Introduction:

The SPI is based on the probability of precipitation for any time scale. The probability of observed precipitation is then transformed into an index. It is being used in research or operational mode in more than 70 countries. Precipitation is the only input parameter. The SPI can be computed for different time scales, provide early warning of drought and help assess drought severity. Because the SPI is normalized, wetter and drier climates can be represented in the same way; thus, wet periods can also be monitored using the SPI. (WMO)

Data:

Observed rainfall data from 34 stations were used to calculate spi values. BMD Daily data from 1981 to 2019 was processed and spi values were calculated on district level. Station data were interpolated using inverse distance weighting method.

For observed spi map, firstly the daily rainfall data were extracted for the desired timescale (both monthly and seasonal). Then the station data were interpolated using inverse distance weighted method to calculate the rainfall value for 64 district of Bangladesh. Then using accumulated rainfall values, spi values were calculated for each district. With these value, observed spi maps were produced.

For forecast spi map, firstly the data were extracted from 1981 to 2018 on one dataframe and for 2019 on another dataframe, for every station on desired timescale (seasonal). Interpolation was done on first dataframe as usual. For second dataframe, interpolation was done, and then 14 days forecasted accumulated rainfall was added to every district's interpolated value. Then using these dataframes, spi values were calculated.

Methodology:

The SPI calculation for any location is based on the long-term precipitation record for a desired period. This long-term record is fitted to a probability distribution, which is then transformed into a normal distribution so that the mean SPI for the location and desired period is zero (Edwards and McKee, 1997).

Positive SPI values indicate greater than median precipitation, and negative values indicate less than median precipitation. Drought, according to the SPI, starts when the SPI value is equal or below -1.0 and ends when the value becomes positive.