Averaged intensity and anomaly functions

\[ T_{1}(i, j) = m_{1}(i, j) + \frac{\sigma_{1}(i, j)}{\sqrt{k}} \varepsilon_{n}, \quad T_{2}(i, j) = m_{2}(i, j) - \frac{\sigma_{2}(i, j)}{\sqrt{k}} \varepsilon_{n} \]

\[ \rho_{1}(i, j) = \frac{T_{1}(i, j) + T_{2}(i, j)}{T_{1}(i, j) + T_{2}(i, j)}, \quad \rho_{2}(i, j) = \frac{T_{1}(i, j) - T_{2}(i, j)}{T_{1}(i, j) - T_{2}(i, j)} \]

\[ \rho_{i}(i, j, \alpha) = \rho_{1}(i, j) + \alpha \rho_{2}(i, j), \]

\[ f_{1}(i, j) = 1, \quad f_{2}(i, j) = 0, \quad f_{3}(i, j) = 0. \]

\[ \alpha(T_{k}) = \frac{1}{N_{1}N_{2}} \sum_{i=1}^{N_{1}} \sum_{j=1}^{N_{2}} f_{1}(i, j, T_{k}) \]

\[ S(T_{k}) = \frac{1}{N_{1}N_{2}} \sum_{i=1}^{N_{1}} \sum_{j=1}^{N_{2}} M(i, j, T_{k}) \]

Cross-correlation between \( \varepsilon(T_{k}) \) and Dst(Tk)

Conclusions

- Cross-correlations between functions of the averaged intensity and anomaly and Dst index may be the basis for precursors of geomagnetic storms.
- Time periods of increased geomagnetic activity are most likely to be preceded, on average, by 1-1.5 days, by time periods with elevated values of the cross-correlation.
- The developed approach allows for significant improvements.

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