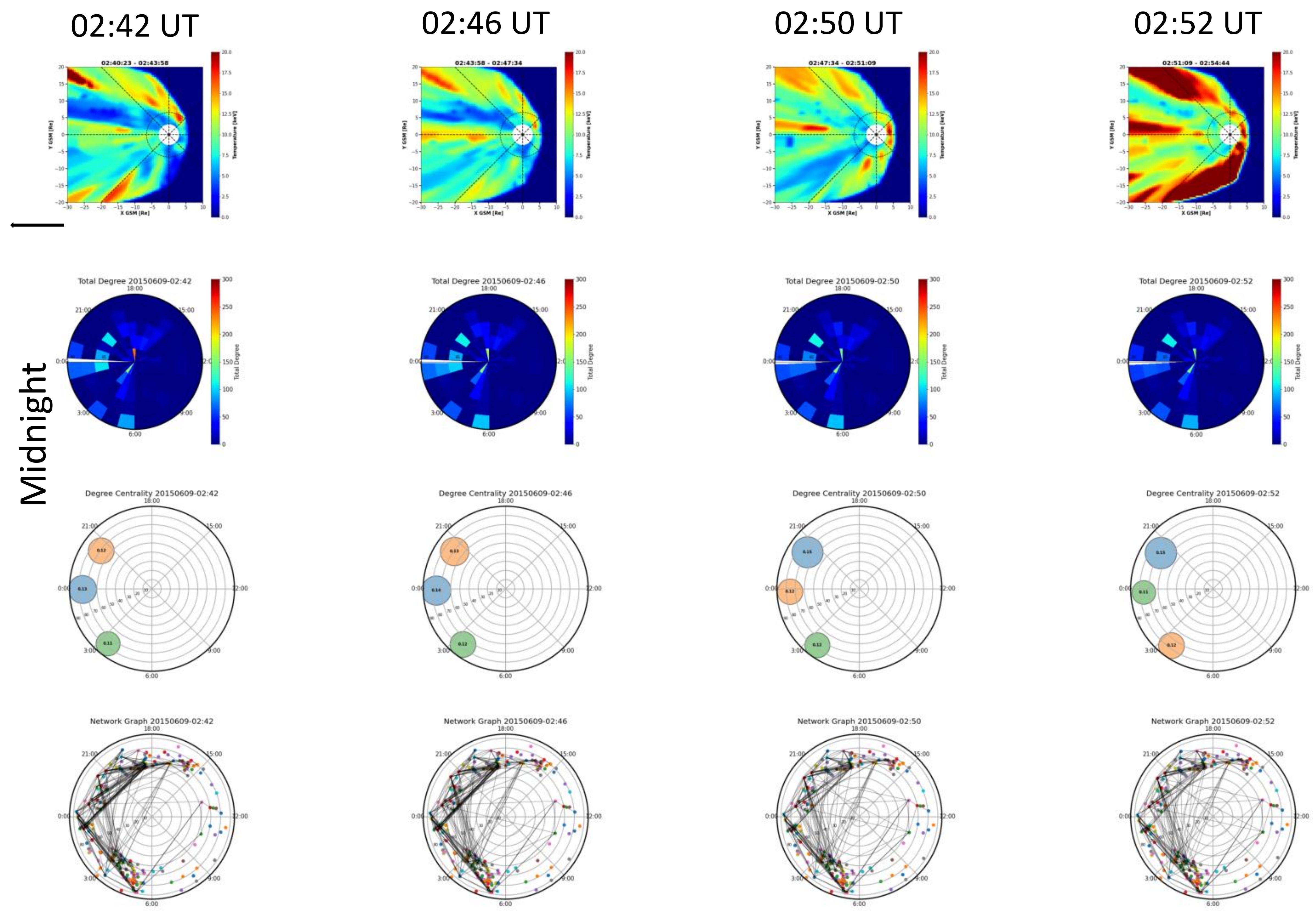
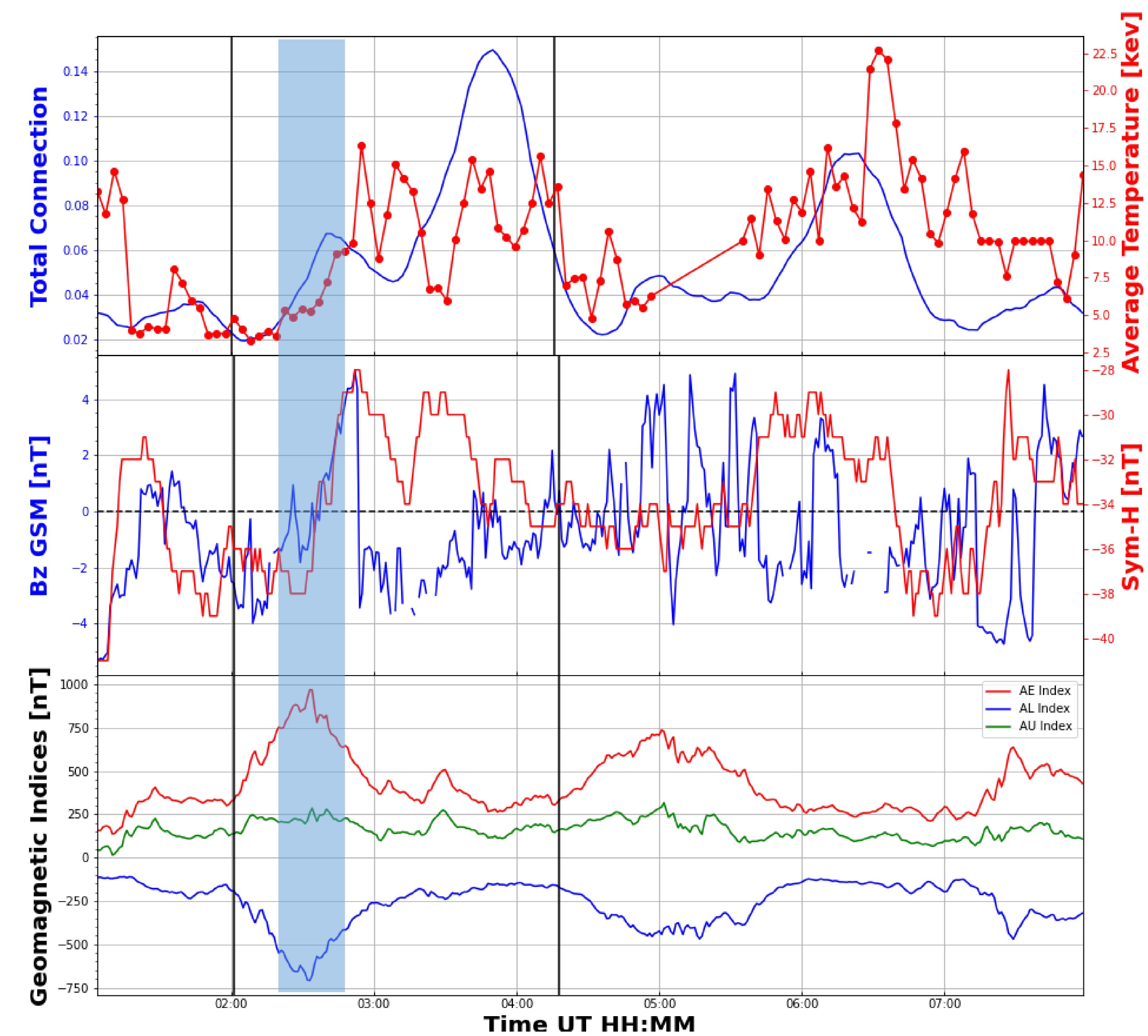


June 09<sup>th</sup> 2015

Time Series Correlation

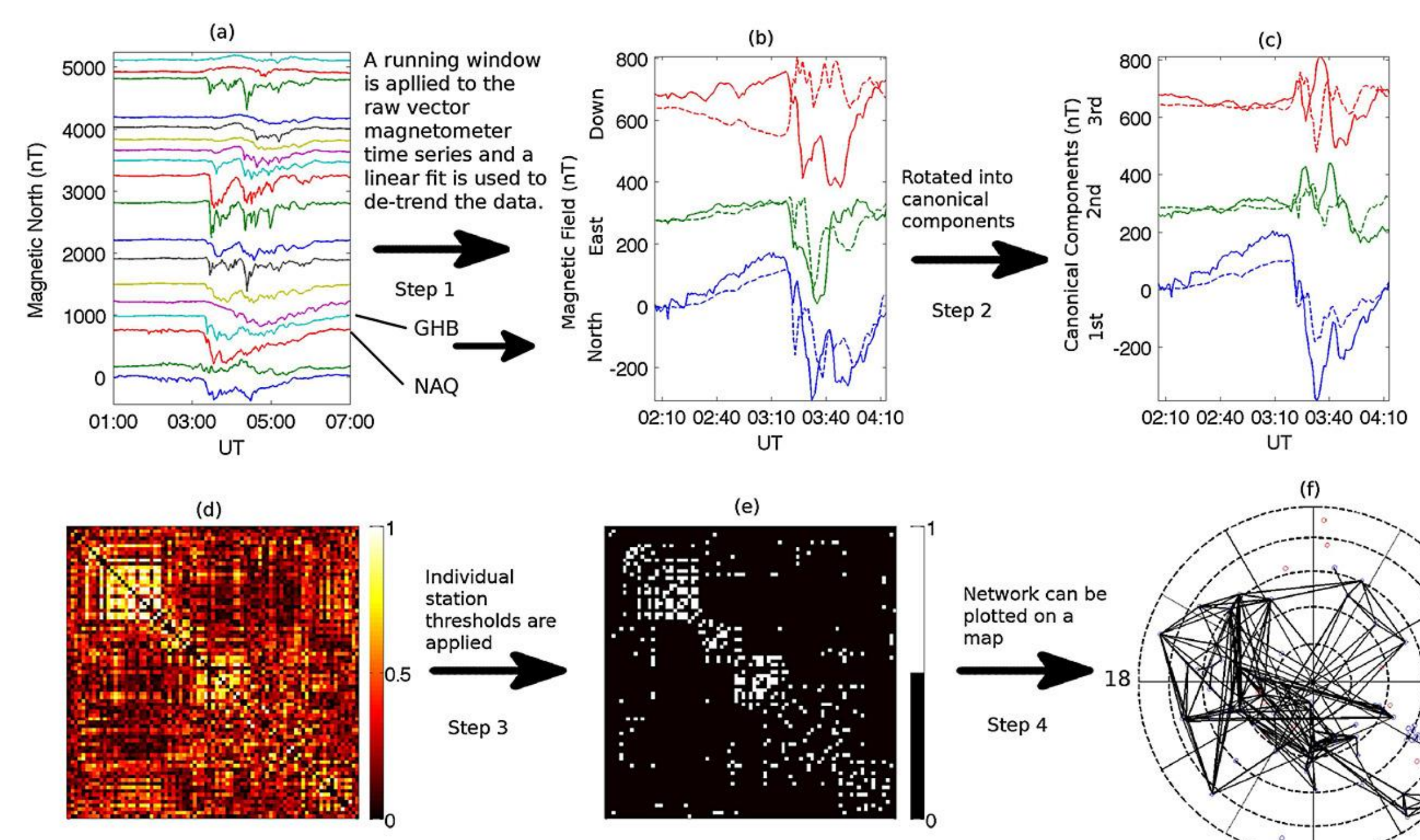


**Fig 1:** Network parameters for the first substorm event, correlated with temperature maps. Clear signatures of multiple flow channels entering the inner magnetotail, particularly towards the midnight sector, are evident. The network histogram illustrates the enhanced connectivity on the night side in response to these incoming flow channels. High latitude stations also show increased activity, correlating with flow channels further out in the magnetotail. The network centrality plot (row 3) highlights the critical connections between 21:00 MLT and 03:00 MLT, corresponding to the main areas where flow channels were observed. These stations were located between 70- and 80-degrees latitude, centered around midnight.



Time series analysis of the temperature maps along with the network connections. First panel is the total connections and averaged temperature map. Second panel and third panels are the geomagnetic background parameters. The lines shows the time of the first and second onset for the two substorm events in the time interval. The Blue rectangle shows the time range for the figure to the right (Fig 1)

## Motivation



- Map out the response of the SuperMAG stations to geomagnetic disturbances.
- Compare spatial and temporal dynamics of the maps with magnetotail temperature maps.

**Fig. 1:** taken from Dods et. al, 2015, the figure highlights the steps taken to generate a network of connection from the SuperMAG stations.

## Conclusions

- Temperature maps of the magnetotail were generated using ENA data from the TWINS mission.
- June 9<sup>th</sup>, 2015, substorm events were analyzed. Substorm onset was around 02:00 UT and 04:15 UT respectively.
- Increase values in the temperature maps and total network connection counts shortly after onset.
- Time lag between the times of onset and response from the temperature maps and network connections.
- Features spread across the night side with increases in total connections in the same region.
- High latitude response to the substorm disturbance, with ENA maps features also further down tail.

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