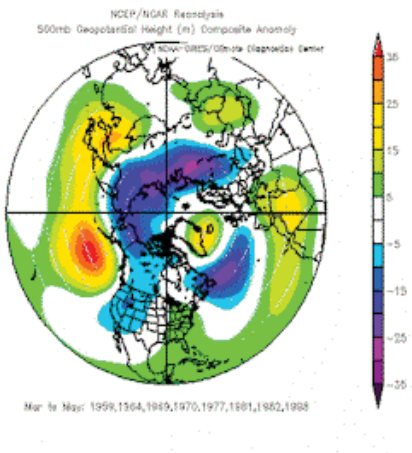
The Pennsylvania State Climatologist



June Climate Highlight:

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This month's climate highlight focuses on temperature and precipitation anomalies in the state of Pennsylvania during the months of July and August. The time series of 1895-2008 (113 years) and two data sets were used in this study. The first set compiles data from just the state of Pennsylvania while the other incorporates the entire Northeast US. The goal was to look for a correlation between the anomalies of the two months.

Temperature Anomalies

Pennsylvania

After analyzing temperature data for July and August in Pennsylvania, it was clear that there was a bit of a correlation between monthly anomalies. Different degradations were used to study the data.

# Years w/same Jul-Aug Anomaly (%)	Limits	(Years Above, Years Below)
77 (68)	<0, >0	(32, 38)
70 (62)	<-0.1, >0.1	(36, 41)
29 (26)	<-1.0, >1.0	(16, 13)

Table 1: Number of years w/same Jul-Aug anomaly with 3 different degradations

As seen from Table 1, the months of July and August are both above average or both below average 68% of the time (77 out of 113 years). However, when the limit is changed to 0.1˚F above or below average, the anomaly is the same only 62% of the time. It also seems as there is a stronger correlation with consecutive above average months as opposed to below average (as seen by the third column in Table 1).

Northeast US

# Years w/same Jul-Aug Anomaly (%)	Limits	(Years Above, Years Below)
78 (69)	<0, >0	(36, 42)
69 (61)	<-0.1, >0.1	(34, 35)
25 (22)	<-1.0, >1.0	(13, 12)

Table 2: Number of years w/same Jul-Aug anomaly with 3 different degradations

The Northeast US dataset shows roughly the same correlation as the Pennsylvania data with 69% of the years having the same anomaly for the two months.

Precipitation Anomalies

After analyzing precipitation data for July and August in Pennsylvania, it was clear that there was a bit of a correlation between monthly anomalies. Different degradations were used to study the data.

Pennsylvania

# Years w/same Jul-Aug Anomaly (%)	Limits	(Years Above, Years Below)
70 (62)	<0, >0	(32, 38)
60 (53)	<-0.1, >0.1	(25, 35)
32 (28)	<-0.5, >0.5	(10, 22)
13 (12)	<-1.0, >1.0	(6, 7)

Table 3: Number of years w/same Jul-Aug anomaly with 3 different degradations

While the precipitation data also shows a correlation between the two monthly anomalies, it is not as strong as the temperature relation. 62% of the years had above or below average anomalies for both months. If the limit is changed to 0.1" then the percentage drops to 53% (60 out of 113 years). It also seems as if there is a stronger correlation with consecutive below average months as opposed to above average (as seen by the third column in Table 3).

Northeast US

# Years w/same Jul-Aug Anomaly (%)	Limits	(Years Above, Years Below)
59 (52)	<0, >0	(26, 33)
50 (44)	<-0.1, >0.1	(22, 28)
26 (23)	<-0.5, >0.5	(7, 19)
6 (5)	<-1.0, >1.0	(2, 4)

Table 4: Number of years w/same Jul-Aug anomaly with 3 different degradations

The Northeast US dataset shows somewhat of a weaker correlation than the Pennsylvania data with only 52% of years having the same anomaly for July and August. Once again, a stronger relation exists between consecutive below average years (see third column in Table 4).

Based on these findings, it can be concluded that there is a slight correlation between July and August temperature and precipitation anomalies. August follows the July anomaly the majority of the time for both meteorological variables. This conclusion coincides with what meteorologists call "persistence forecasting." This method relies on forecasting for next month what has happened so far for the current month. For example, if July was cool and wet, persistence would predict that August would also be cool and wet. This method works best for long range forecasts and is sometimes argued to be better than using numerical weather prediction models for monthly and seasonal forecasts.