Blocking Index

The meridional gradients for 500 hPa geopotential height, GHGS and GHGN, are computed for each latitude as follows:

\[
\begin{align*}
\text{GHGS} &= \frac{Z(\phi_0) - Z(\phi_s)}{\phi_0 - \phi_s}, \\
\text{GHGN} &= \frac{Z(\phi_n) - Z(\phi_0)}{\phi_n - \phi_0},
\end{align*}
\]  

(1)

where

\[
\begin{align*}
\phi_n &= 77.5^\circ \text{N} \pm \Delta, \\
\phi_0 &= 60.0^\circ \text{N} \pm \Delta, \quad \Delta = 0^\circ, \ 2.5^\circ, \ 5.0^\circ, \\
\phi_s &= 40.0^\circ \text{N} \pm \Delta. 
\end{align*}
\]

A specific longitude on a given day is defined as being blocked if both of the following conditions are satisfied (for at least one value of $\Delta$):

\[
\begin{align*}
\text{GHGS} &> 0, \\
\text{GHGN} &< -5 \text{m/deg lat}.
\end{align*}
\]  

(2)