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## Long-term Changes in Wind Speed and Direction at Swift Current: 1955-1964 and 1996-2005

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### Introduction

- ! The climate of southwestern Saskatchewan has changed over the past 50 years.
- ! Swift Current has become warmer over the past 4-5 decades, especially during January thorough April.
- ! Average annual wind speed has tended to decrease since the early 1970's (Cutforth 2000).

### Objective

- ! To determine changes in wind speed and direction in the Swift Current area over the last 50 years

### Methods

- ! From 1953 to present, wind speed at a height of 10 m has been recorded at a standard meteorological site located at the Swift Current Airport.
- ! We compared annual and seasonal - Winter (D,J,F); Spring (M,A,M); Summer (J,J,A); Fall (S,O,N) - wind speed (km/yr) and wind direction for 1955-1964 and 1996-2005.

### Observations (comparing 1996-2005 to 1955-1964)

- ! Annually
  - ! average wind speeds are about 16% less now (1996-2005) than 50 years ago (1955-1964) (Table 1)
  - ! wind speeds are reduced from all directions (Table 2; Fig. 1). However, wind reductions from the E and W have been very small; whereas amounts from N, NW, W, S have been reduced about 20% (Table 2)
  - ! % time winds have blown from the SW has increased, but has decreased for W and S winds (Fig. 1)
- ! Seasonally
  - ! largest reduction in wind speed occurred in fall (20%); smallest reduction in spring (12%) (Table 1)
  - ! the large reductions in N, S, W wind speeds generally consistent across seasons (Table 2; Figs. 2a & 2b)
  - ! the small reduction in E wind speeds consistent across seasons (Table 2; Figs. 2a & 2b)
  - ! whereas averaged reduction in NW wind speeds is about 20%, average wind run

increased slightly during spring (5%) but decreased during the other seasons (especially for fall - 27%, winter - 40%) (Table 2; Figs. 2a & 2b)

- ! annual reduction in SW wind speed very small; however, wind speeds increased in winter (4%) and spring (9%) but decreased in fall (5%) and summer (14%) (Table 2)
- ! wind patterns are similar for winter and fall, and for spring and summer (Figs. 2a & 2b)
- ! generally, % time winds were from W, S has decreased; % time winds NW decreased during winter and increased slightly during spring (Figs. 2a & 2b)
- ! generally, % time has increased for winds from SE, and from SW (especially in winter) (Figs. 2a & 2b)

## References

Cutforth, H.W. 2000. Climate change in the semiarid prairie of southwestern Saskatchewan: temperature, precipitation, wind, and incoming solar energy. *Can. J Soil Sci.* 80:375-385.

**Table 1.** Average wind speed (km/h) reduction and % reduction for 1996-2005 compared to 1955-1964 at Swift Current.

Period	Annual	Winter	Spring	Summer	Fall
1955-1964	23.7	25.3	23.8	20.9	24.7
1996-2005	20	21.6	20.9	17.7	19.7
Reduction	3.7	3.7	2.9	3.2	5
%Reduction	15.6	14.6	12.2	15.3	20.2

**Table 2.** Wind speed for 1996-2005 as a percentage of wind speed for 1955-1964 at Swift Current.

Direction	Annual	Winter	Spring	Summer	Fall
N	0.8	0.79	0.81	0.8	0.79
NE	0.87	1.03	0.85	0.93	0.72
E	0.97	1.01	0.93	1.01	0.95
SE	0.86	0.84	0.83	0.89	0.87
S	0.74	0.8	0.77	0.75	0.68
SW	0.98	1.04	1.09	0.86	0.95
W	0.79	0.86	0.76	0.76	0.75
NW	0.81	0.61	1.05	0.89	0.73