



# Project 1-2

## Spatial and Temporal Variation of Extreme Events: Research Update



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# Outline of Research Results Obtained in The Past Year

**1)**

**Assessment of whether/how changes in extreme floods are occurring over time across Canada (D. Burn and collaborators)**

**Sites from across Canada were considered**

**Significant regional or local increasing or decreasing trends were identified**

**Rates of change during the period of record were quantified**

# Research Results (continued)

2)

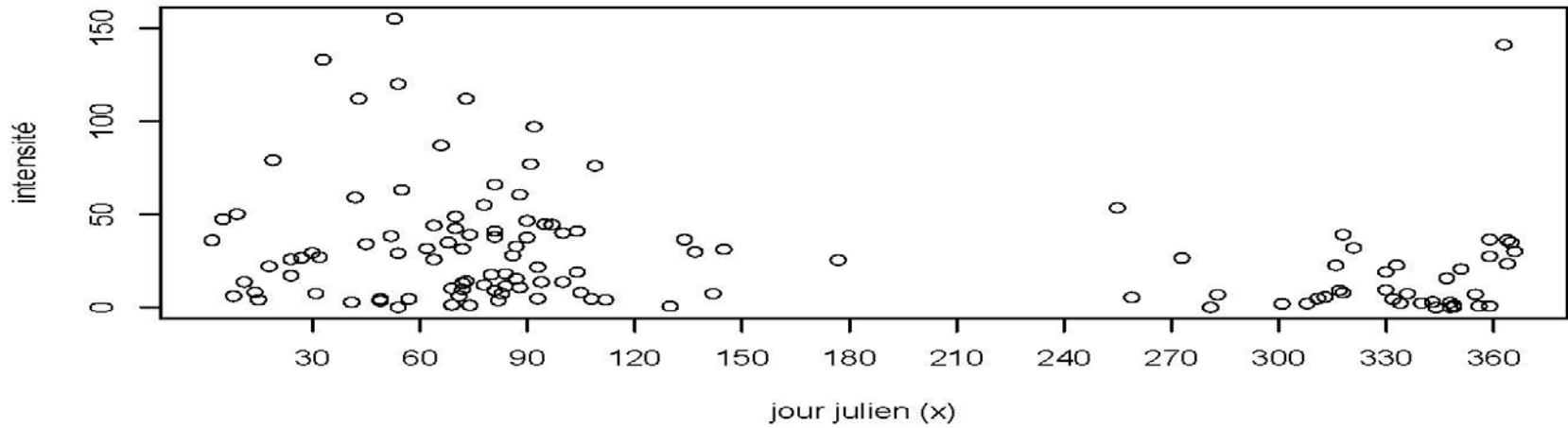
**Since non-seasonal flood models do not account for seasonal variability in flood characteristics, there is a need to identify geographical regions with distinct flood sub-populations.**

# Research Results (continued)

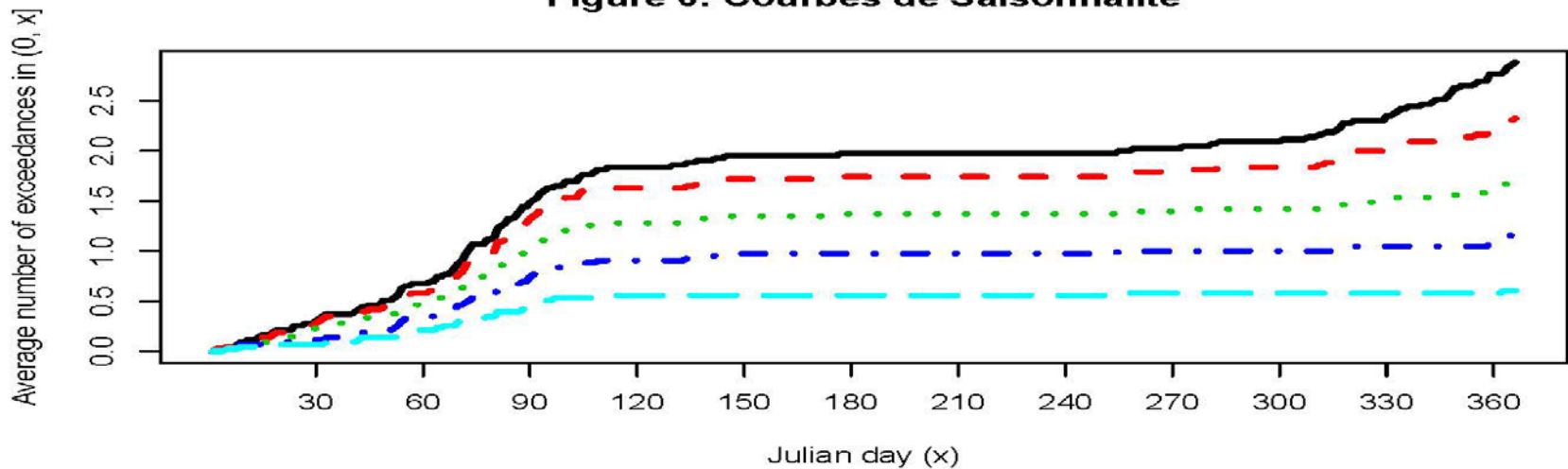
**From daily streamflow data at a site, we developed means of analyzing flood frequencies and their temporal distribution during the year.**

**This allows, using the peaks over threshold method, to get a seasonal portioning of the year**

**Figure 5: Diagramme de dispersion des crues**



**Figure 6: Courbes de Saisonnalité**



# Research Results (continued)

**3)**

**New results were obtained on the discrimination between statistical distributions for hydrological frequency analysis.**

**Specifically, discrimination between Gumbel and alternative models was studied, which confirmed some advantages of the Shapiro-Wilk statistic as a discrimination tool.**

# Example: Discrimination between Gumbel (GEV with shape parameter = 0) and GEV with shape parameter = 0.2

|             | Sample size n |        |        |        |        |        |
|-------------|---------------|--------|--------|--------|--------|--------|
|             | 10            | 20     | 40     | 60     | 80     | 100    |
| <b>RML</b>  | 62(4)         | 68(3)  | 78(2)  | 83(2)  | 87(2)  | 90(1)  |
| <b>TNSW</b> | 62(6)         | 69(4)  | 78(2)  | 84(1)  | 87(0)  | 90(1)  |
| <b>AD</b>   | 61(8)         | 68(6)  | 76(3)  | 82(1)  | 86(1)  | 88(0)  |
| <b>R</b>    | 60(6)         | 65(10) | 72(12) | 76(12) | 80(11) | 82(10) |

# In the coming year, we will attempt to:

- **Identify geographical regions with distinct flood sub-populations.**
- **Develop Seasonal models for these regions, which should be more appropriate than non-seasonal ones.**
- **Propose statistical homogeneity tests to evaluate the real need for seasonal modelling at a site or within a region.**



# In the coming year, we will attempt to (continued)

**Extend our discrimination research, which till now only included discrimination between 2-parameter frequency models, to include 3-parameter ones such as GEV, P3, LP3 and GLO.**

**Thank you!**