Preliminary considerations on the selection of the test storm events and test locations

Geomagnetic storm intensity: To test ionospheric prediction capabilities under storm conditions, we may focus on moderate (-100 nT < minDst ≤ -50 nT) and intense (Dst ≤ -100 nT) storm events.

Interplanetary drivers of the storms: It may be important to include events driven by all possible interplanetary solar wind drivers, i.e. ICME and HSSs.

Spatial distribution of the test locations

The ionospheric storm time response depends strongly on the latitude and the local time of the observation point. This dependence is comprehensively discussed in several review articles available in the literature [see for example the review articles presented by Rishbeth (1991), Prölss (1995), Buonsanto (1999), and Mendillo (2006)]. To test the efficiency of present modeling capabilities in capturing these dependencies and to test the models' prediction efficiency in global, we look for data available at least in two distinct local time sectors, e.g. US and Europe, from high to equatorial latitudes. The list of the proposed network of stations in full potentiality are provided in Table 1 distributed in both the Northern and Southern Hemispheres to support the possibility to explore also the trends in predicting hemispheric asymmetries. The proposed network of the test stations is also mapped in Fig. 1.

Table 1: List of ionospheric locations to be used in the present analysis

Station	Geographic Lat(° N)	Geographic Long (° E)
Goose Bay	53.30	299.70
Millstone Hill	42.60	288.50
Idaho National Lab	43.81	247.32
Boulder	40.00	254.70
Eglin AFB	30.50	273.50
Jicamarca	-12.00	283.20
Port Stanley	-51.60	302.10
Sondrestrom	66.98	309.06
Tromso	69.60	19.20
Chilton	51.50	359.40
Pruhonice	50.00	14.60
Ebre	40.80	0.50
Athens	38.00	23.50

Hermanus	-34.42	19.22
Grahamstown	-33.30	26.50
Louisvale	-26.50	21.20
Madimbo	-22.39	30.88

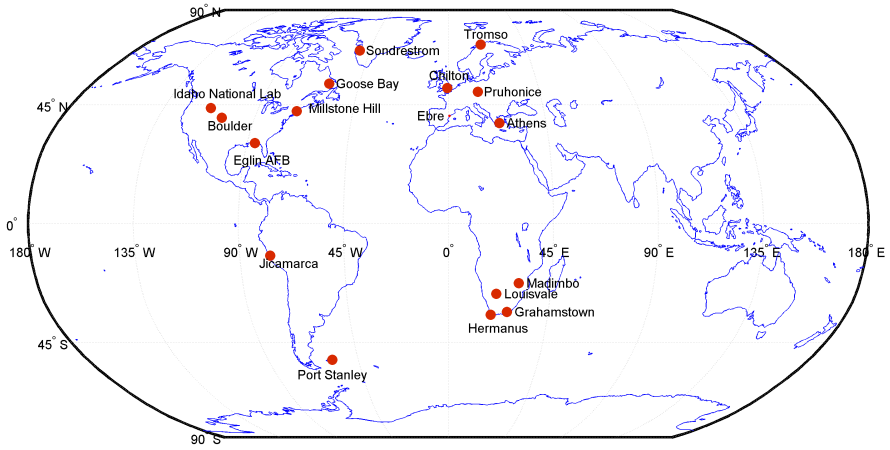

Fig. 1: The proposed test network.

Relation to previous/complementary initiatives: Part of GEM-CEDAR Challenge Events available at http://ccmc.gsfc.nasa.gov/challenges/Event_list_for_Metrics_Study.pdf

Data availability: Good data coverage within the test events and 30 days prior to them in order to explore reliably all options for the determination of the background conditions and the quantification of the storm impact. Data resolution: preferably 15 min.

Preliminary list of storm events:

Date	**Min Dst (nT)**
29 March – 3 April 2001	-387
18 - 31 July 2004	-99 -126 -170
14 - 16 May 2005	-247
8 - 11 March2012	-74 -131
16 - 20 March 2013	-132
31 May – 4 June 2013	-119
21 - 24 June 2015	-204

References

Buonsanto, M. Ji. "Ionospheric storms—A review", Space Science Reviews 88.3-4: 563-601, 1999.

Mendillo, M., Storms in the ionosphere: Patterns and processes for total electron content, Rev. Geophys., 44, RG4001, doi:10.1029/2005RG000193, 2006.

Rishbeth, H., F-region storms and thermospheric dynamics, J. Geomagn. Geoelectr., 43 (1991), p. 513, 1991.

Prölss, G. W., Ionospheric F region storms, in Handbook of Atmospheric Electrodynamics, edited by H. Volland, pp. 195–248, CRC Press, Boca Raton, Fla., 1995.