Project 1-2
Spatial and Temporal Variation of Extreme Events: Rsearch Update

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Outline of Results Obtained in The Past Year

1)

New results on the assessment of whether/how changes in extreme floods are occurring over time across Canada (D. Burn and collaborators)

This involves identification of regional or local increasing or decreasing trends and quantification of rates of change during the period of record

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Research Results (continued)

2)

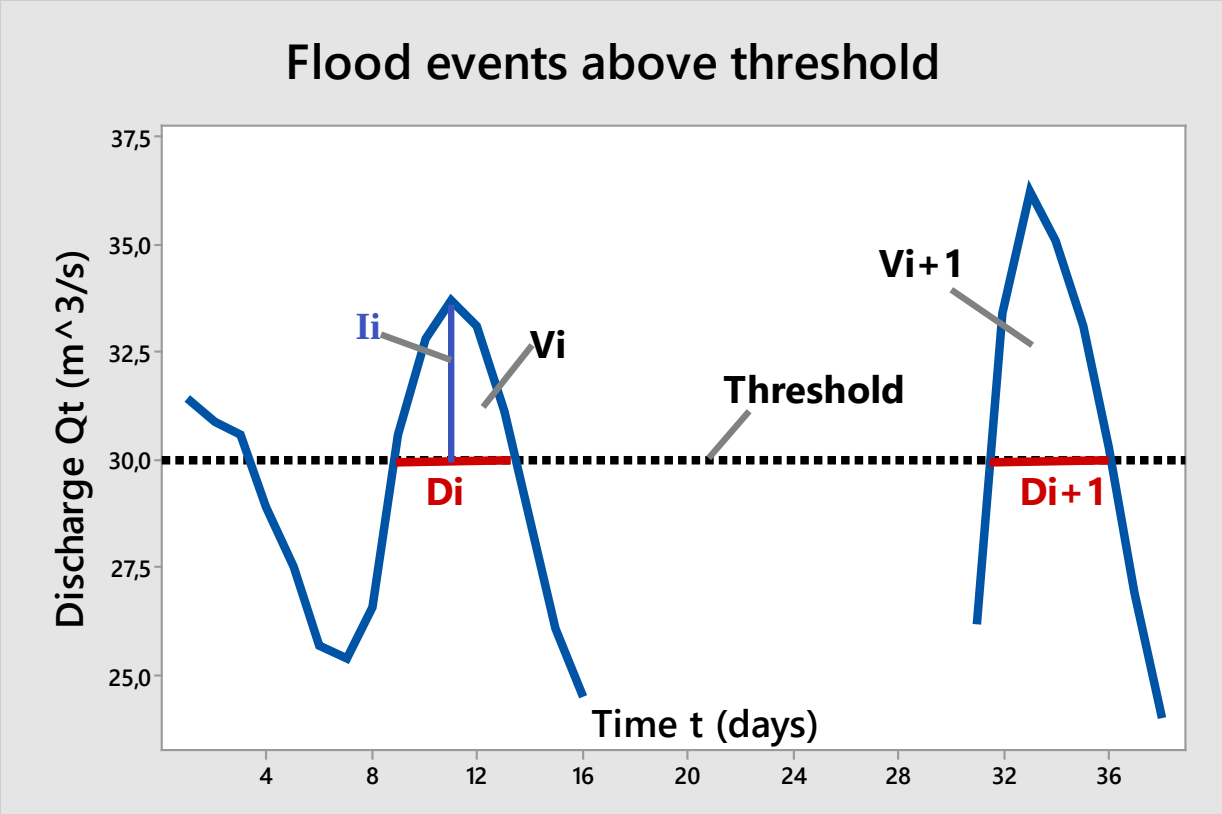
Non-seasonal flood models do not account for seasonal variability in flood characteristics, so there is a need to identify geographical regions with distinct flood sub-populations.

Research Results (continued)

Hence, 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

Research Results (continued)



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Research Results (continued)

- The objective is:
  1) To achieve a seasonal portioning of the year based on the time distribution of flood occurrences
  2) To assemble stations similar in flood seasonality into "homogeneous regions based on seasonality"

- A homogeneous region is characterized by:
  - The number of significant "seasons"
  - The dates of beginning and end of each season

- A Mann-Whitney homogeneity test is used to:

Confirm whether or not seasonal modeling is needed at a site

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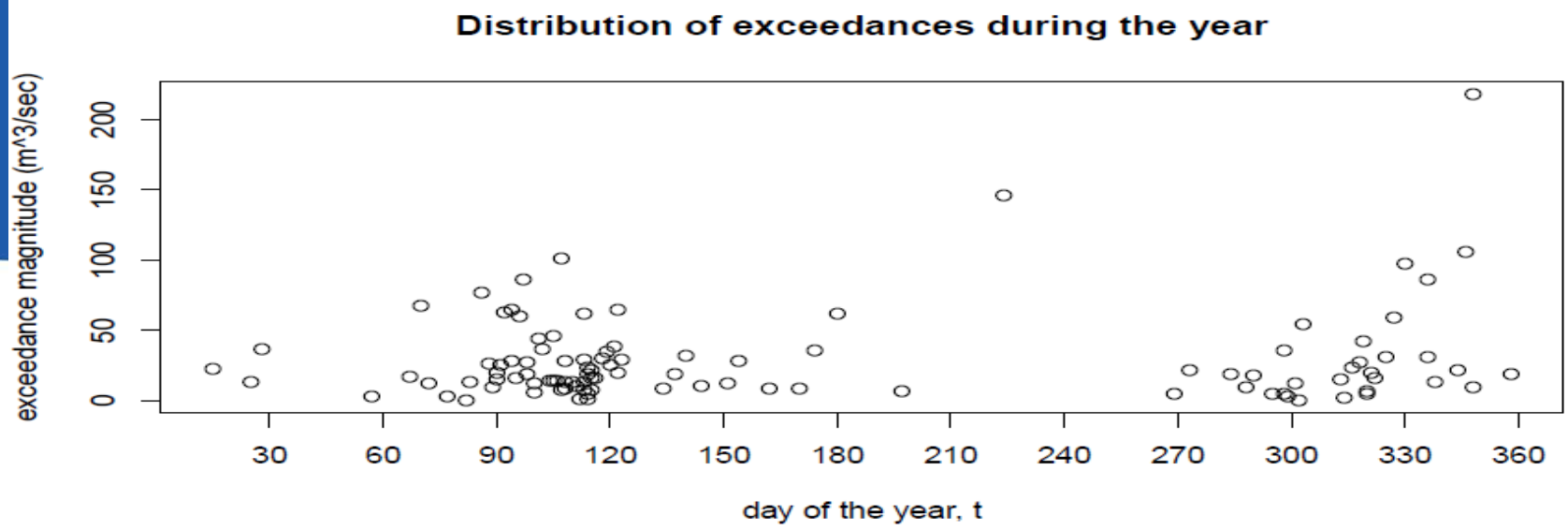

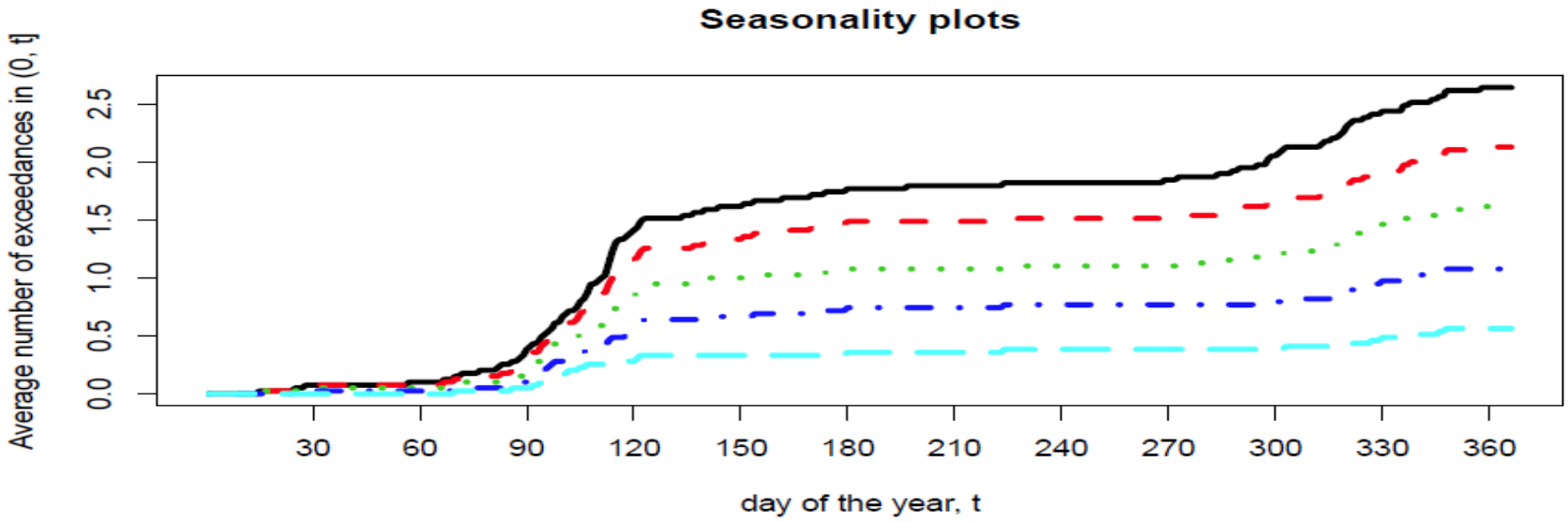

Hydrometric station 01AJ010 (New Brunswick)

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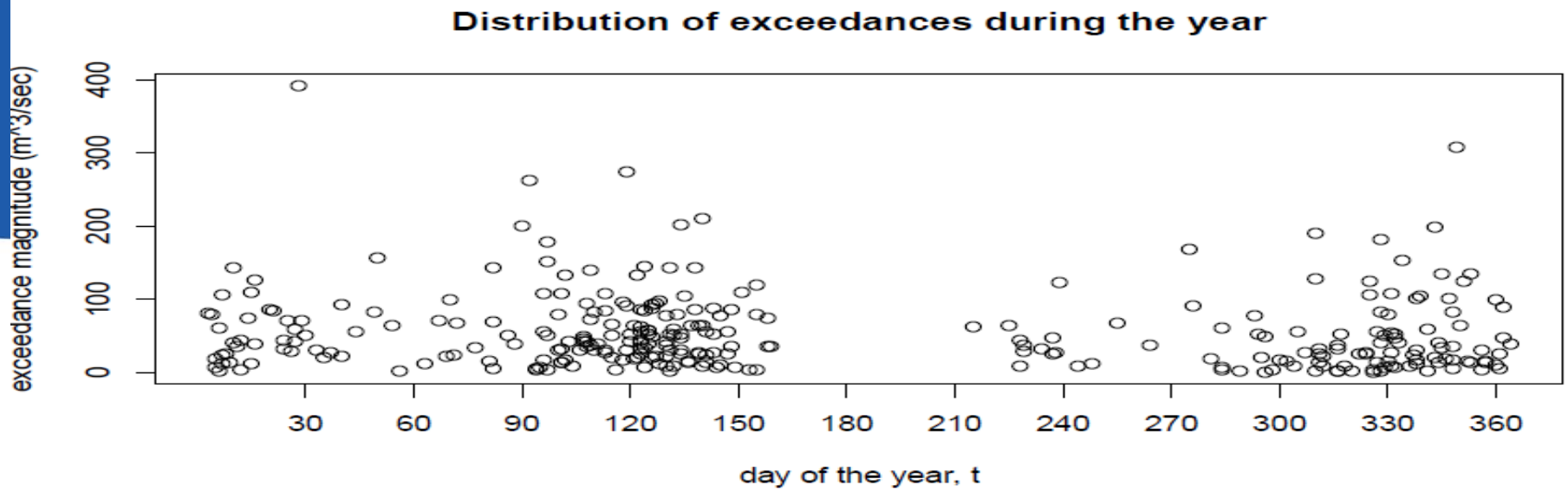

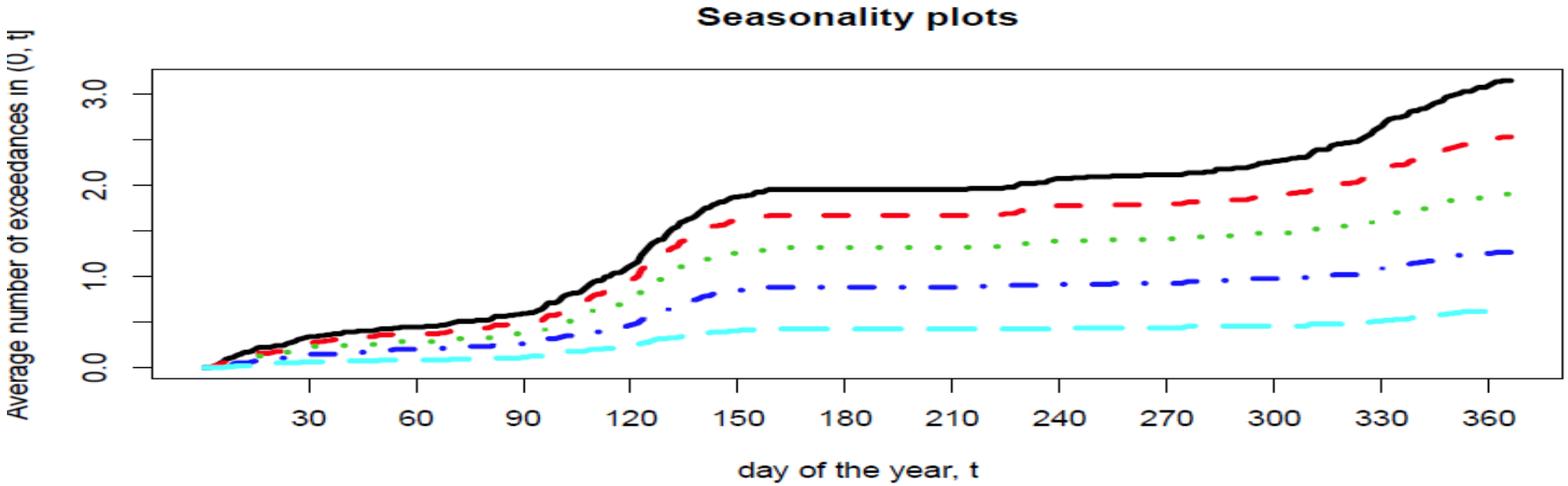

Hydrometric station 01FB001 (Nova Scotia)

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Research Results (continued)

3)

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

- **GP and KAP models**
- **Gumbel and some alternative models**
- **Model pairs belonging to the group {GEV, P3, GLO)**

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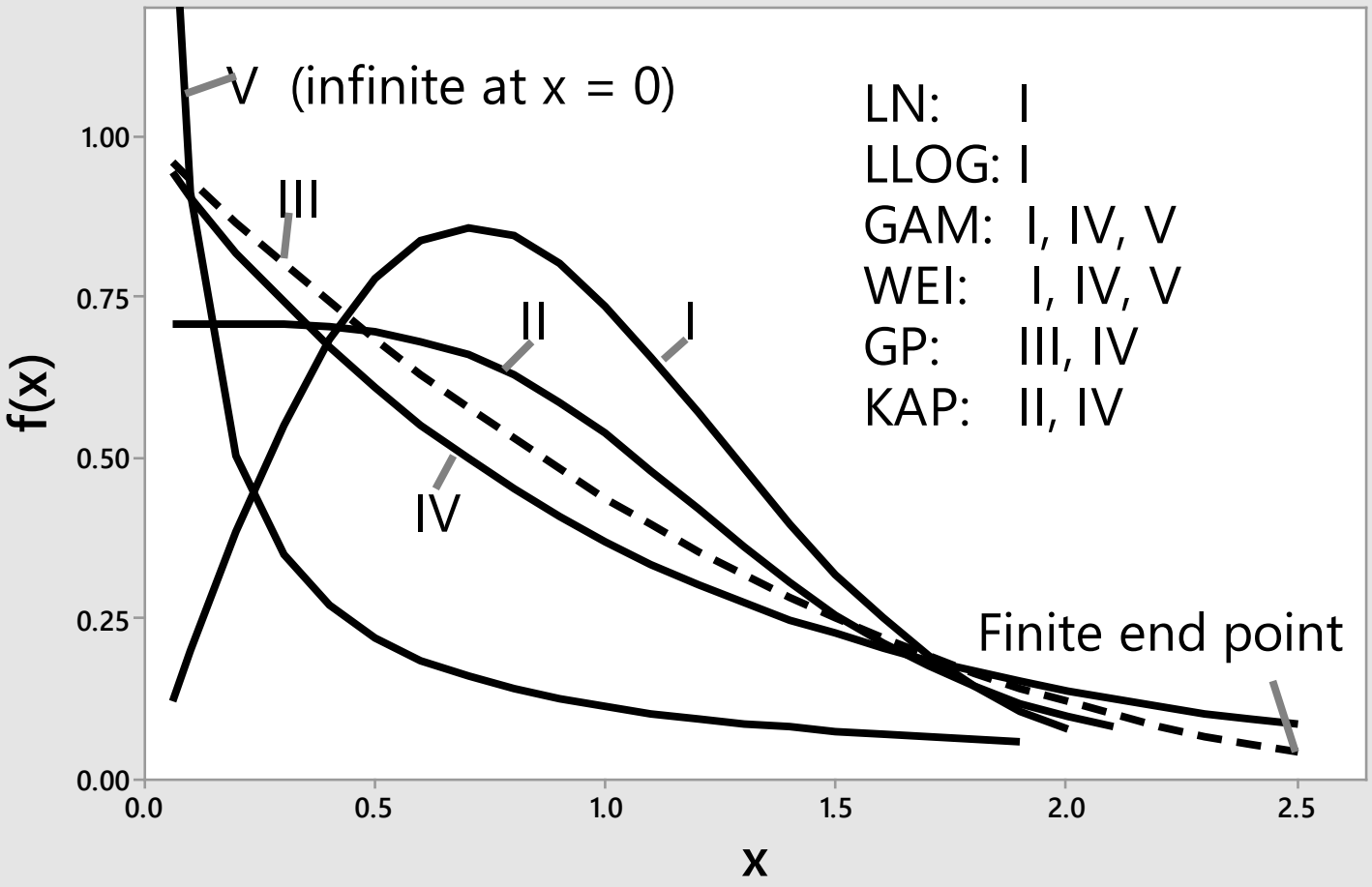
Example: Discrimination between Gumbel (GEV with shape parameter = 0) and GEV with shape parameter = 0.2



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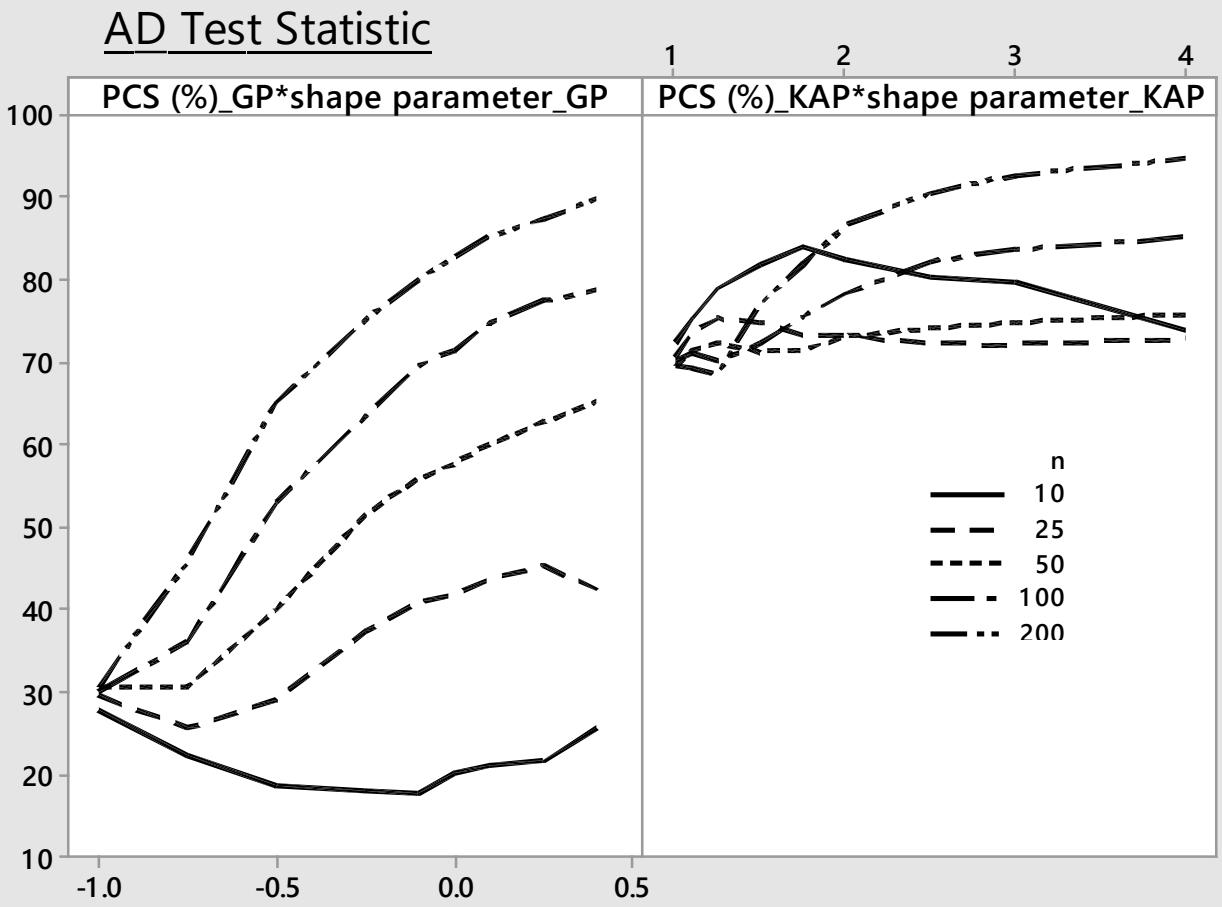
Example: Discrimination between generalized Pareto and Kappa distributions



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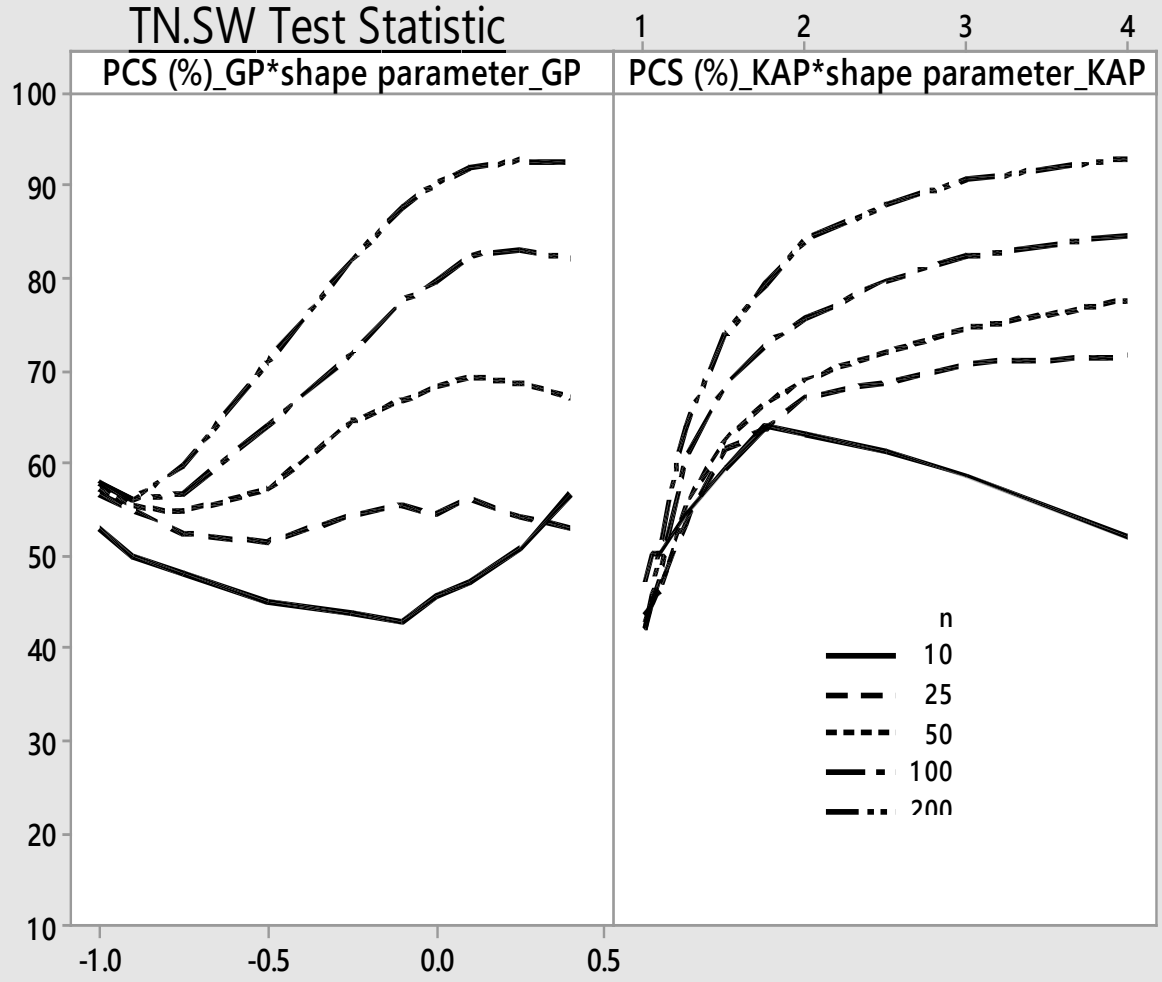
Example (continued)



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Research Results (continued)

4)

Research is continuing on:

- **Adjusting for small-sample non-normality of design event estimators (extreme distribution quantiles)**

This allows obtaining:

- **Improved confidence intervals for quantiles (CIQs)**

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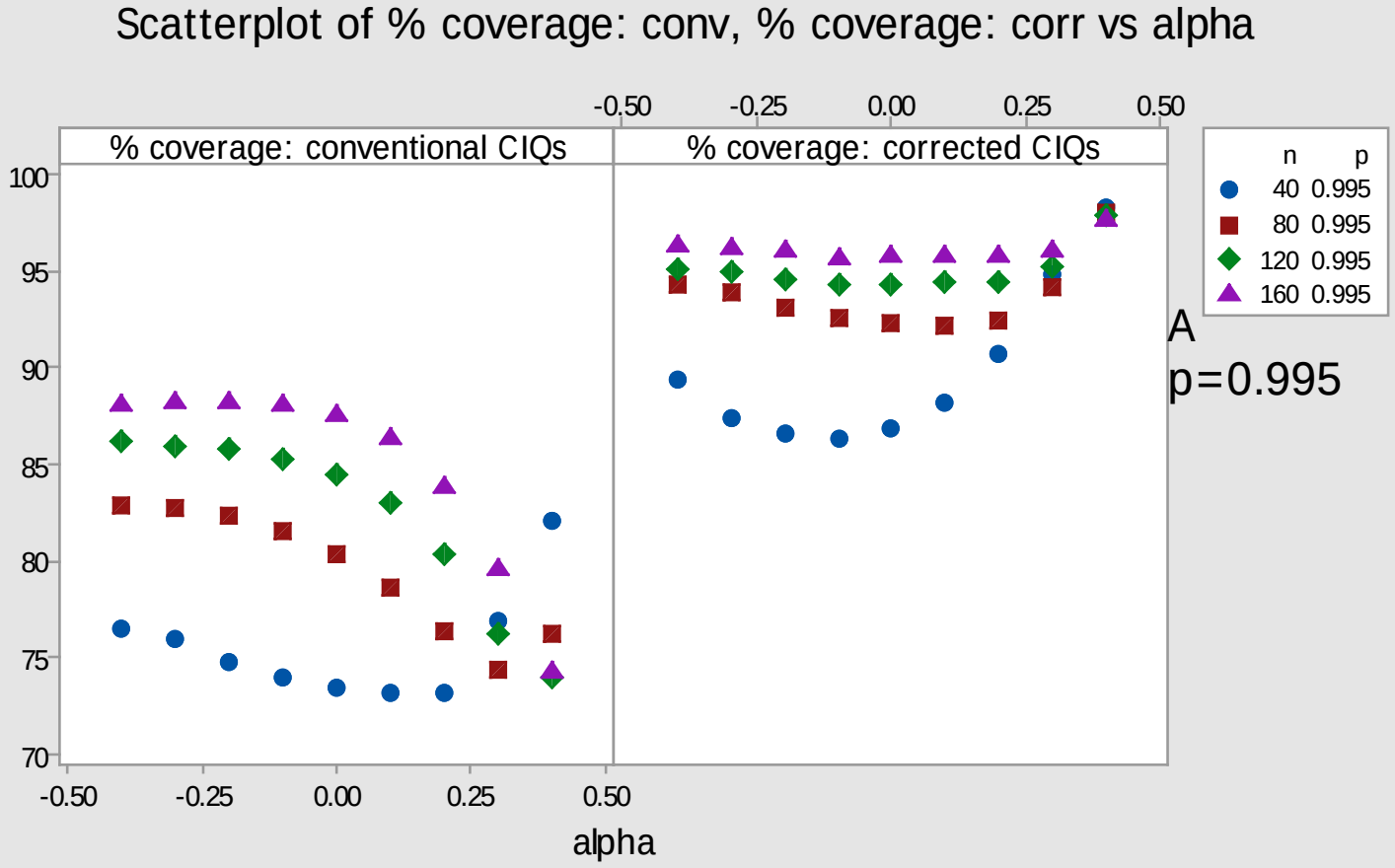
Example: Improved confidence intervals for quantiles



Results include rows where (n=40 Or n=80 Or n=120 Or n=160) And p=.995.

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Ongoing and short-term research

Making the research results as user-friendly as possible; specifically results pertaining to:

- **Improved discrimination between distributions**
- **Improved confidence intervals for quantiles (CIQs)**

Thank you!

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