Precipitation in Aberdeen, SD: Data Analysis Approach

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The daily, monthly and annual sum of precipitation was analyzed for station Aberdeen-Airport, South Dakota (NOAA COOP #390020) with traditional normative statistical descriptions of precipitation variability and with methods of data analysis (MDA). MDA was applied to analyze empirical data for seasonality and regularity of high values of daily precipitation. Daily data were available for 415,556 of the 422,294 days of station operation (1890-2008; 2008 data file SD390020 from NOAA National Climatic Data Center). For 9629 days the precipitation was >= 0.01 in., for 516 >= 1.0 in., for 86 >= 2.0 in., for 24 >= 3.0 in., and for 4 >= 4.0 in. The daily values cannot be considered as having any use for the forecast.

The observations of 1423 monthly sums of precipitation have the following characteristics:
- <1.0 in. - 42.66%
- <3.0 in. - 80.74%
- <5.2 in. - 95.29%
- <7.71 in. - 99.02%

Fourteen periods have amplitudes higher that 0.1. The biggest amplitude from those components belongs to period of 12 months (amplitude of approximately twice that height (0.066)). Fourteen periods have amplitudes higher that 0.1. The same analysis for annual sum for time interval 1932-2006 presents mean = 19.514, 1.525, 1.451, 1.084, 1.066, and 1.451. The model shows that annual precipitation is moderately greater than the long-term mean value.

The seasonal regime may be well represented by the factor scores; four factors charts (for factors 1, 3, 4, and 5) show different degrees of decrease in sum of precipitations for analyzed interval. In contrast, for factor 2 slightly increased.

The assumption of possible forecast for precipitation and connected flooding was considered based on the obtained results of daily, monthly and annual sums of monthly sums in May and June.

This rainfall event set the state record 24 hr precipitation total of 8.75" at Groton.