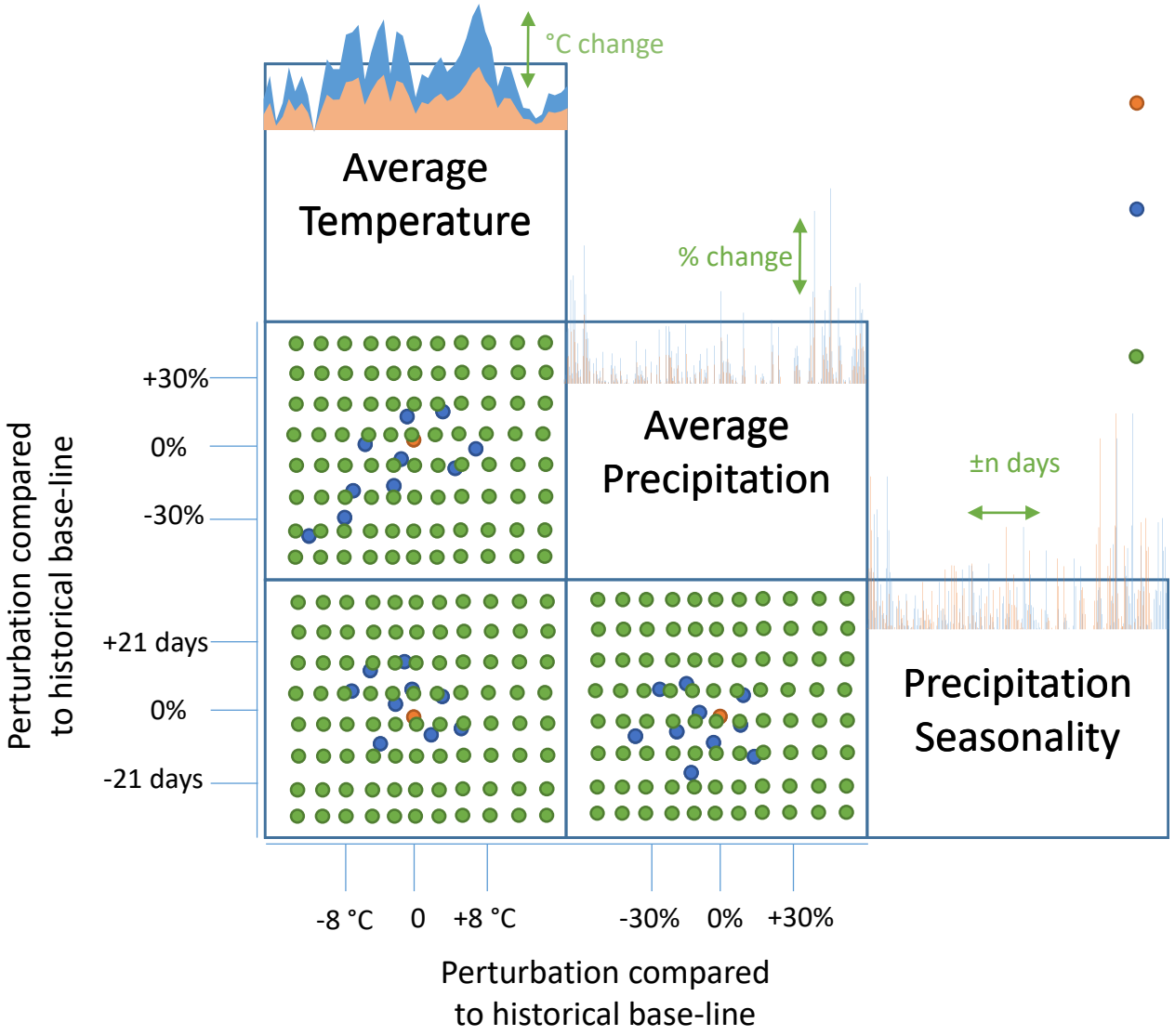
Plausible Future Scenarios

Integrated Modelling Program for Canada
Global Water Futures



- Current State
- Climate Model Projection
- Plausible Future Scenarios

Sources: Guo et al. 2018, Guo et al 2017, Culley et al. 2016, Culley et al. 2019

Stochastic Weather Generator

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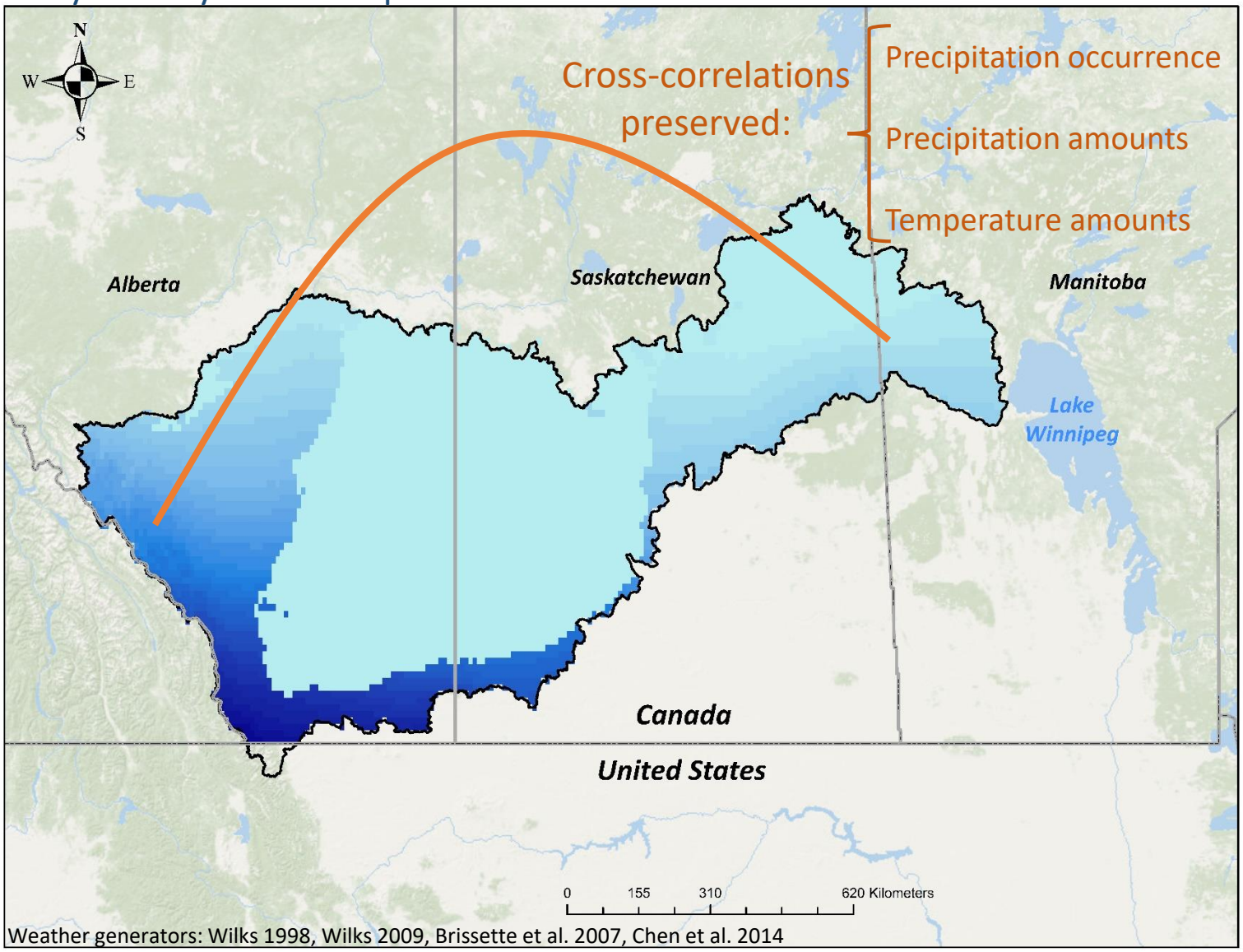
Global Water Futures

Daily Grid-by-Grid Precipitation Generation



Weather generators: Wilks 1998, Wilks 2009, Brissette et al. 2007, Chen et al. 2014

Water Resources Systems Stress-test

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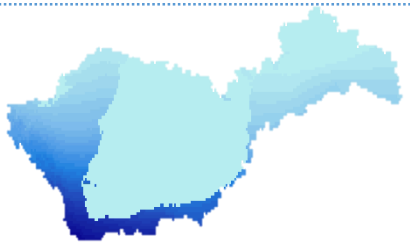
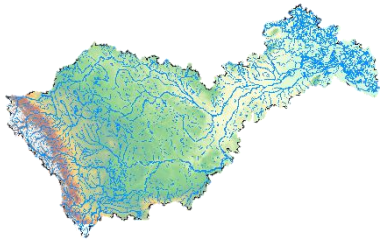
Start

Scenario generation



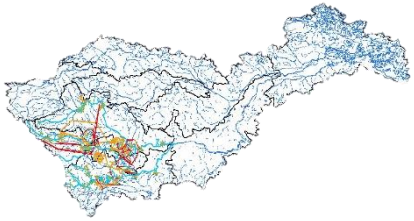
Stochastic weather generation with perturbed attributes

Hydrological Processes



Streamflow generation using hydrological models

Water Management Processes



Simulating water management strategies and regulations in the basin

Climate-induced vulnerabilities

End

Preliminary Results – Scenarios

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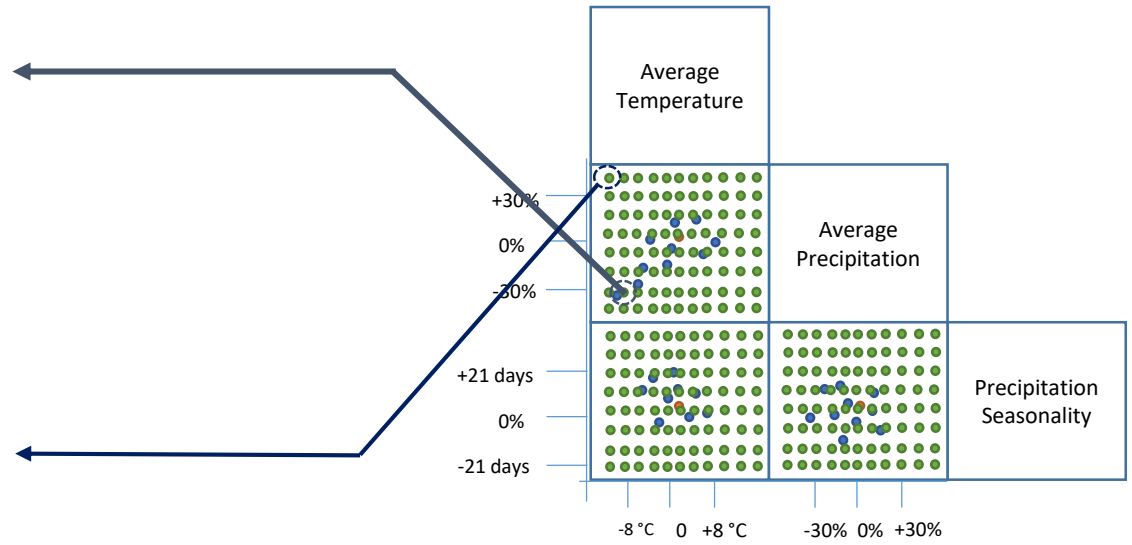
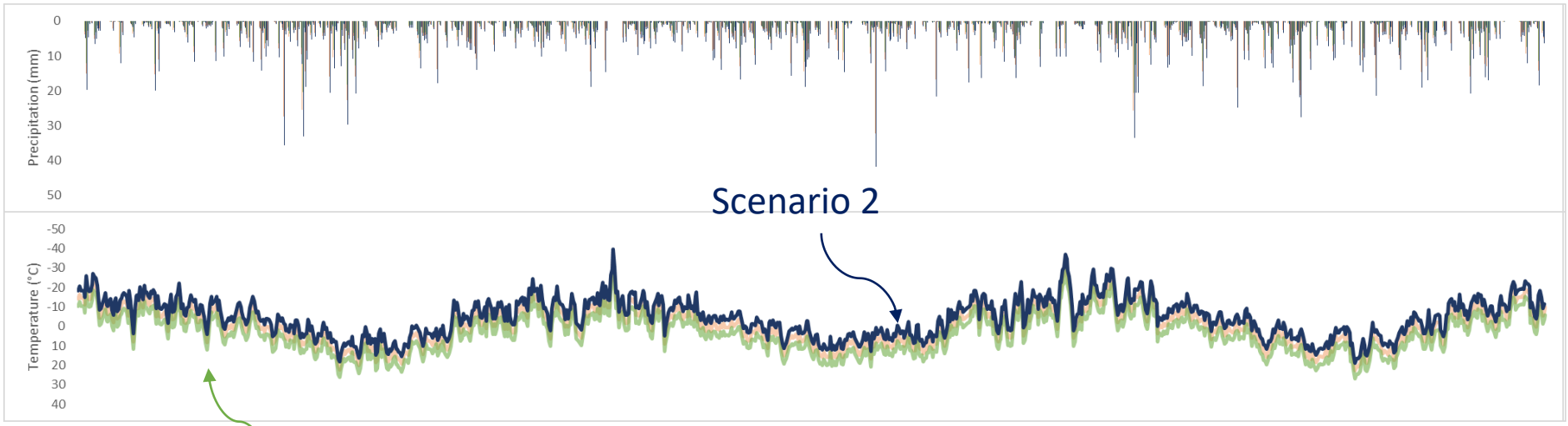
Example Scenario 1:
* Temperature: 4 °C decrease
* Precipitation: 20% decrease

Example Scenario 2:
* Temperature: 4 °C increase
* Precipitation: 30% increase





Preliminary Results - Hydrographs

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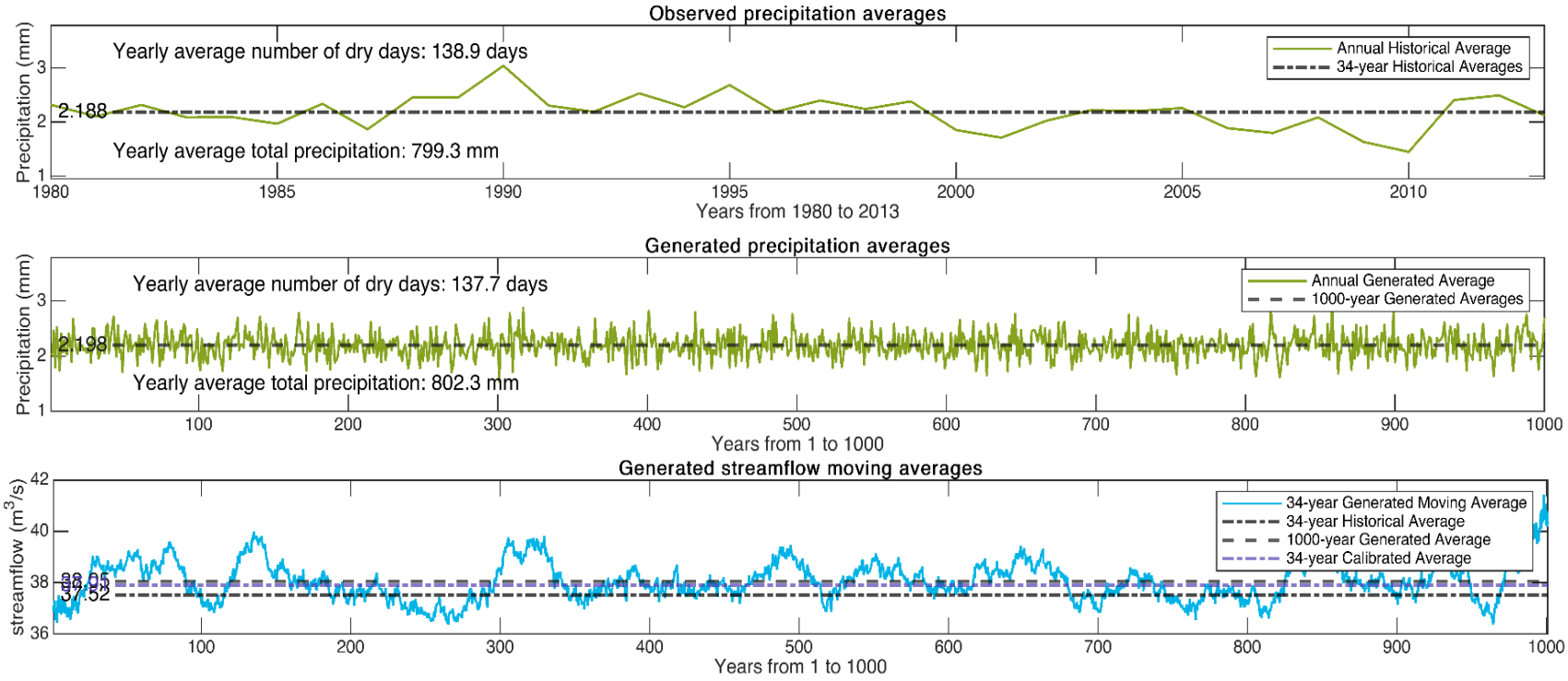
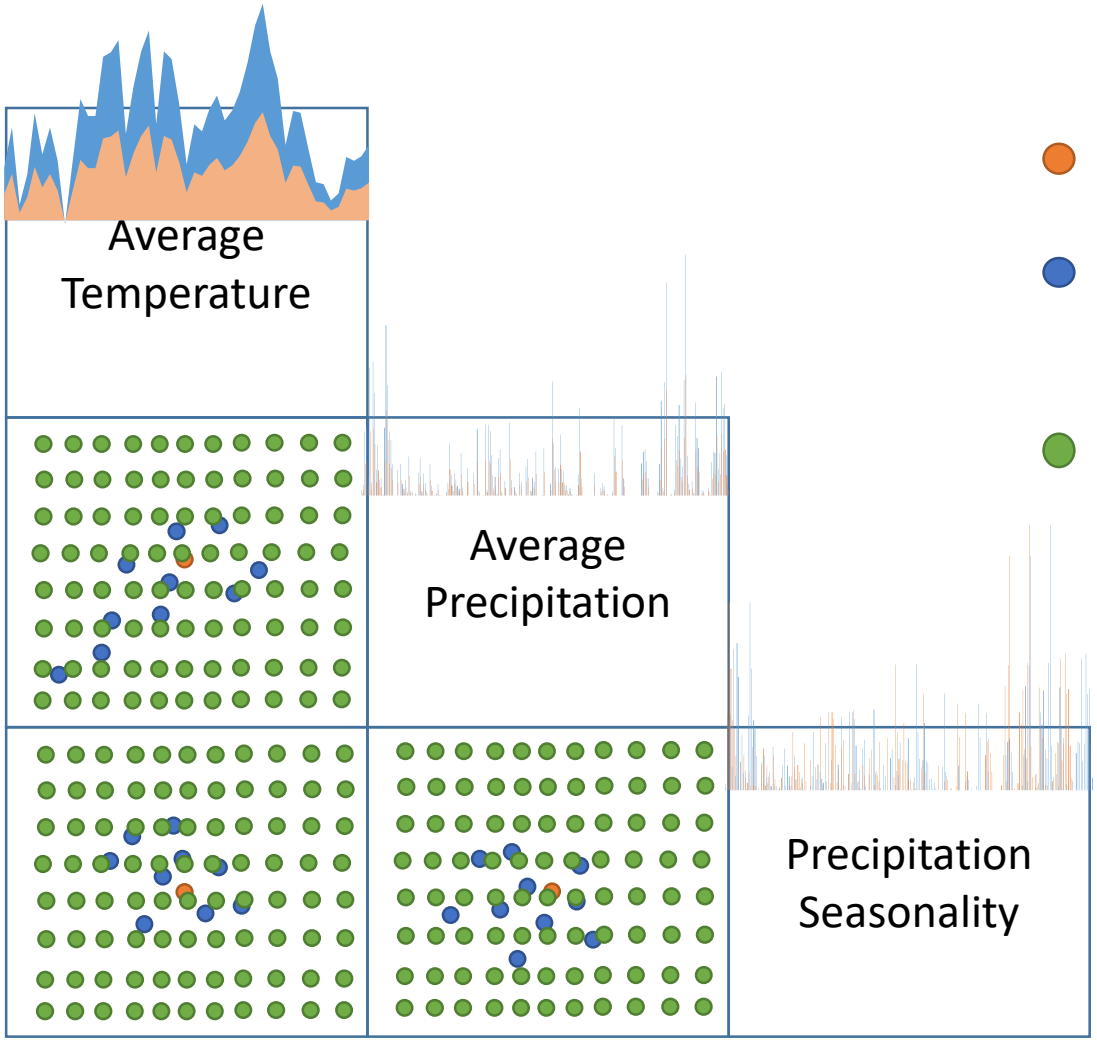
Results of a 1000-year scenario
for the headwaters of
Bow River at Banff





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