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An overview of the Bratt's Lake precipitation gauge intercomparison facility and wind adjustments for the gauge measurement of snowfall on the prairies

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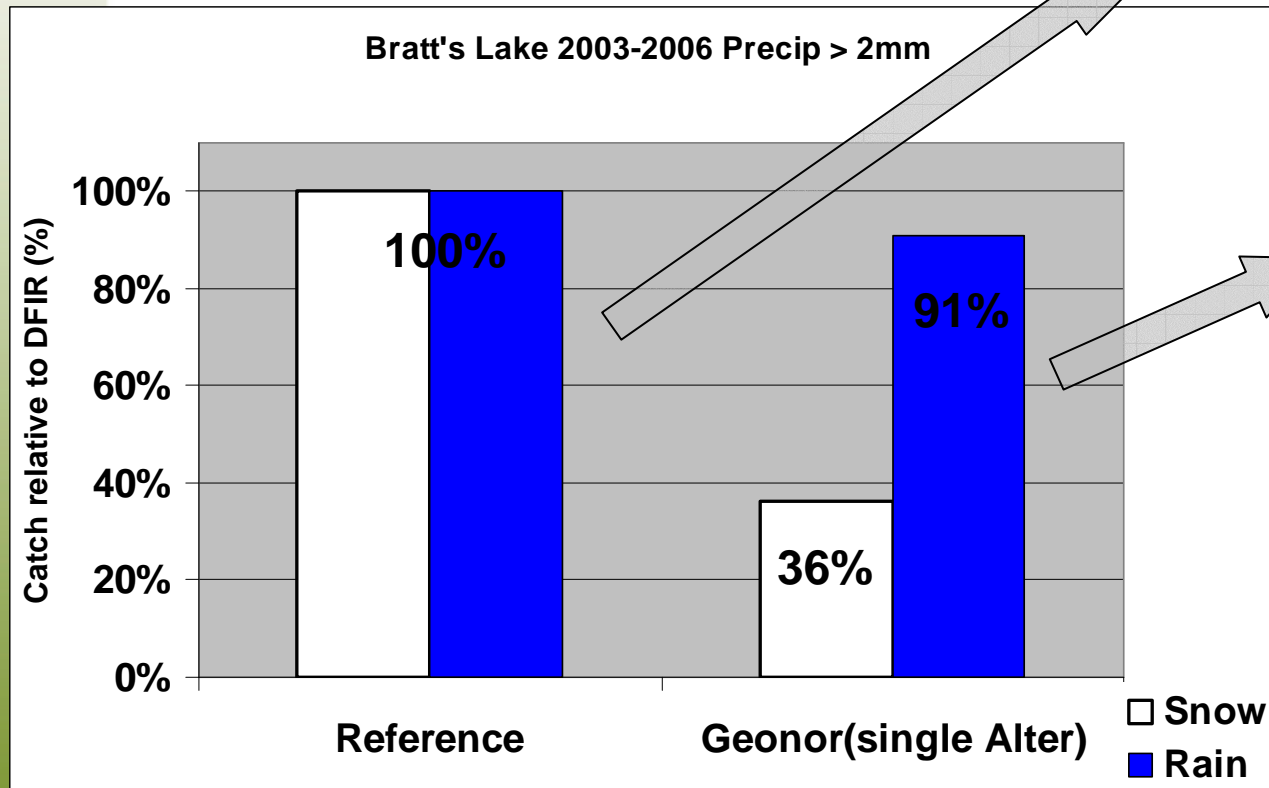
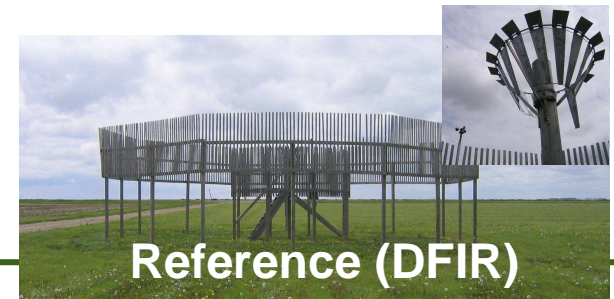
Prairie Hydrology Workshop, 18 Nov 2009, Saskatoon

Motivation



- There are hundreds of precipitation gauges and wind shield configurations, 11+ all-weather configurations used in the Prairies
- Most precipitation gauges suffer from systematic biases due to:
 - Gauge properties (profile, height, wind shield)
 - Measurement environment (wind, temperature, precip type and properties)
- Under-catch of snowfall due to wind most significant
- Precipitation event bias can vary from 0% - 100%
- Precipitation gauge data standardization is a nightmare!!

More Motivation



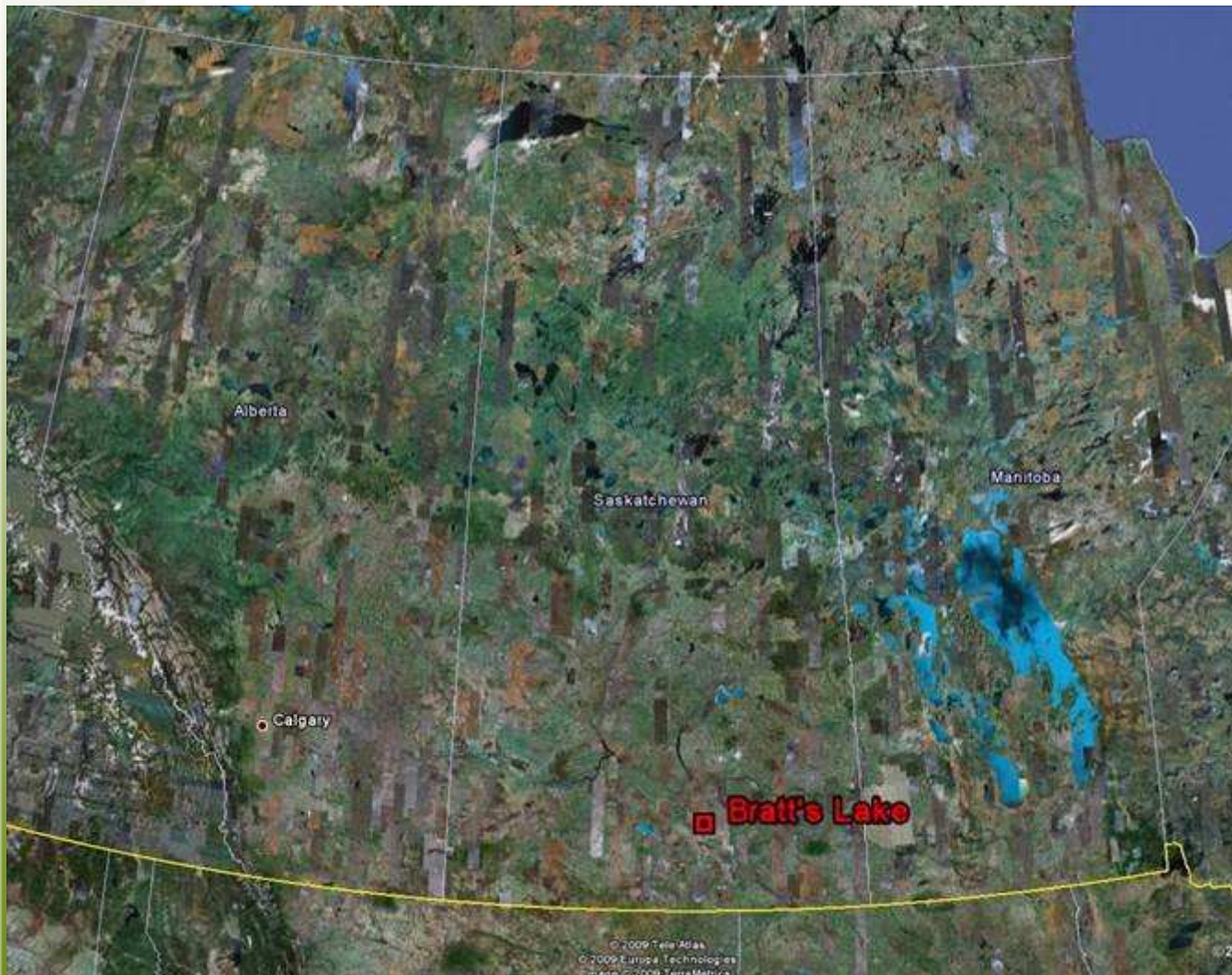
Average 2m wind speed

Rain: 4 m/s

Snow: 5 m/s



Bratt's Lake Intercomparison Facility



Annual Temp:
2.8°C

Annual Precip:
388 mm

Annual Snowfall:
106 cm

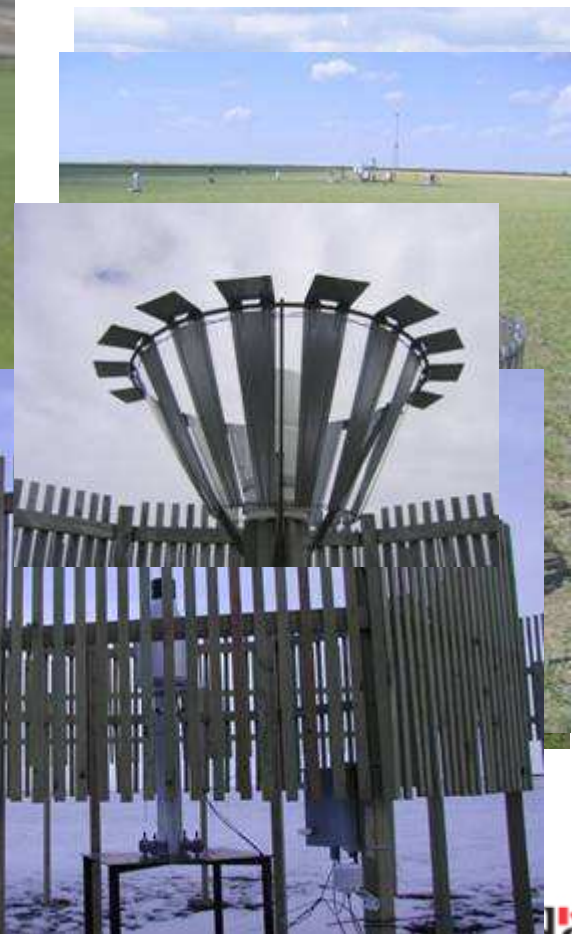
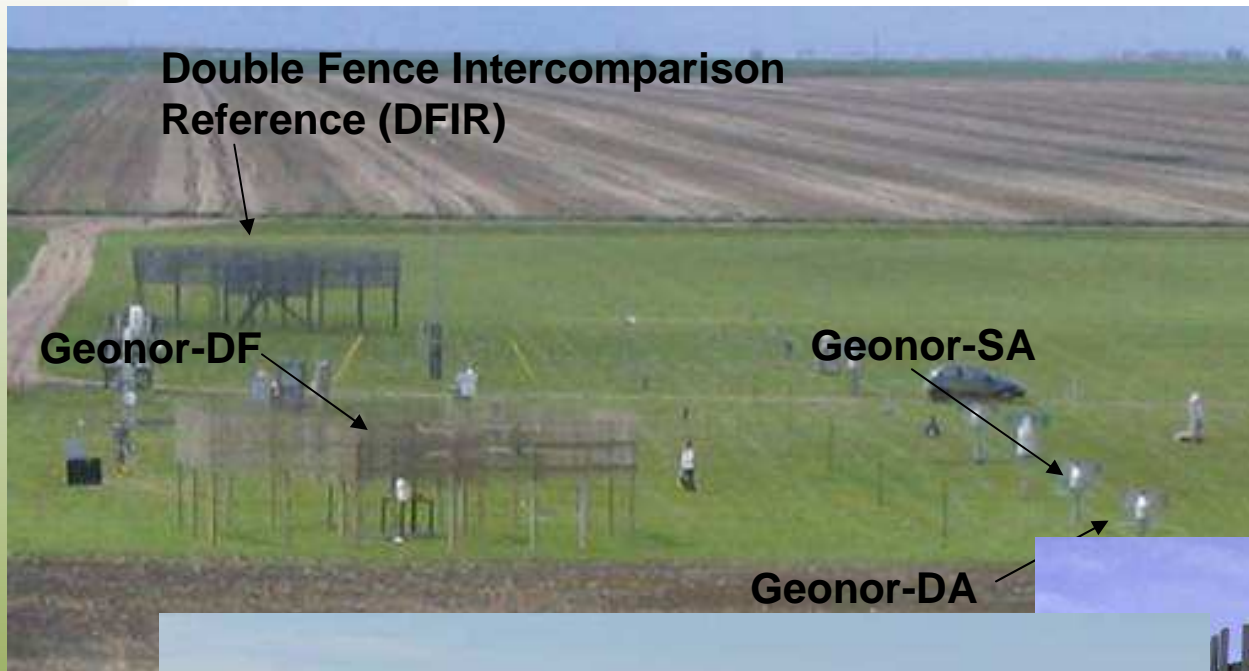
Average 10m Wind
Speed:
5 m/s



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Bratt's Lake Intercomparison Facility (Old Configuration)



Bratt's Lake Intercomparison Facility (New Configuration)



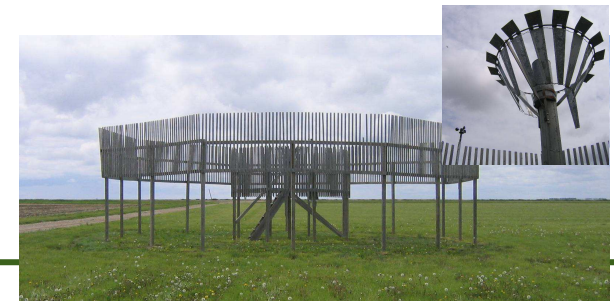
Bratt's Lake Intercomparison Facility (New Configuration)



- 19 instrument pedestals w/ AC power (14 empty)
- 2 x daily manual DFIR observations
- 2nd Large Double Fence (Geonor)
- Supporting meteorological data
- Real time data access via Internet



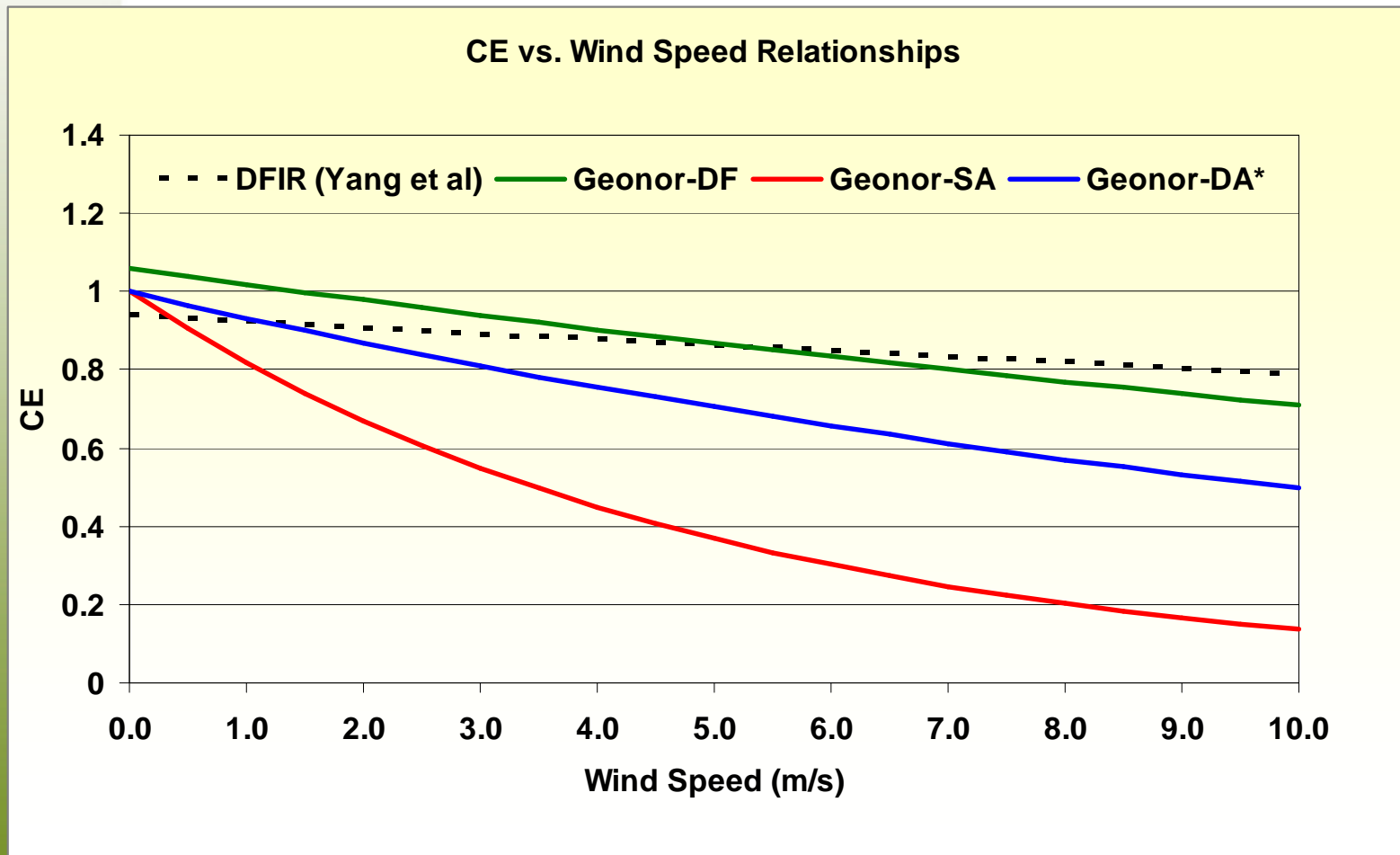
Results



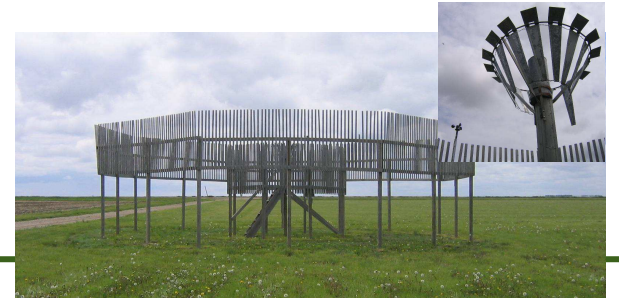
- Focus on the Geonor T-200B accumulating precipitation gauge: current standard all-weather gauge in the CRCS
- Geonor Configurations:
 - Single Alter
 - Double Alter
 - Large Octagonal Double Fence
 - Heated Single Alter
- Adjusted DFIR (manual) as the reference
- Snowfall catch efficiency – wind speed relationships



Geonor Snowfall Catch Efficiency Curves



Future Work



- Possible WMO sanctioned auto gauge intercomparison
- Automated reference for gauge measurement of snowfall
- Populate the empty pedestals
- Re-examine some older gauges: F&P, Belfort Universal, Canadian Nipher
- New technologies (unconventional precip measurements, precip typing)



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Thank you!

