NAO index calculation

For the southern station, *A* (which could be Lisbon, Gibraltar, Ponta Delgada etc.) and the northern station, *B* (which could be Reykjavik, SW Iceland etc.):

$A_{m,y}$ is sea level pressure (SLP) in month m (1..12) and year y at station *A*.

$B_{m,y}$ is SLP in month m (1..12) and year y at station *B*.

The mean and the standard deviation are computed separately for each month of the year, and for A and B separately, using values only from the reference period. Phil Jones often uses 1951-1980 as the reference period, others sometimes use 1961-1990.

Mean is: $\overline{A_m} = \sum_{y=1951}^{y=1980} A_{m,y}$

Standard deviation is: $\boldsymbol{S}_{A_m} = \sqrt{\frac{1}{n-1}\sum\left(A_{m,y} - \overline{A_m}\right)^2}$

and similarly for station B. Each monthly station SLP series is then "normalised" by subtracting the mean for the appropriate month, and dividing by the standard deviation for the appropriate month.

$$A'_{m,y} = \frac{A_{m,y} - \overline{A_m}}{\boldsymbol{S}_{A_m}}$$

and similarly for station B. The monthly NAO index is then computed by differencing the two normalized series:

$$NAO_{m,y} = A'_{m,y} - B'_{m,y}$$

Seasonal means of the NAO index are computed simply by taking an average of the monthly NAO index values (i.e., it is <u>not</u> necessary to compute seasonal means of the original SLP series and go through the entire process again).

Because the normalisation is applied to the individual station records prior to differencing them, the NAO index itself does not have a standard deviation of one. When the monthly NAO index values are averaged into seasonal means, again no further normalisation is done and so the seasonal NAO index also does not have a standard deviation of one.