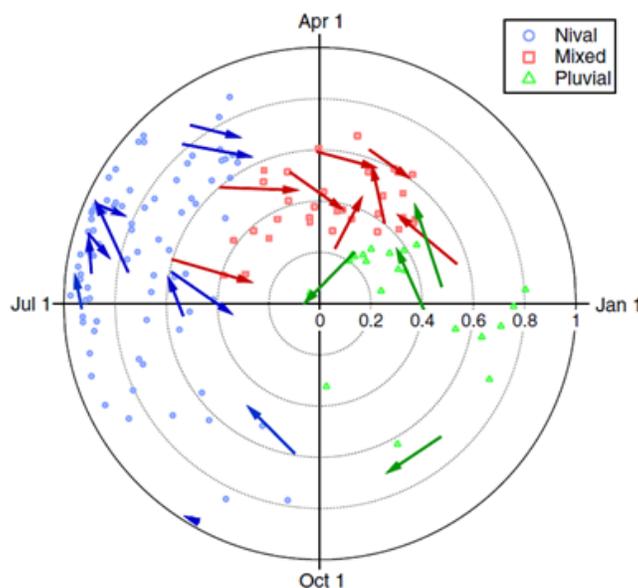
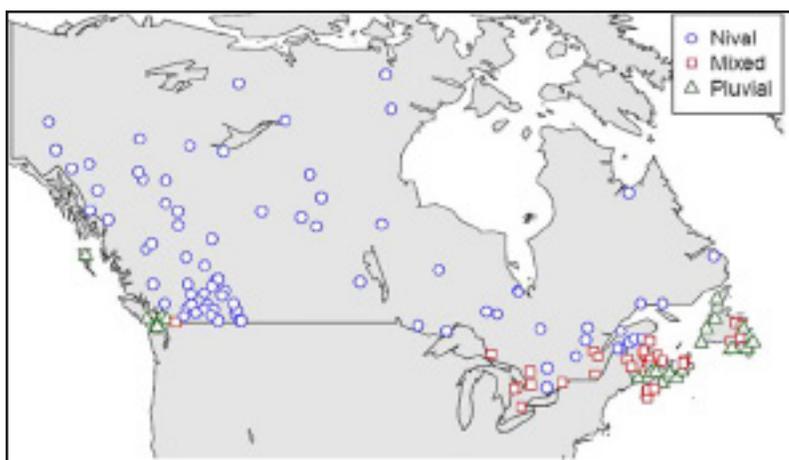
Recent flood events have led to speculation that changes in flood behaviour are occurring; these changes have often been attributed to climate change. This research, which is a part of Project 1-2, examines flood data for 132 gauging stations in Canada, all of which are part of the Canadian Reference Hydrometric Basin Network (RHBN). The RHBN stations are considered to have good quality data and were screened to avoid the influences of regulation, diversions, or land use change. Daily flow data for each watershed are used to derive a peaks over threshold (POT) dataset. Several measures of flood behaviour are examined based on the POT data. The changes in flood responses of the watersheds are summarized by grouping the watersheds by size (small, medium, and large) and also by hydrologic regime (nival, mixed and pluvial).

The results imply that changes have occurred to the flood regime in Canada, including:

1. smaller magnitude snowmelt events;

2. an increased number of over threshold events;
3. decreased importance of snowmelt events and increased importance of both rain on snow events and rainfall events;
4. a transition of nival catchments to a more mixed response; and
5. a transition of mixed flood regime to a more pluvial regime.

There are noticeable differences in trend response between the different hydrologic regimes (nival, mixed, or pluvial) but few differences related specifically to catchment size. There is also evidence of a shift in the flood regime in some catchments from nival to mixed to pluvial, reflecting a decreased importance of the spring freshet flood event. The observed changes in the flood regime, and changes expected to occur in the future, will require changes to flood management strategies in Canada.



Burn, D.H., Whitfield, P.H. & Sharif, M. (2016) Identification of changes in floods and flood regimes in Canada using a peaks over threshold approach, *Hydrol. Process.* DOI: 10.1002/hyp.10861.