

Changes in flood regimes as inferred from long record gauging stations

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Scope

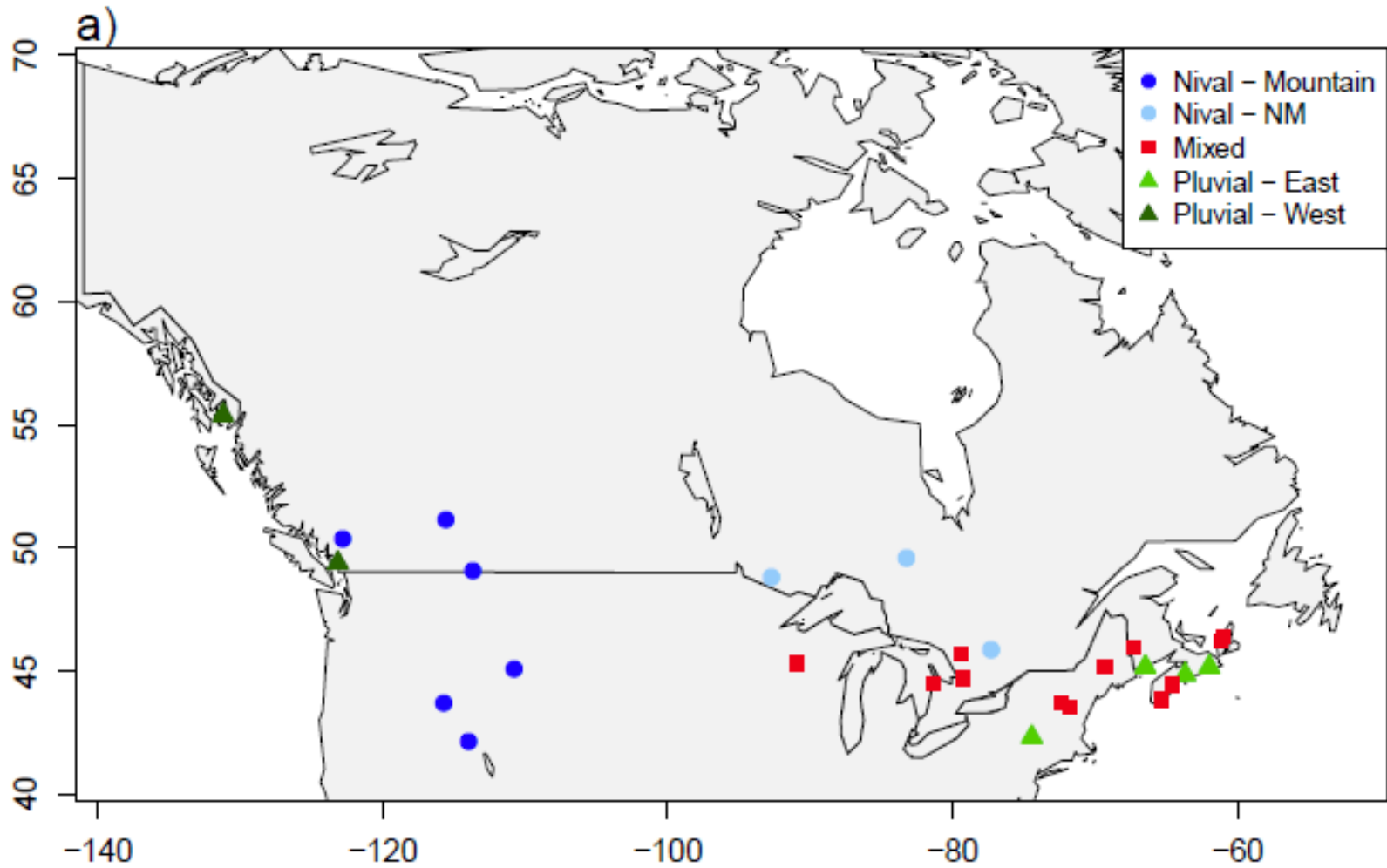
- Data from long term hydrometric reference streamflow gauging stations with a data record that spans most of the past century are used (1916 – 2015)
 - 18 reference sites are from the Canadian Reference Hydrometric Basin Network (RHBN) and 9 are from the U.S. Geological Survey (USGS) Hydro-Climatic Data Network (HCDN)
 - Stations were classified as nival, mixed, or pluvial

Methodology

- Series of interest (variables) were:
 1. Annual maximum exceedence magnitude;
 2. Annual average exceedence magnitude;
 3. Average date (day of year) of occurrence of exceedence events;
 4. Flood event volume;
 5. Number of annual threshold exceedence events; and
 6. Flood event duration.

Methodology

- Trend analysis was applied for the period of record for each site
- Flood quantiles and confidence limits were calculated separately for “early” and “late” subsets of the data
 - Similar process followed for negative and positive phases of PDO, AMO and SOI

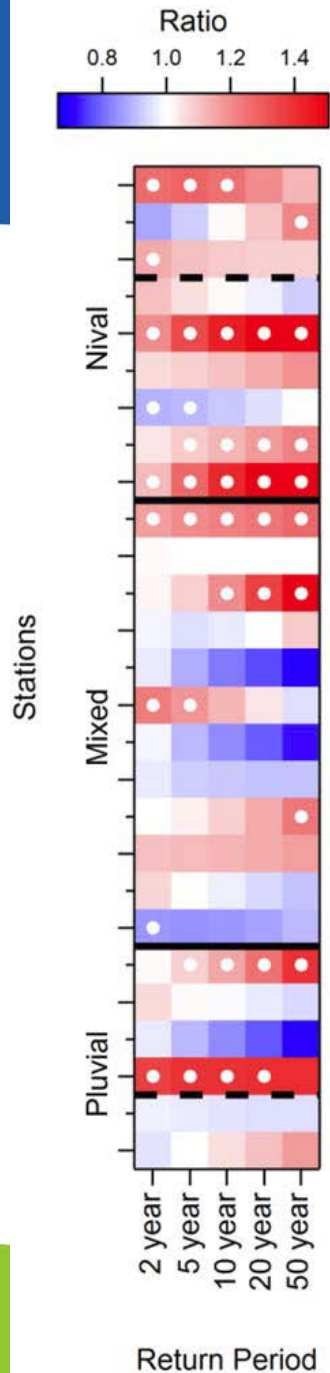


Percentage of significant **increasing** (**decreasing**) trends

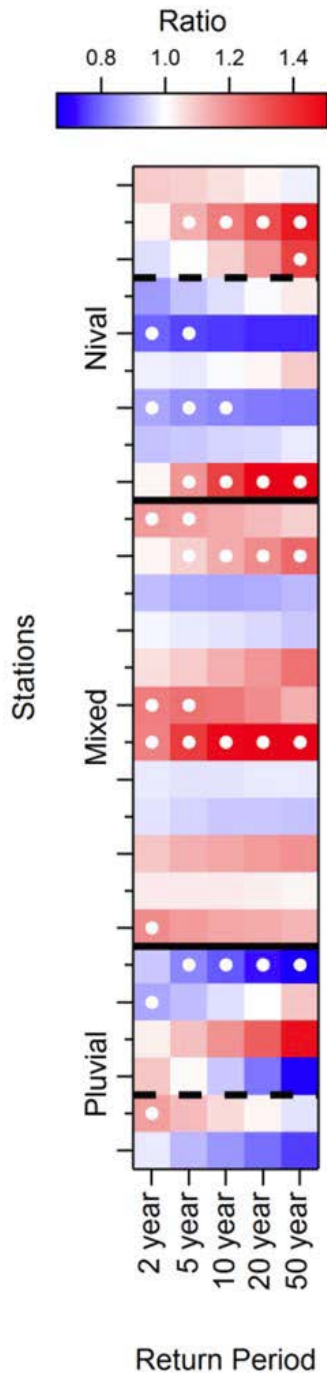
	All Sites (27)	Nival (9)	Mixed (12)	Pluvial (6)
Max Magnitude	7.4 (0.0)	<u>22.2</u> (0.0)	0.0 (0.0)	0.0 (0.0)
Ave Magnitude	7.4 (0.0)	<u>22.2</u> (0.0)	0.0 (0.0)	0.0 (0.0)
Occurrence date	0.0 (<u>18.5</u>)	0.0 (<u>22.2</u>)	0.0 (<u>25.0</u>)	0.0 (0.0)
Event Volume	3.7 (<u>18.5</u>)	0.0 (11.1)	8.3 (<u>16.7</u>)	0.0 (0.0)
Number events	<u>33.3</u> (0.0)	11.1 (0.0)	<u>50.0</u> (0.0)	<u>33.3</u> (0.0)
Event Duration	0.0 (<u>14.8</u>)	0.0 (11.1)	0.0 (<u>25.0</u>)	0.0 (0.0)

Entries in **bold underline** are field significant (10% level)

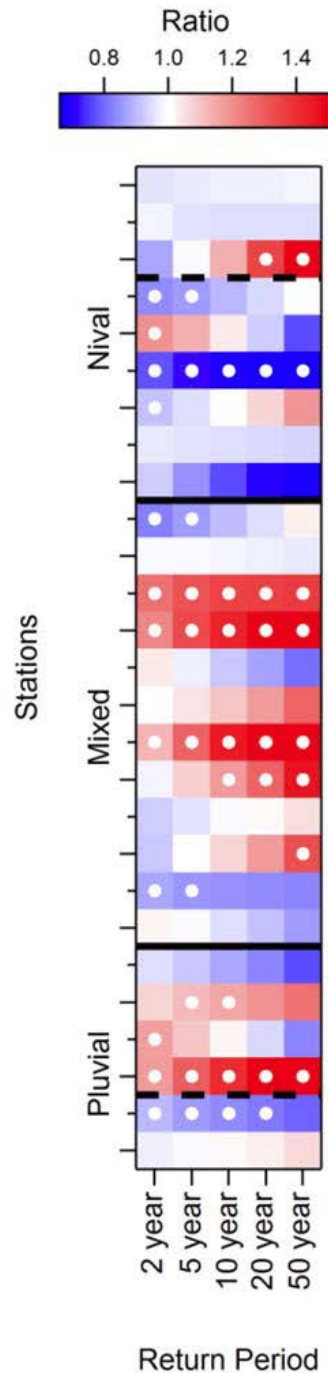
a) Temporal



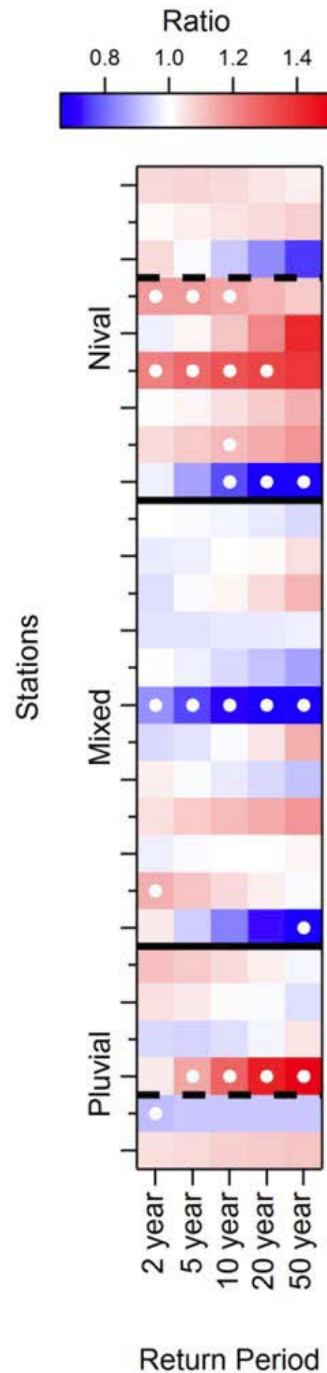
b) PDO



c) AMO



d) SOI



Conclusions

- Flood responses from 100 year period
 - Nival – generally increasing magnitude
 - Mixed – more events, changing average date as new events occur in different season
 - Pluvial – generally more events
- Longer return period floods in recent period are generally larger than earlier flood quantiles
 - Trend results not likely solely driven by teleconnections