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Drought effects on Prairie Weather

Alberta DRI Users Workshop

Greenwood Inn Hotel & Suites, Edmonton

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MSC – Science – HAL

April 6, 2010

Prairie weather



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Summary of Analyses

Drought – Post drought comparisons

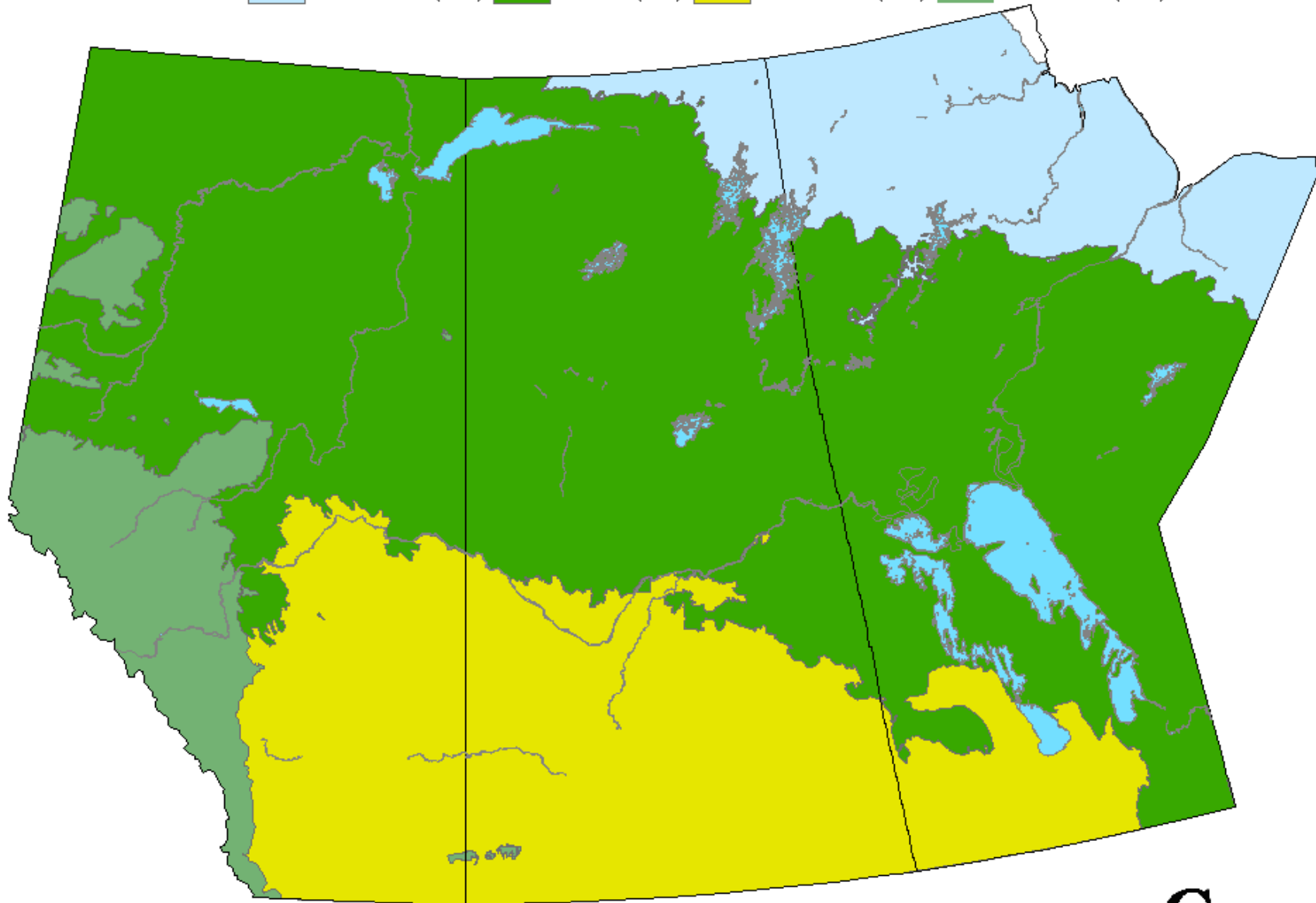
- Lightning activity
 - Canadian Lightning Detection Network Data Archive
- Severe weather activity
 - Prairie and Arctic Storm Prediction Centre Climatology reports.

Drought – 30YR climatology comparisons

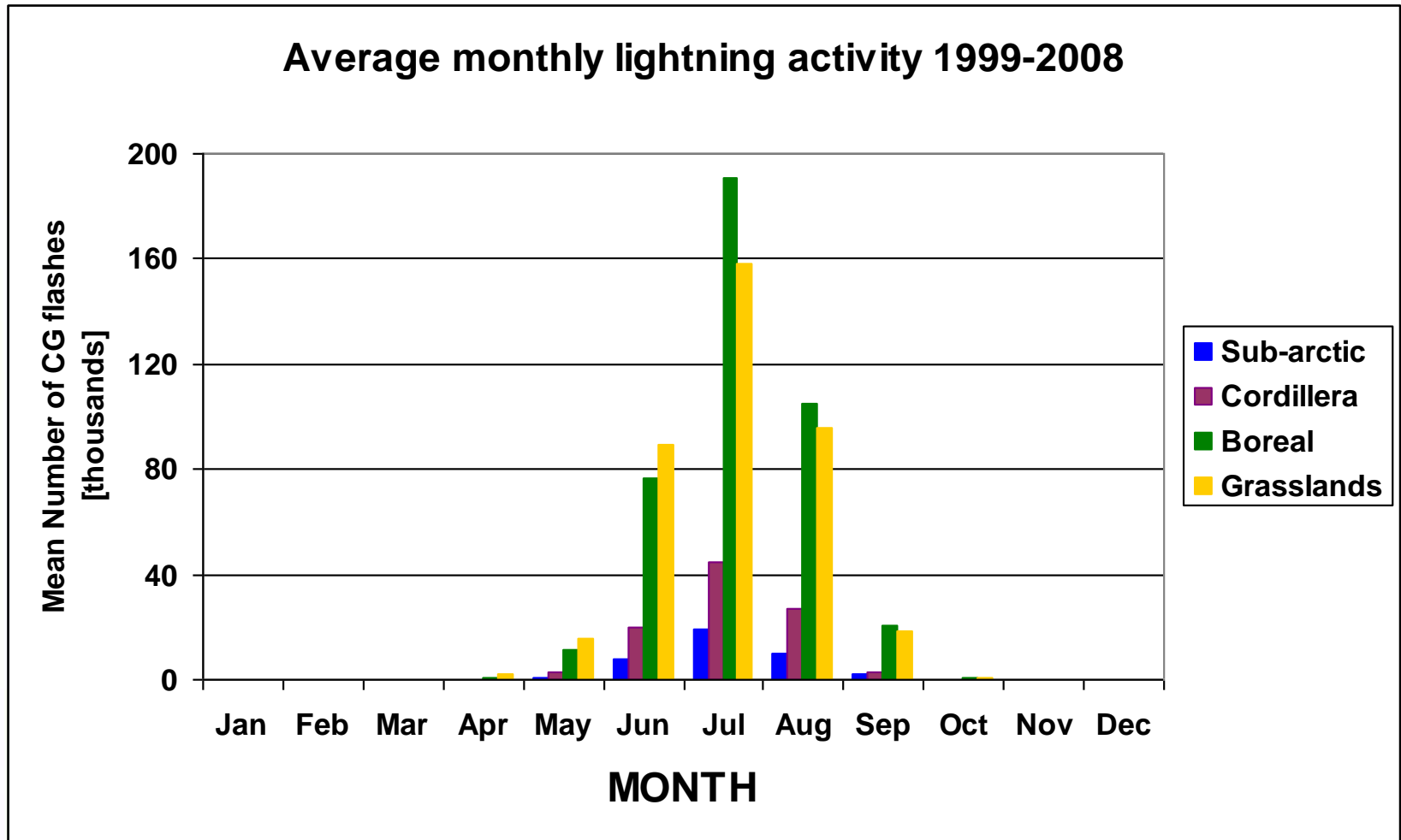
- Surface winds
 - Selected weather stations from Environment Canada's National Climate Data Archive

Ecozones

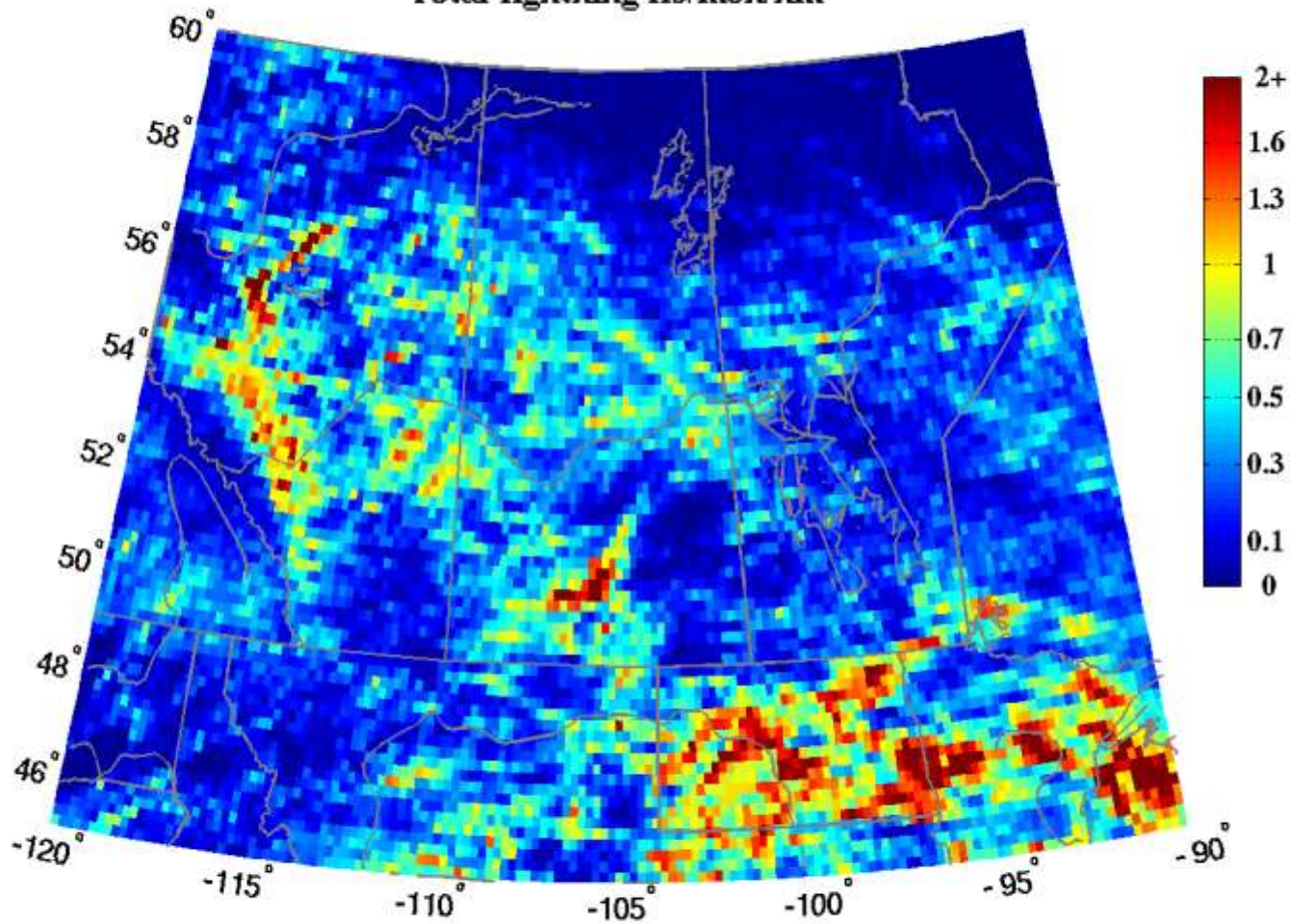
Sub-Arctic (SA) Boreal (BL) Grassland (GL) Cordillera (CD)



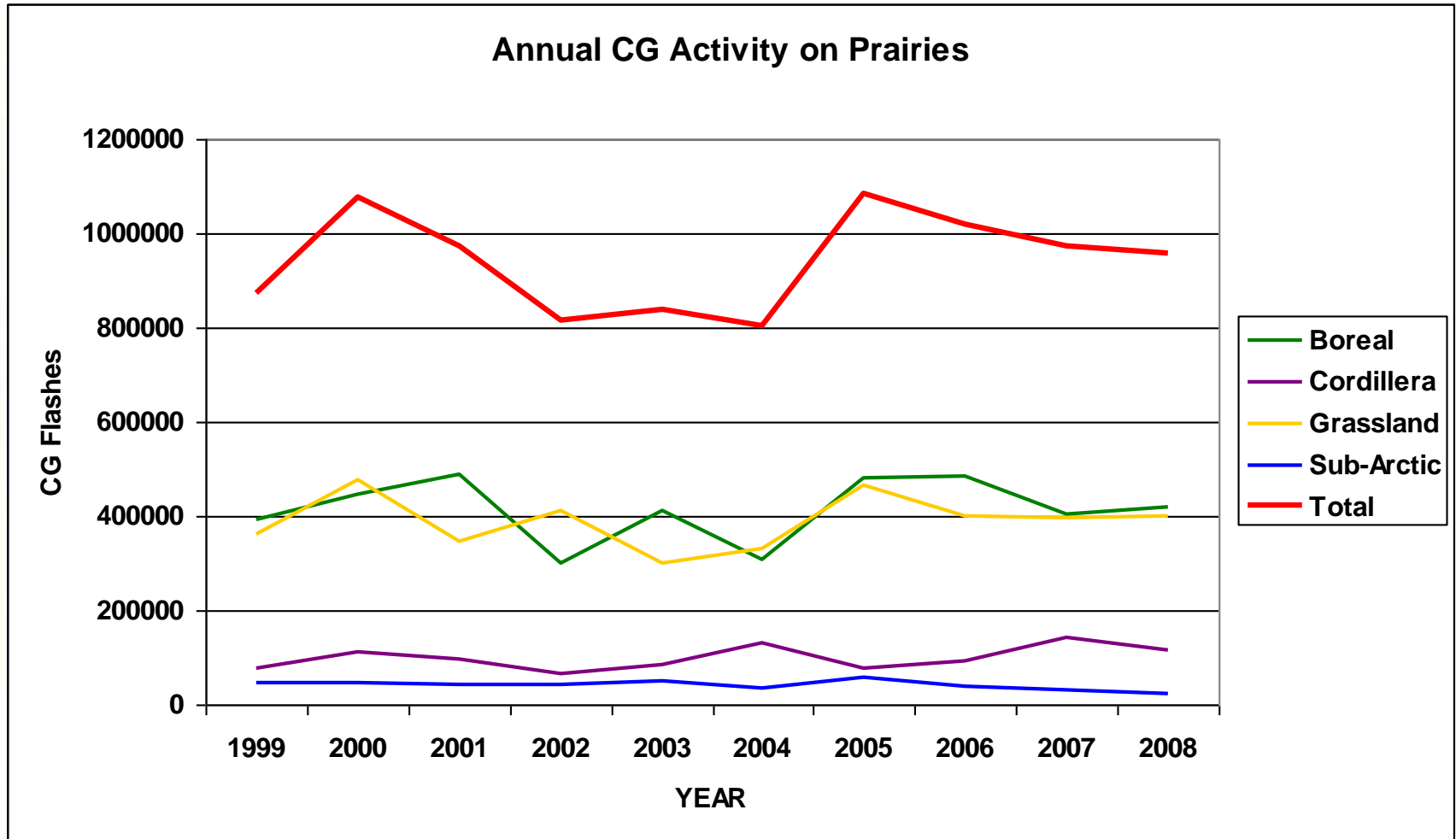
Monthly lightning climatology by ecozone



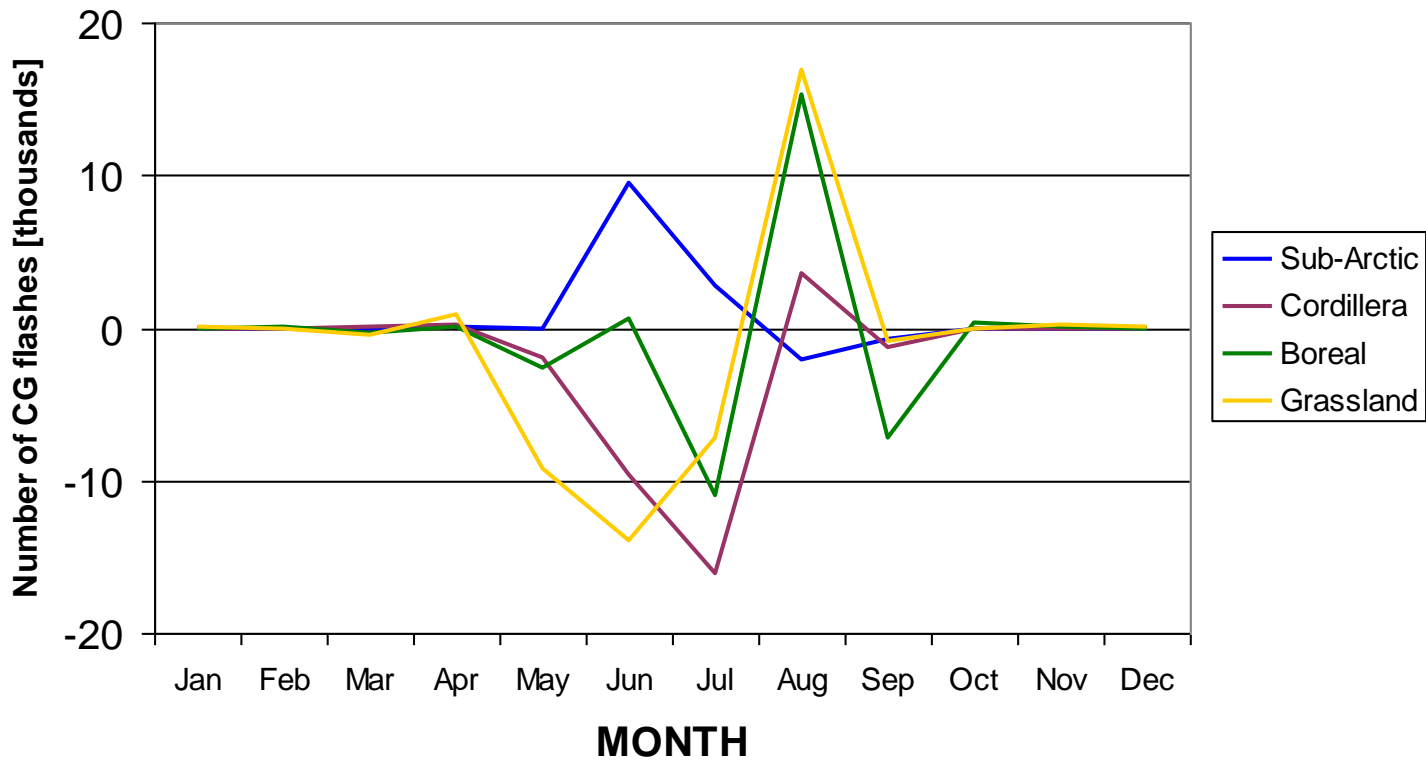
July 2006
Total lightning fls/mon/km²



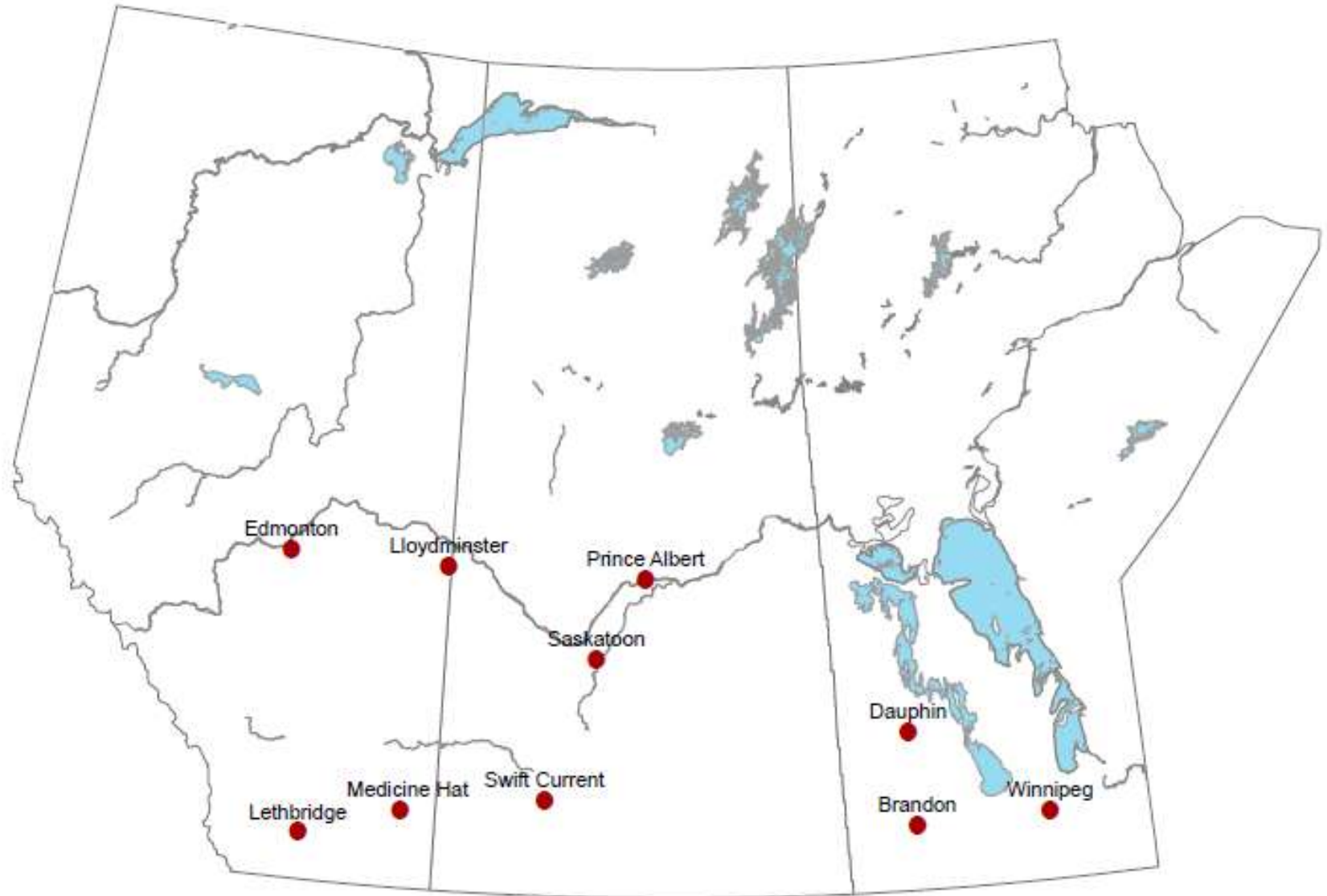
Annual lightning variation by ecozone



Monthly lightning activity difference between drought and post-drought periods

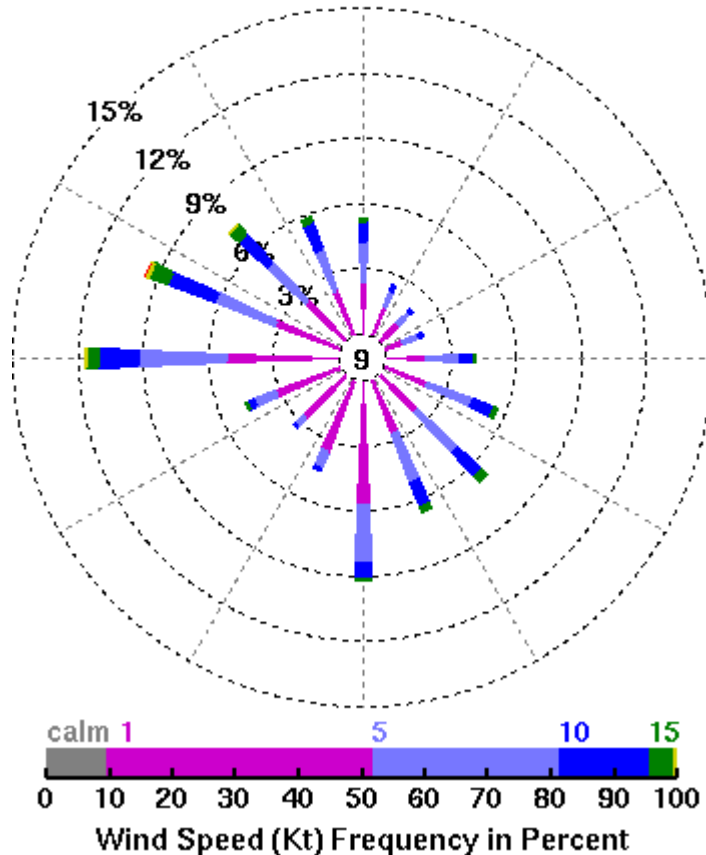


Selected sites for surface wind study

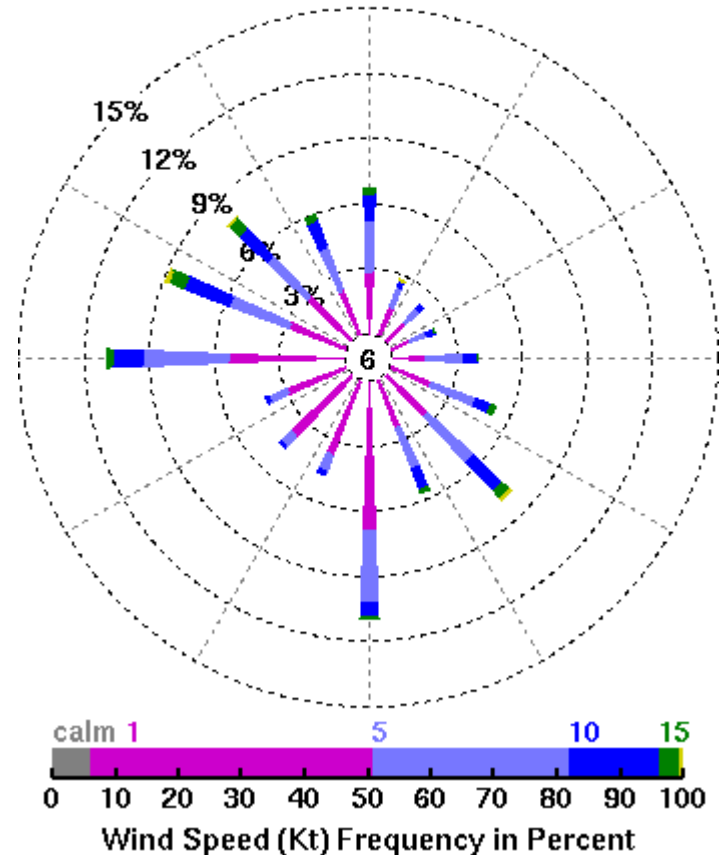


Summer Climatology / drought period comparison

**EDMONTON INT'L Airport
June-August (1971-2000)
Wind Speed Frequency by Direction**



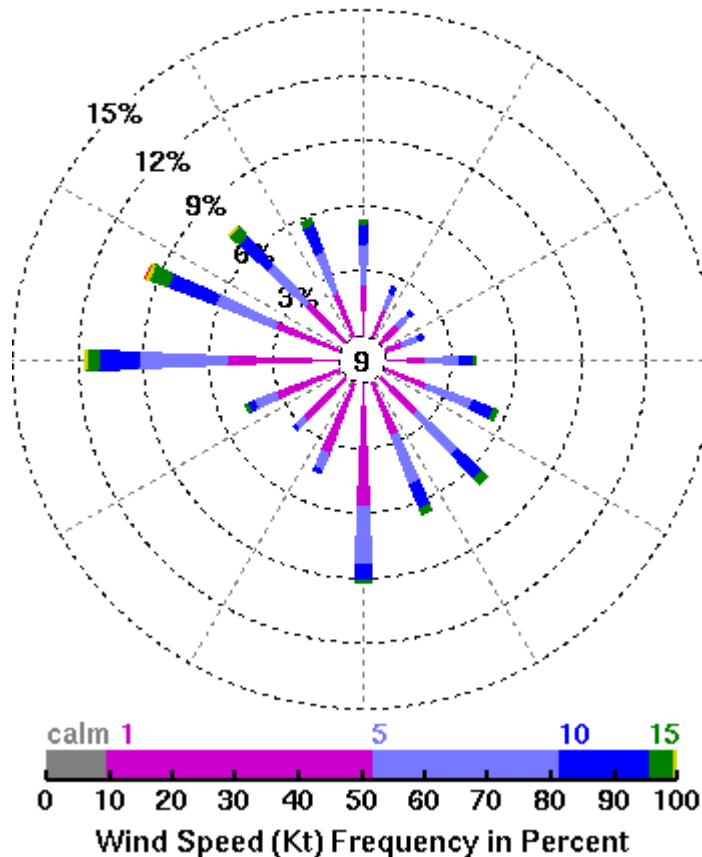
**EDMONTON INT'L Airport
June-August (1999-2005)
Wind Speed Frequency by Direction**



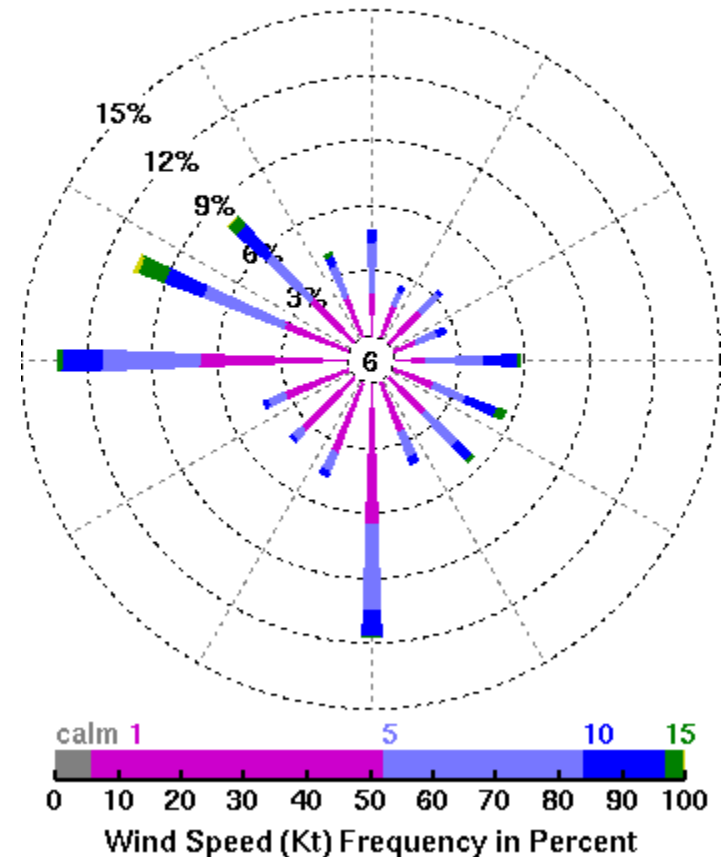
Summer

Annual variations during drought period

EDMONTON INT'L Airport
June-August (1971-2000)
Wind Speed Frequency by Direction



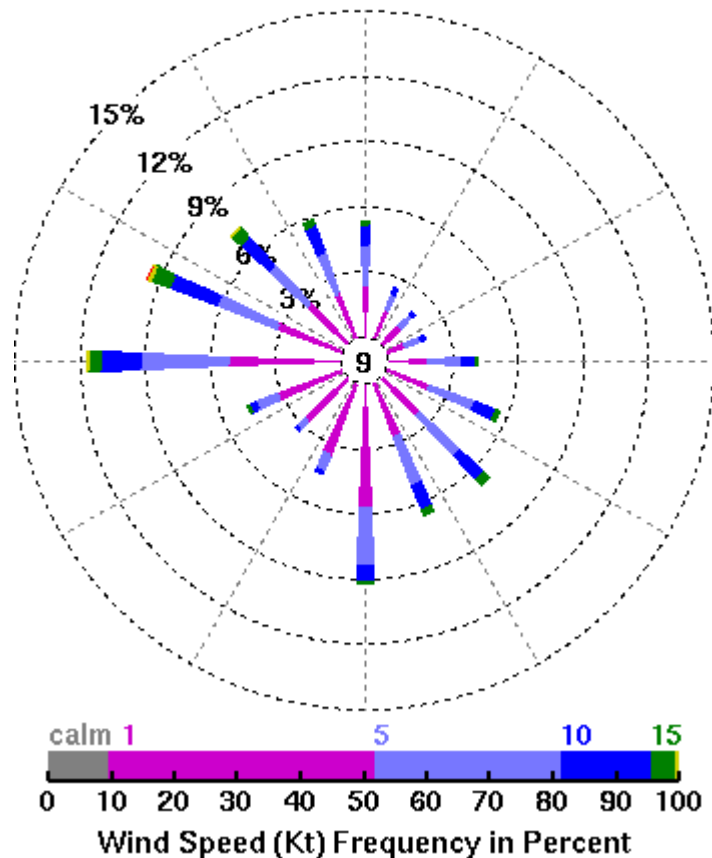
EDMONTON INT'L Airport
June-August (2000-2000)
Wind Speed Frequency by Direction



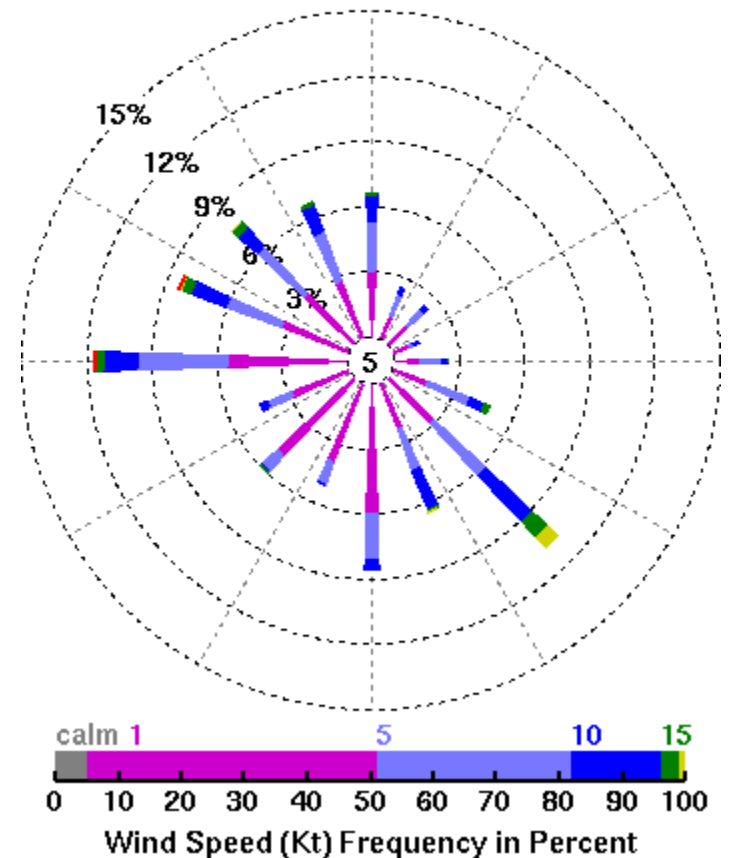
Summer

Annual variations during drought period

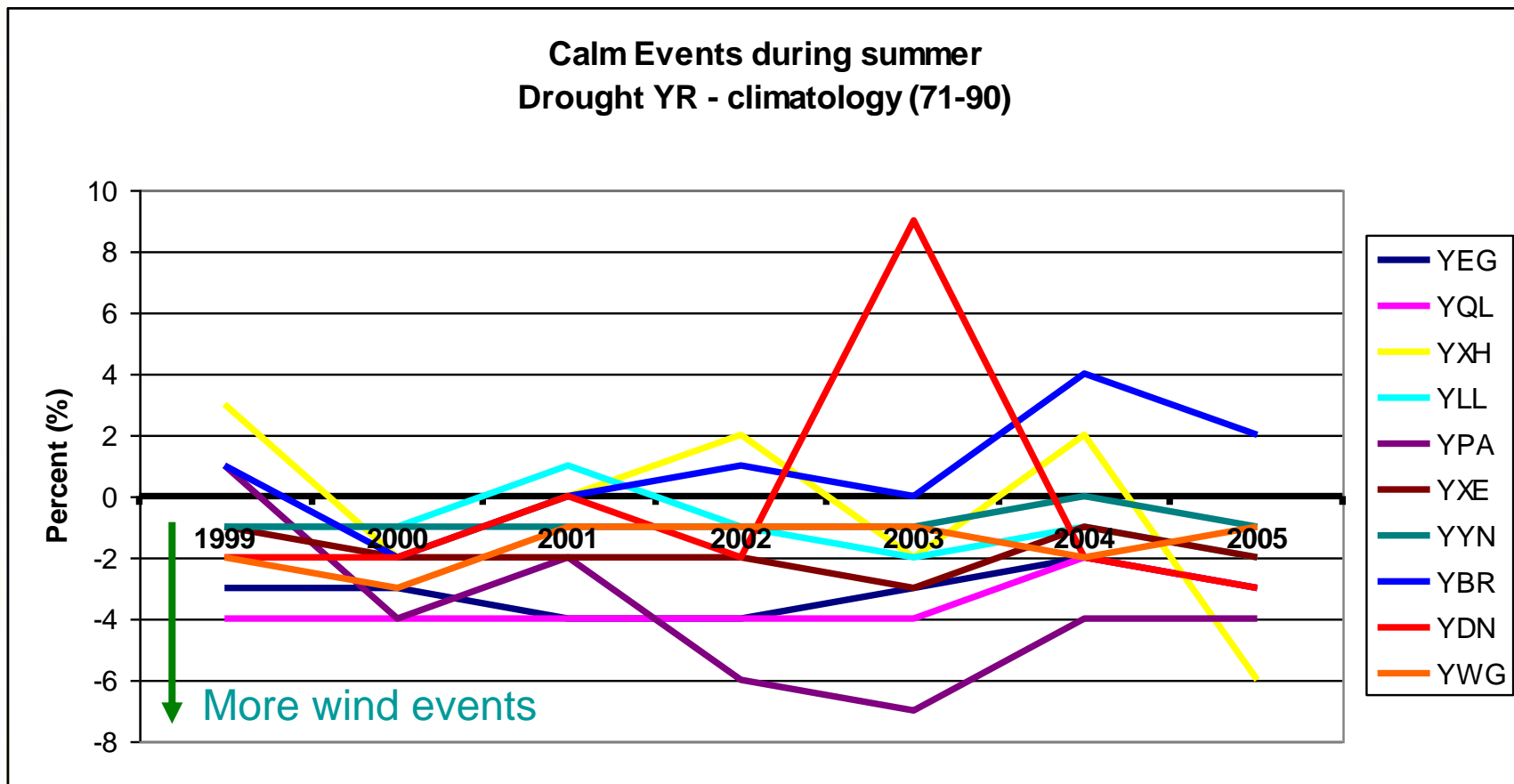
EDMONTON INT'L Airport
June-August (1971-2000)
Wind Speed Frequency by Direction



EDMONTON INT'L Airport
June-August (2001-2001)
Wind Speed Frequency by Direction



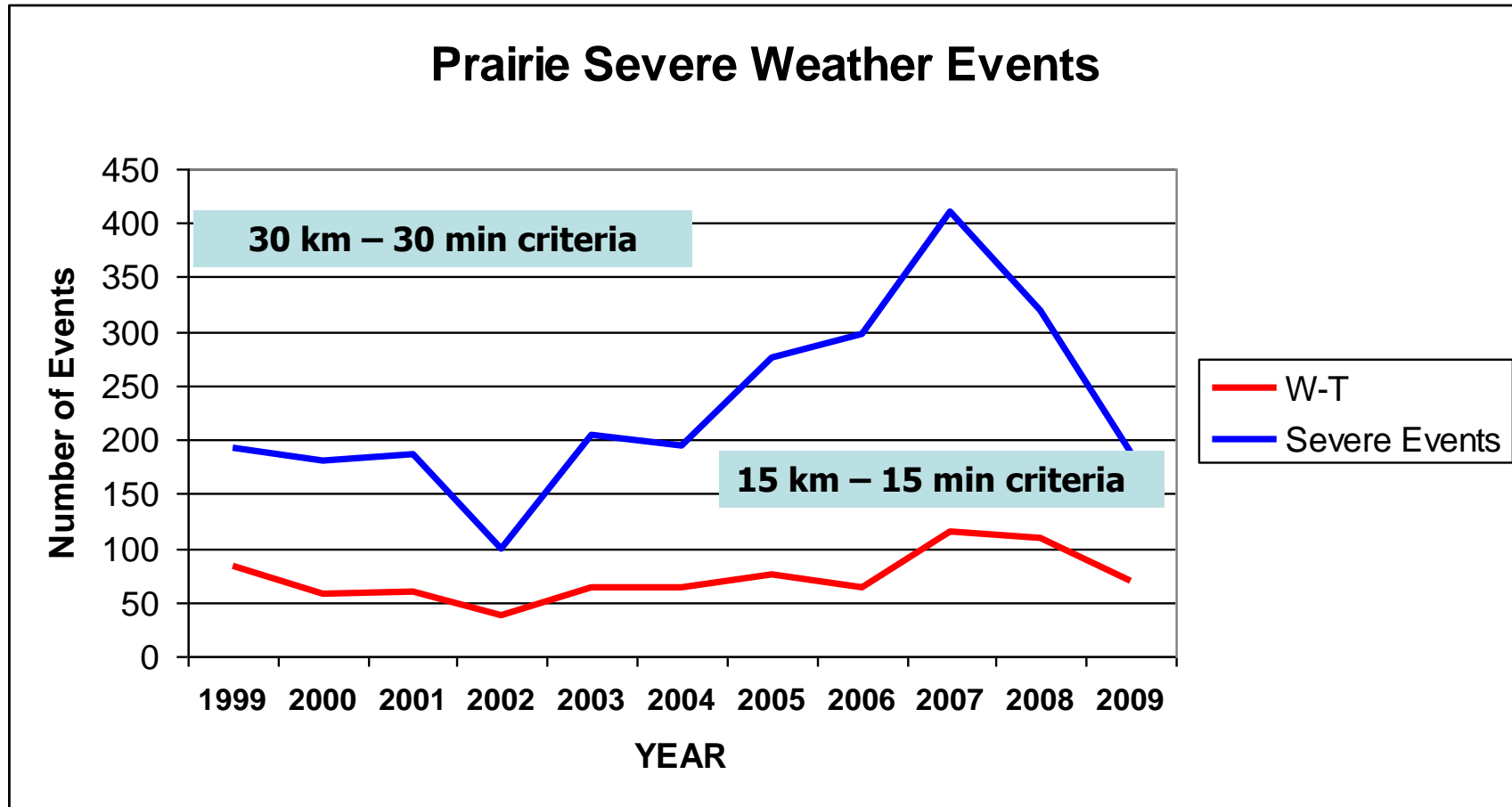
Summer variation of Calm wind events 1999-2005 (drought yr – 30yr climatology)



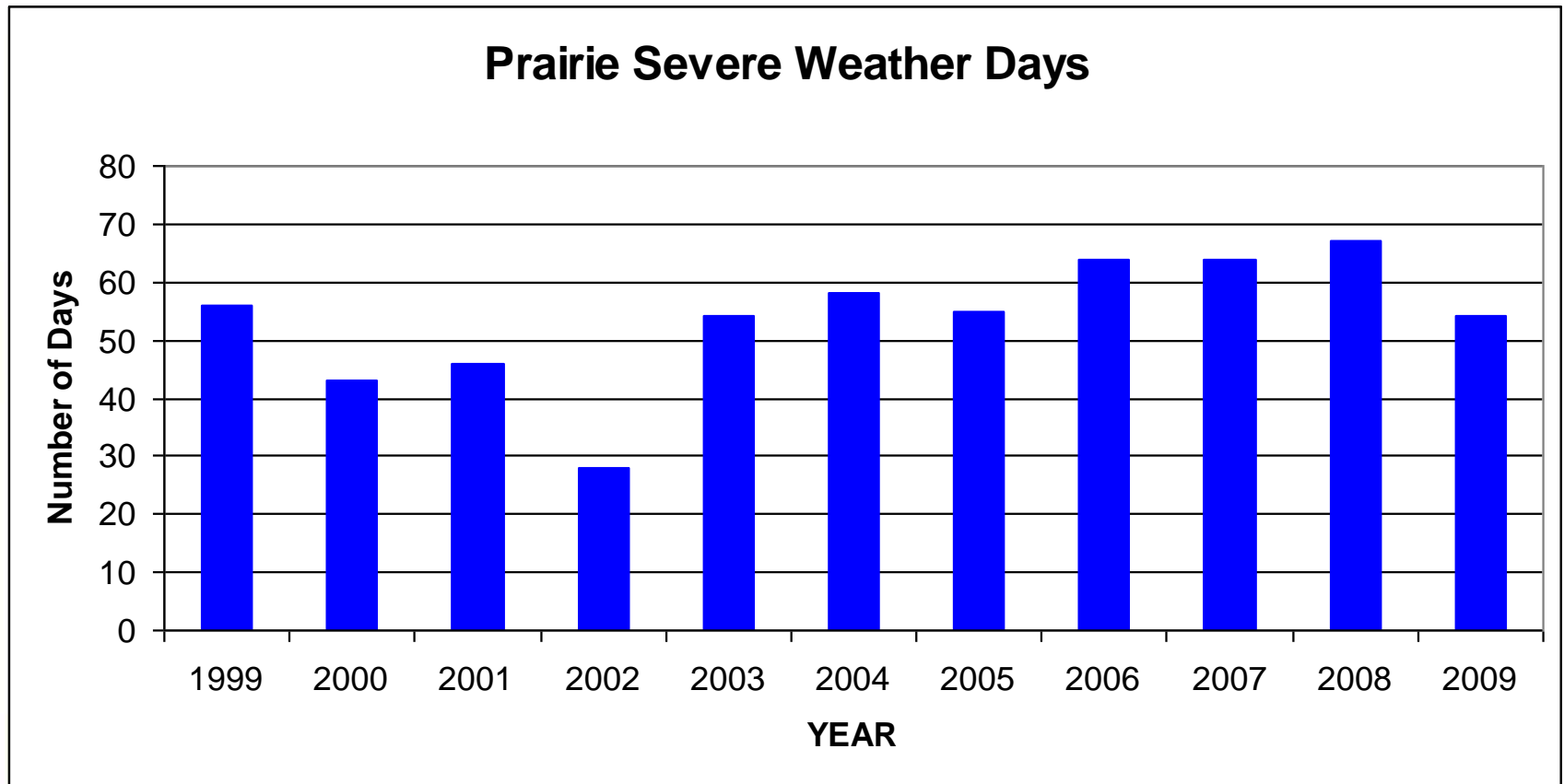
Severe Thunderstorm Criteria

- Objective criteria
 - 50 mm or more of rain in 1 hr or less or 75 mm in 3 hr or less
 - Wind speed or gusts \geq 90 km/hr
 - Hail diameter of 20 mm or larger
 - Tornadoes or waterspouts
- Subjective criteria
 - Flooding causing damage or serious inconvenience
 - Wind $<$ 90 km/hr causing significant property damage
 - Hail $<$ 20 mm in diameter causing significant property damage.
- Severe event is considered when one of the criteria is confirmed by a reliable report from the ground.

Annual Variation of Severe Weather Activity on the Prairies



Annual variation of severe weather days on the Prairies



Final remarks

- The picture emerging of prairie weather during the 1999-2005 drought.
 - Less lightning activity
 - Fewer severe weather days
 - Fewer calm days (windier conditions)