Progress

Changes in the export of nutrients and carbon during extreme climate events across landscapes

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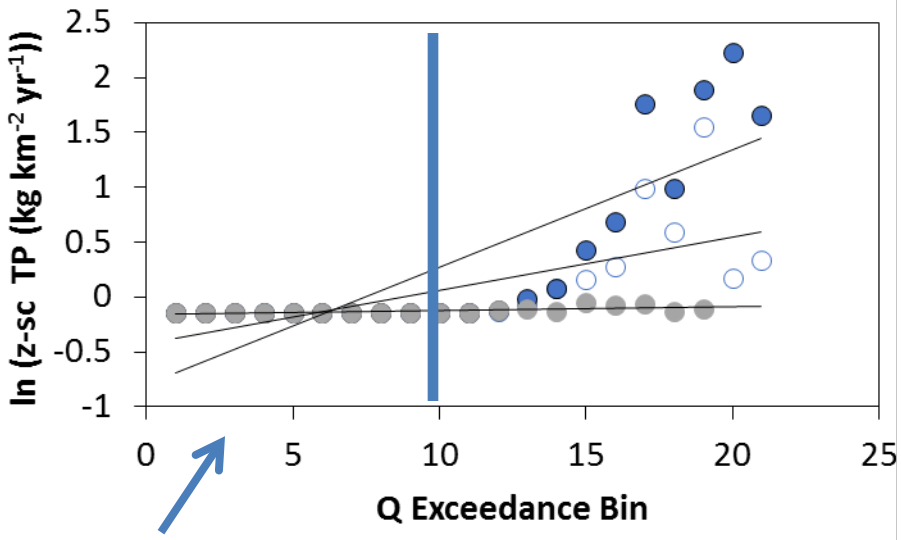
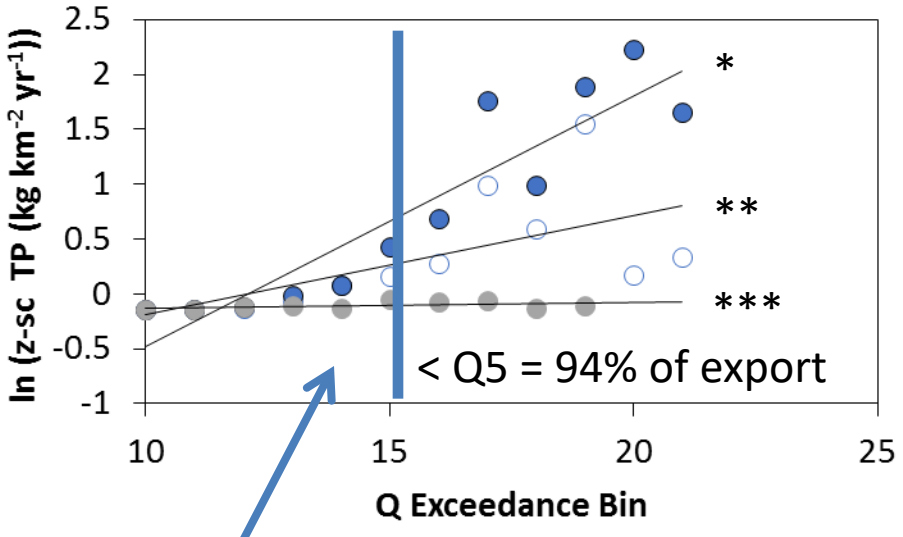
AGU CHAPMAN CONFERENCE
San Juan, Puerto Rico, USA | 22-27 January 2017

Export by event: TP (no land use effect)



Low export at low-flow bins



- Rising
- Falling
- Non-Event

Increase in TP export more pronounced during rising and falling events

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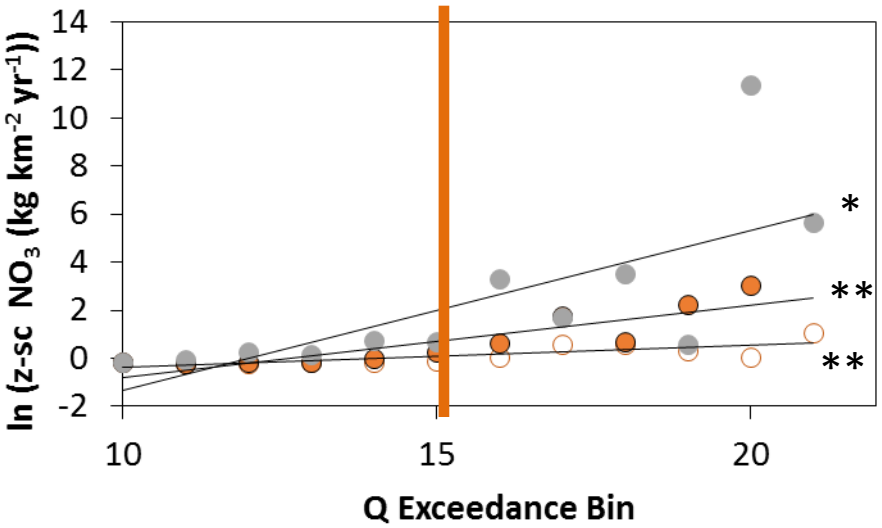
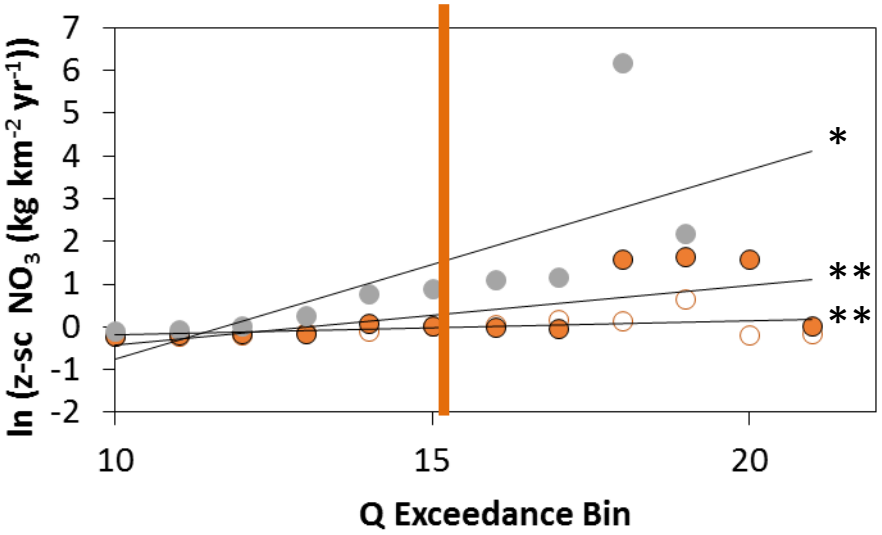
Export by event: NO_3 land use effect



Rising

90% of annual NO_3 export from high flow events



Falling

- Low
- Medium
- High

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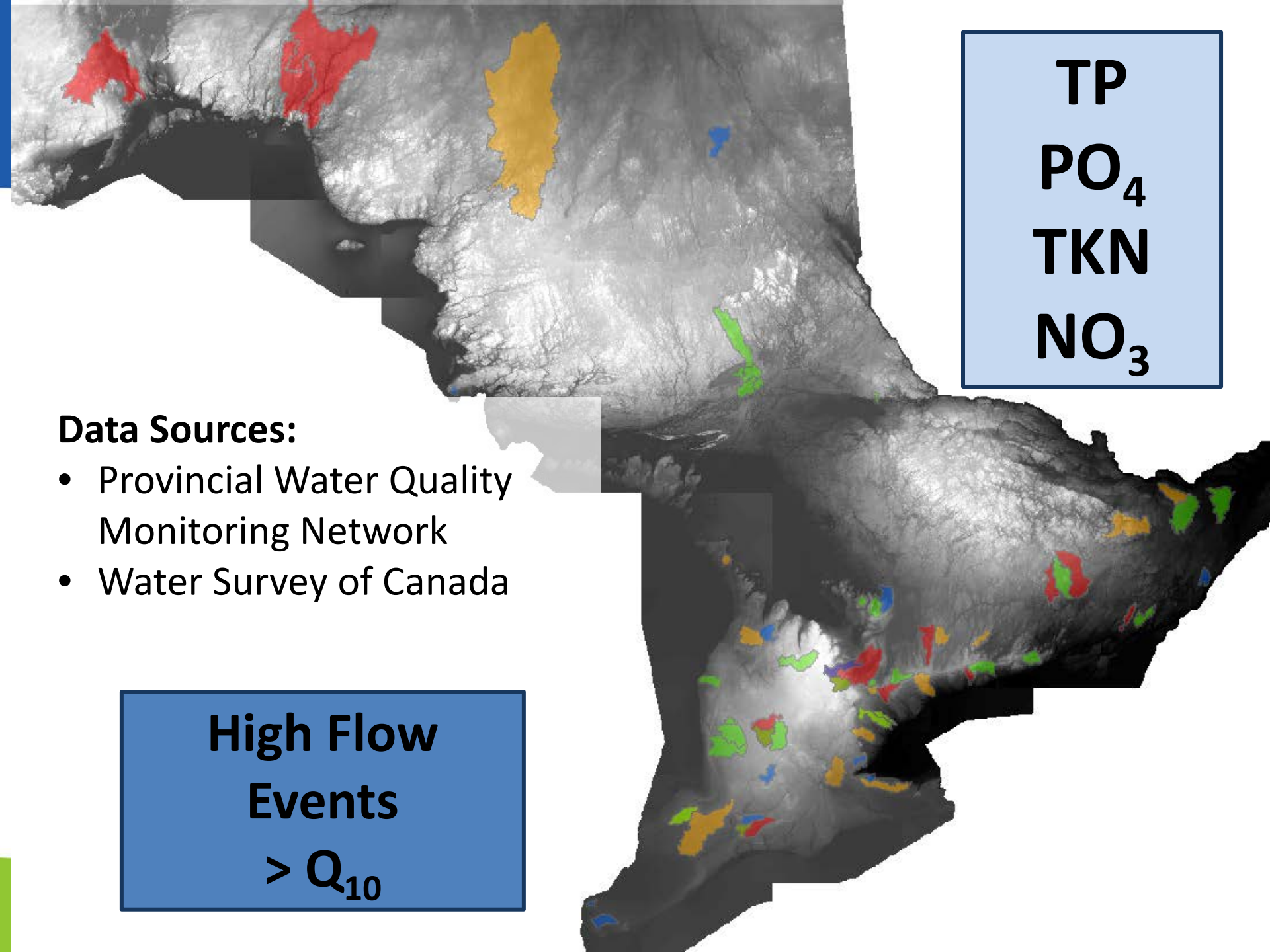
Progress

- Sarah D'Amario:
  - C-Q fluxes and export, interaction with land use
  - POTS analysis with Don Burn
  - 2 manuscripts in prep.
  - Update next



TP
PO_4
TKN
NO_3

Data Sources:

- Provincial Water Quality Monitoring Network
- Water Survey of Canada

High Flow Events
$> Q_{10}$

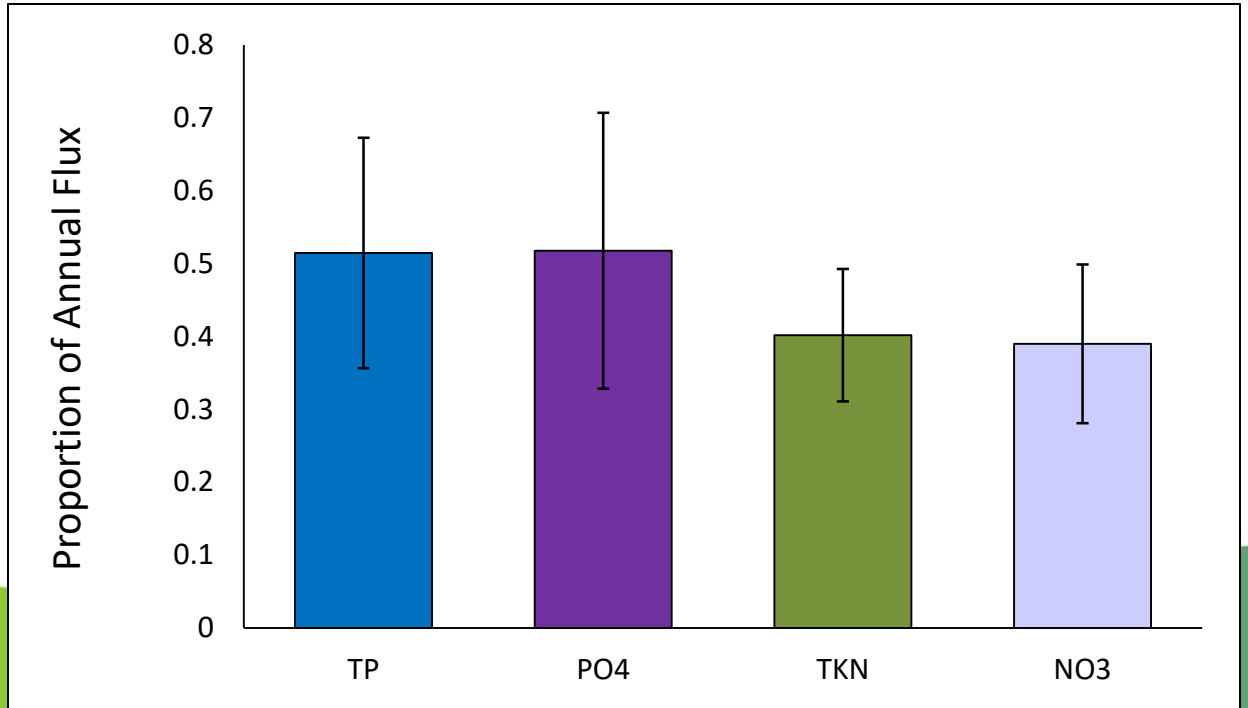
Hydrologic Variables

- Magnitude: $\frac{Q_{peak}}{Q_{10}}$
- Duration: number of days over Q_{10}
- Volume: total discharge volume over Q_{10}

- Nutrient Flux: total flux for the duration of the event (LOADEST)

Flux during Peak Events

- Most annual flux occurs during peak events
  - 36 days of the year



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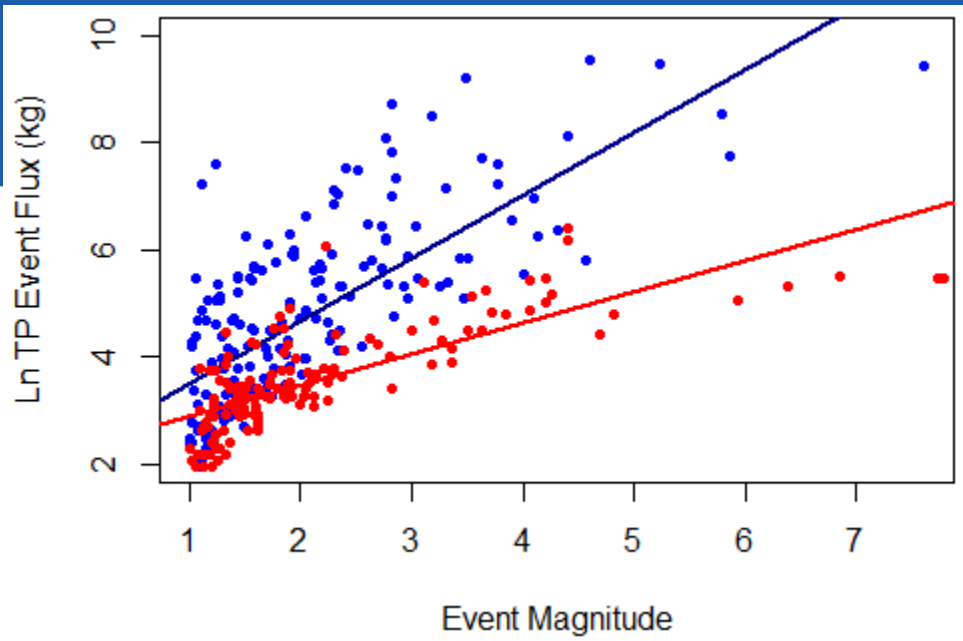
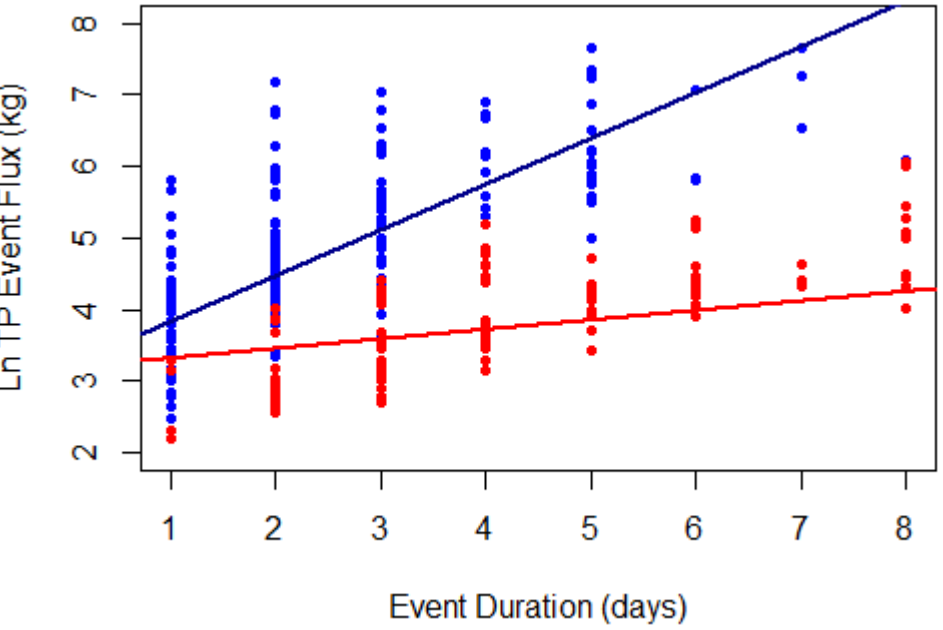
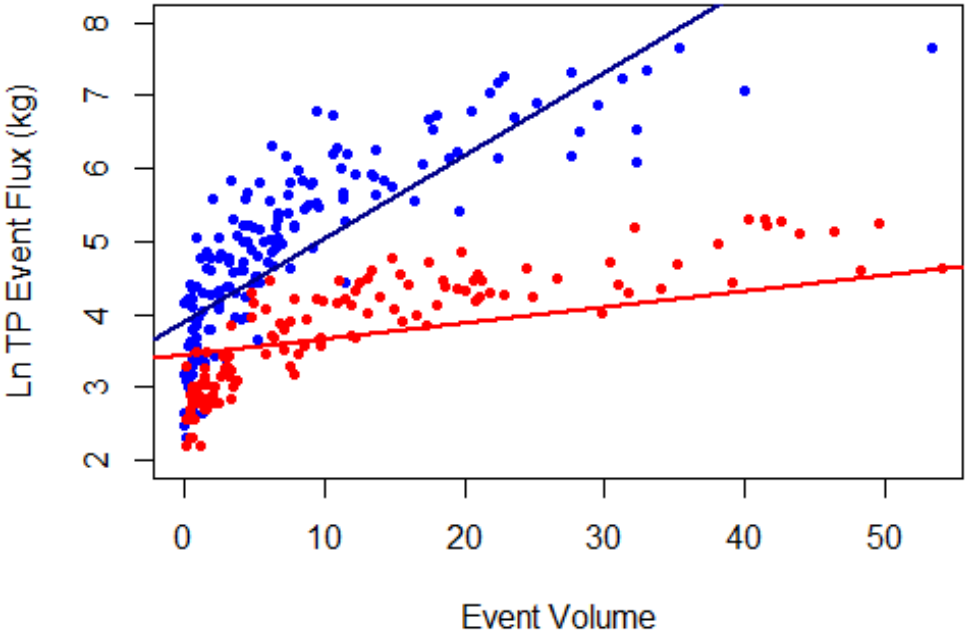
Event Flux

- Flux increases with event hydrological parameters
- What influences slope differences?



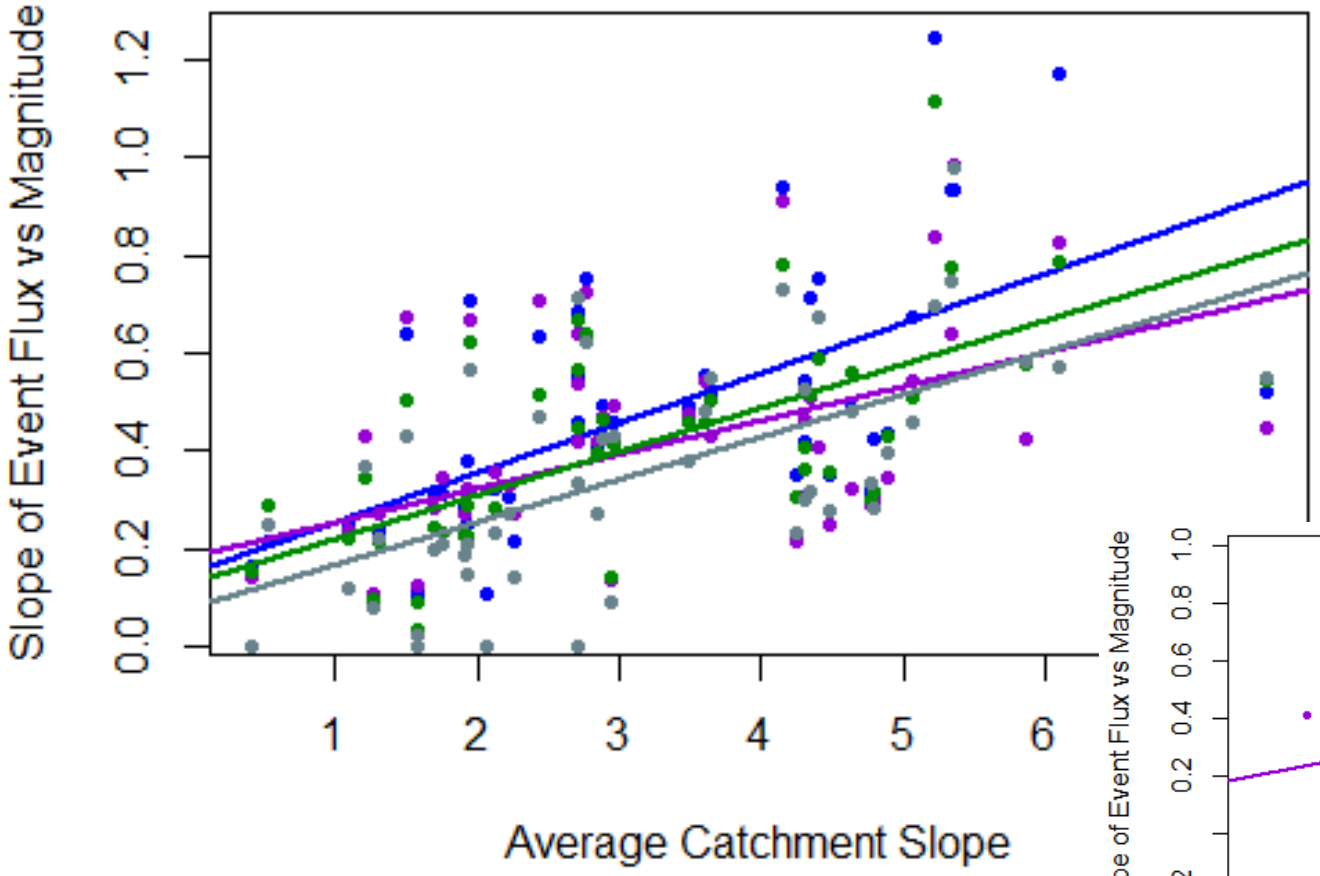




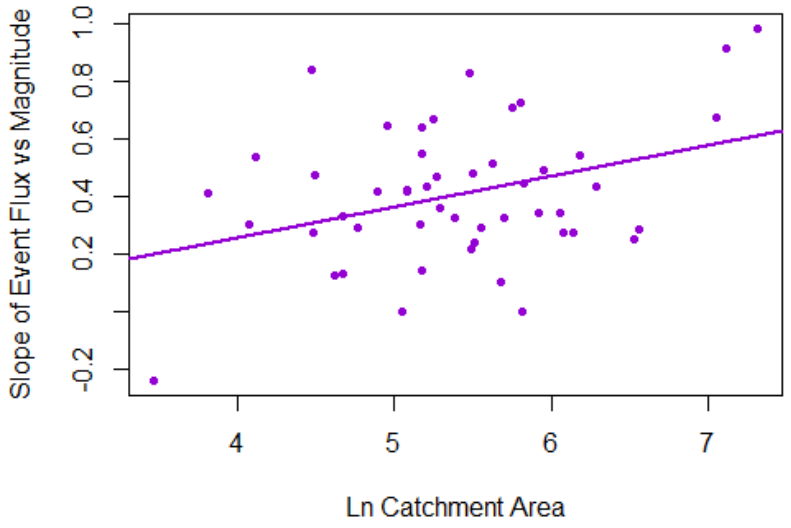
BIC/linear regression with Catchment Characteristics

- Climatic variables
  - Annual average temperature
  - Average annual precipitation and discharge volume
- Geomorphology
  - Average catchment slope and elevation
  - Average channel length and slope
  - Longitude and latitude
  - Catchment area
- Land use
  - Agriculture, Forest, Wetland, Urban
  - Open water
  - Dams

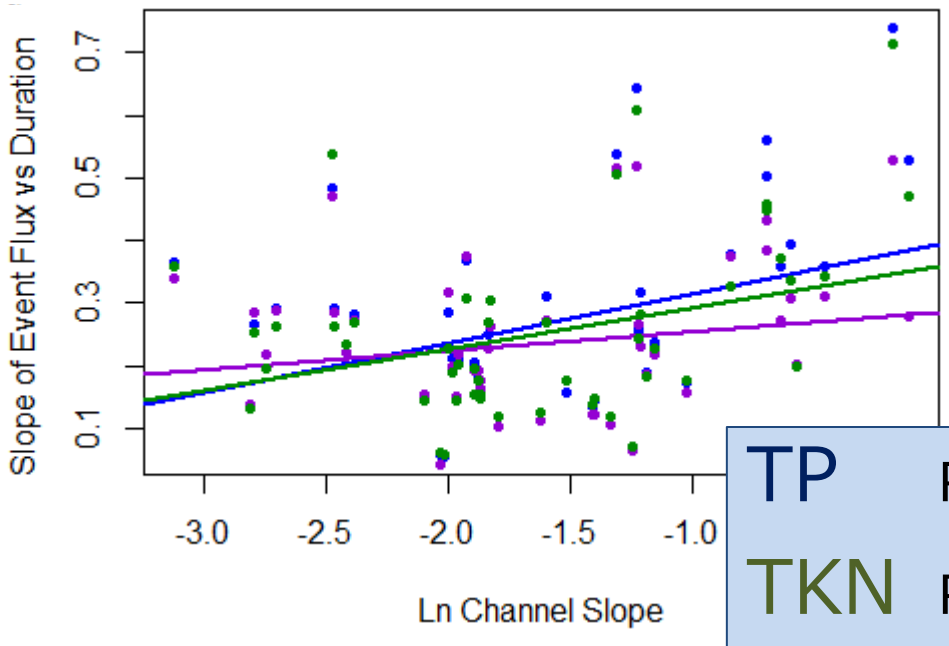
Flux-Magnitude

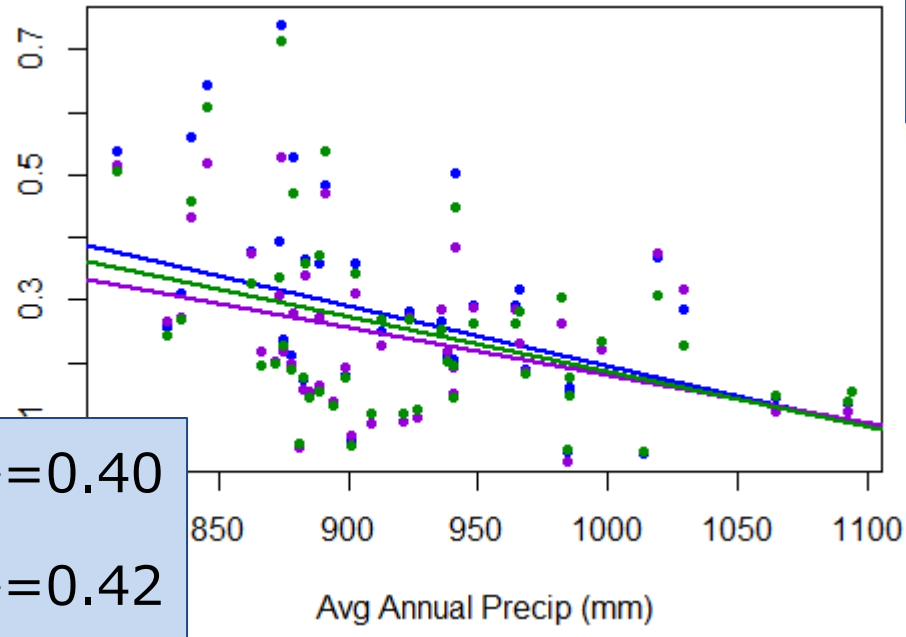


TP	R^2=0.36
TKN	R^2=0.37
NO_3	R^2=0.37
PO_4	R^2=0.31

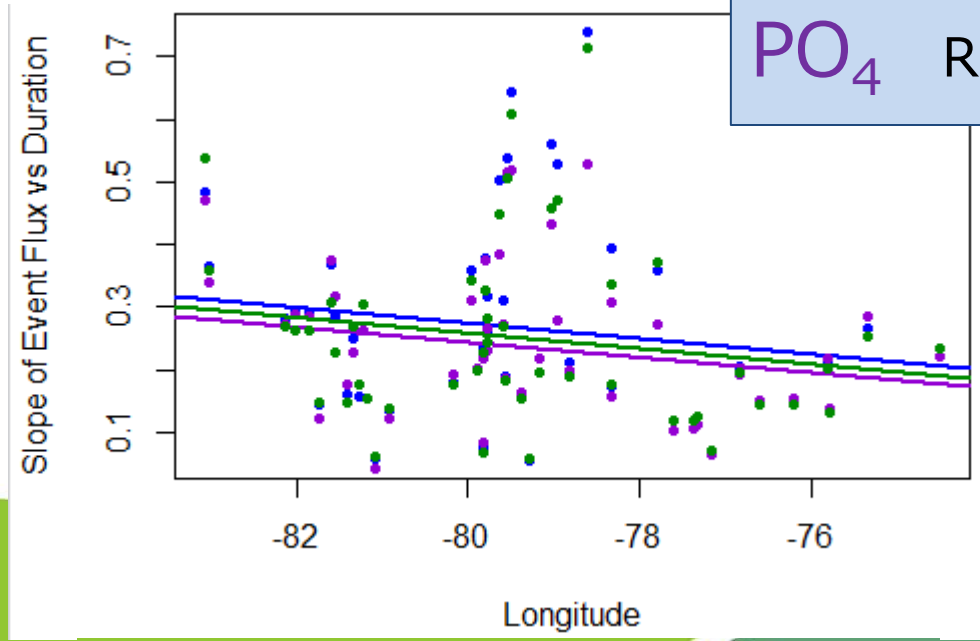


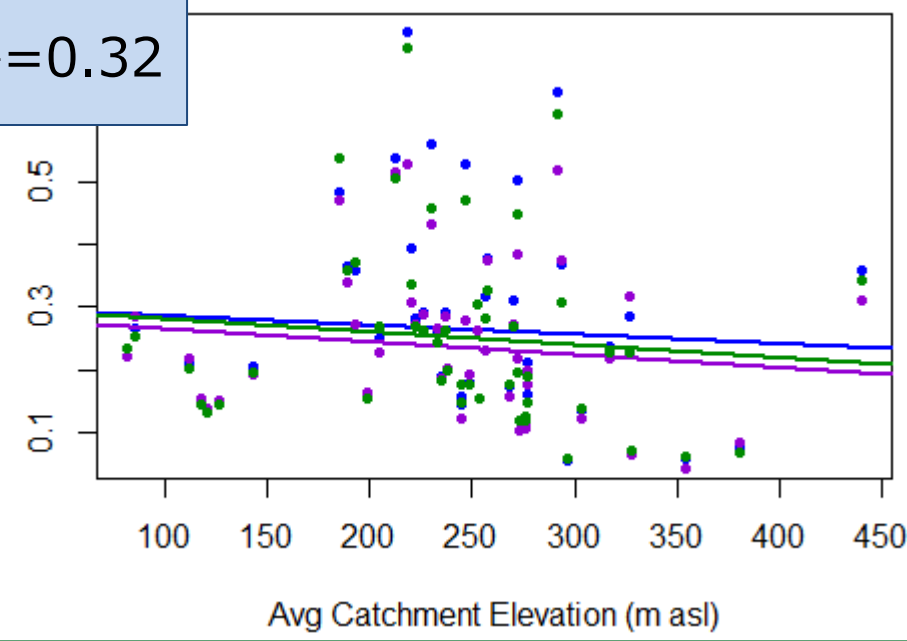
Flux-Duration



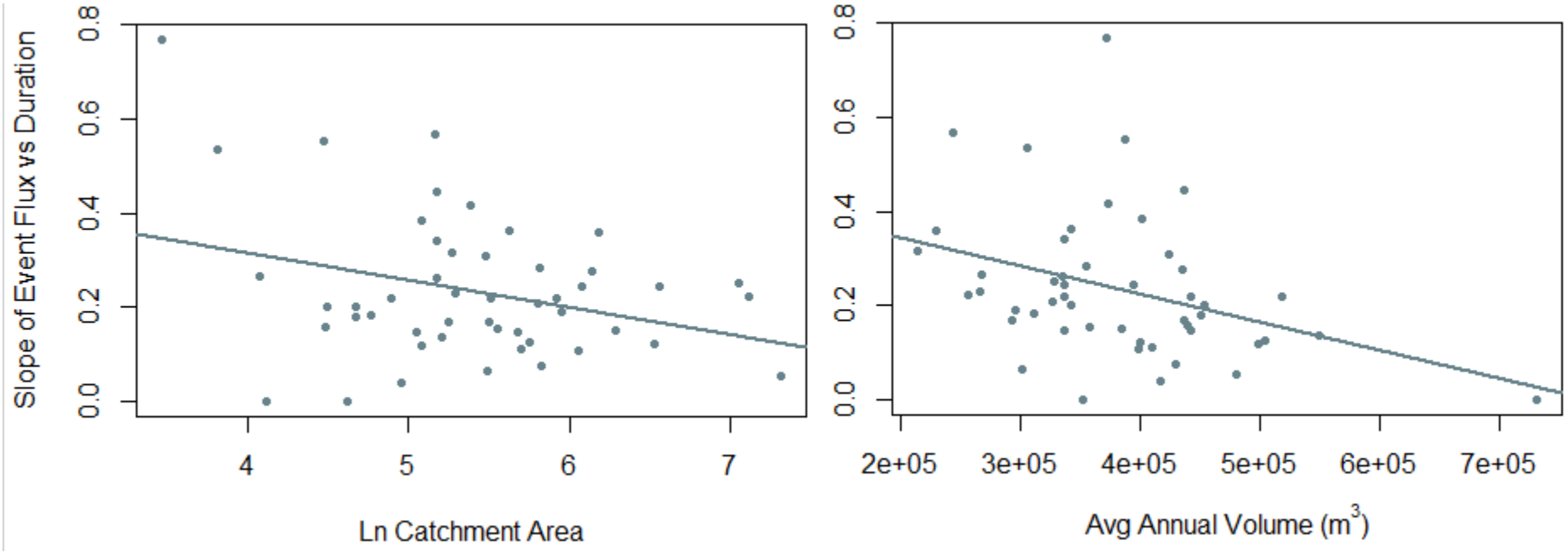


TP	R^2=0.40
TKN	R^2=0.42
PO_4	R^2=0.32





Flux-Duration



NO_3 R^2=0.23

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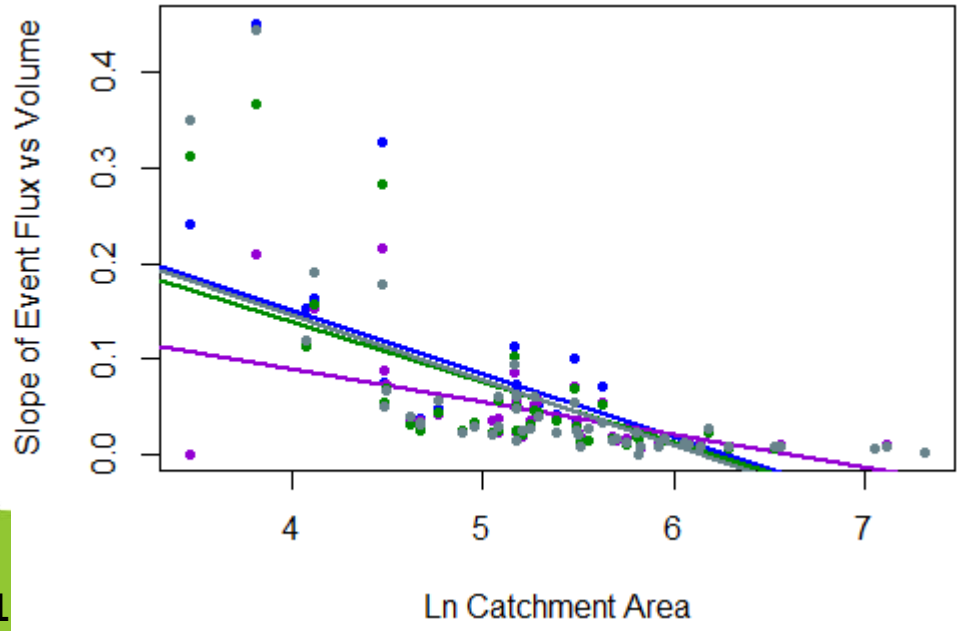
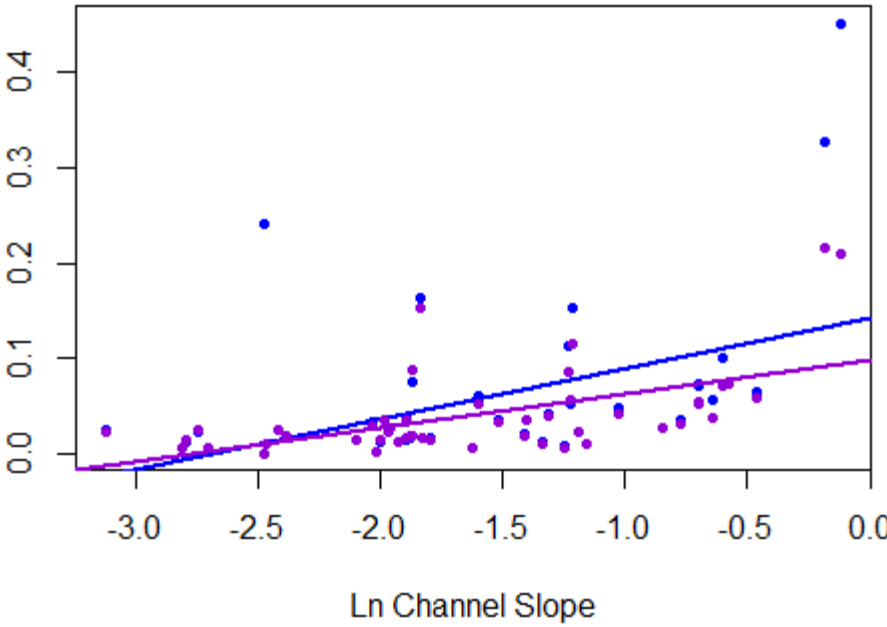
Flux-Volume

TP	R^2=0.48	PO_4	R^2=0.50
TKN	R^2=0.43	NO_3	R^2=0.44





Conclusion

- TP, PO_4, TKN dramatically increases in events in catchments that are:
  - Small and hilly
  - Low elevation
  - Low precipitation
  - Steep channel slopes
- NO_3 in catchments that are:
  - Small and hilly
  - Low annual discharge

Thank You

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