Does Below Normal Fall and Winter Snowfall Influence Spring and Summer Weather?

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For this study

- Focus is on snowfall so far and what that means for upcoming spring and summer conditions.
- Statistical correlations were calculated using snowfall for the September through February period (meteorological fall and winter).
- Locations used were Bismarck, Minot, Jamestown, and Williston.
  - Significant gaps in Dickinson data excluded its consideration from the study.

- Correlations were drawn against the following:
  - March snowfall
  - April snowfall
  - Spring
    - Snowfall
    - Precipitation
    - Average temperature
  - Summer
    - Precipitation
    - Average temperature

Notes on Correlations

- This function gives values between -1 and 1.
- Values near zero → no correlation.
- Values closer to -1 or 1 → strongly related.
- Positive (negative) values imply drier and/or cooler (wetter and/or warmer).

- Data set definitions:
  - *Overall* – Correlation performed using the entire data set.
  - *Below* – Correlation performed using below normal snowfall periods.
  - *Much Below* – Correlation performed using only significantly below normal periods.
    - Only the 17% least snowy fall and winter periods considered (i.e., 1 standard deviation below average snowfall).

BISMARCK

Years of Data	BISMARCK	Snowfall	Snowfall	Snowfall	Temp	Temp	Precip	Precip
		Spring	March	April	Spring	Summer	Spring	Summer
123	Overall	0.18	0.13	0.17	-0.10	-0.04	-0.06	0.01
73	Below	0.02	-0.02	0.04	0.00	0.16	-0.11	-0.22
18	Much Below	-0.12	0.18	-0.49	0.44	0.04	0.01	0.08

WILLISTON

Years of Data	WILLISTON	Snowfall	Snowfall	Snowfall	Temp	Temp	Precip	Precip
		Spring	March	April	Spring	Summer	Spring	Summer
104	Overall	0.11	0.03	0.14	-0.03	-0.05	0.02	-0.04
59	Below	0.14	0.01	0.17	0.17	0.14	0.12	-0.21
14	Much Below	0.25	0.32	0.03	0.10	-0.26	0.12	0.24

MINOT

Years of Data	MINOT	Snowfall	Snowfall	Snowfall	Temp	Temp	Precip	Precip
		Spring	March	April	Spring	Summer	Spring	Summer
103	Overall	0.20	0.23	0.07	-0.12	-0.04	0.02	-0.08
52	Below	0.12	0.14	0.06	-0.16	0.00	0.05	0.08
20	Much Below	0.35	0.04	0.45	-0.34	-0.40	0.57	0.49

JAMESTOWN

Years of Data	JAMESTOWN	Snowfall	Snowfall	Snowfall	Temp	Temp	Precip	Precip
		Spring	March	April	Spring	Summer	Spring	Summer
101	Overall	0.10	0.05	0.12	-0.05	0.01	0.00	-0.12
57	Below	0.00	-0.05	0.14	-0.15	0.00	-0.05	-0.15
14	Much Below	0.12	0.06	0.23	0.17	-0.05	0.11	0.31

In Conclusion

- Snowfall from September through February at these sites is not related to weather for the spring or summer.
- A complementary study using a different method also found that no relationship exists.
- In general, similar results were found for above normal and much above normal fall and winter snowfall periods.