

Progress Toward a Regional Warning Centre for Africa

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April 28, 2010

Some History

- First geo-magnetic measurements at UCT in 1932



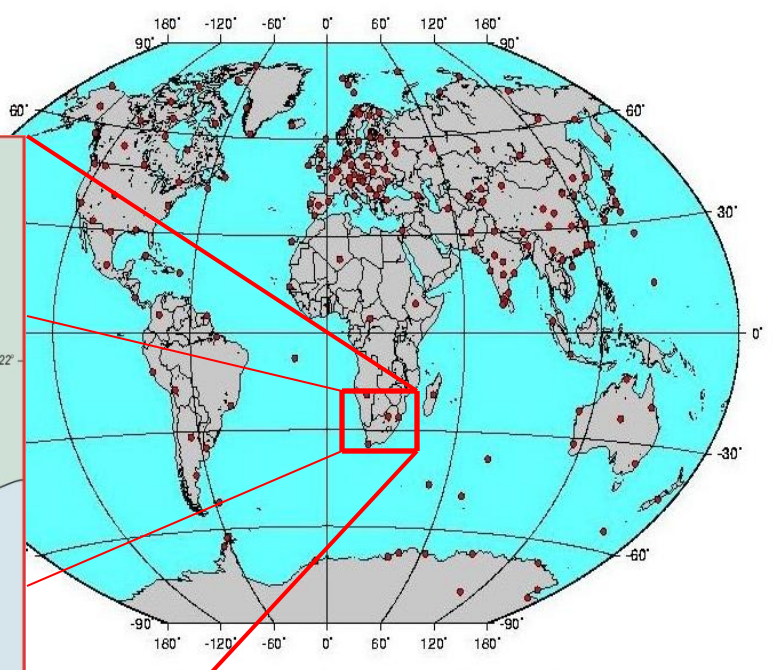
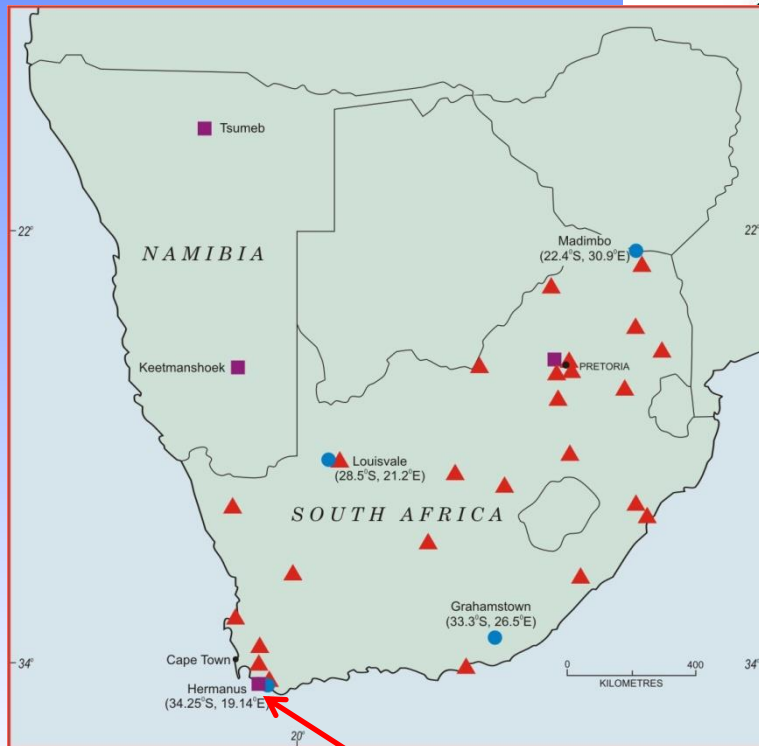
Some History

- HMO commenced January 1, 1941



Some History

- Location



Hermanus RWC

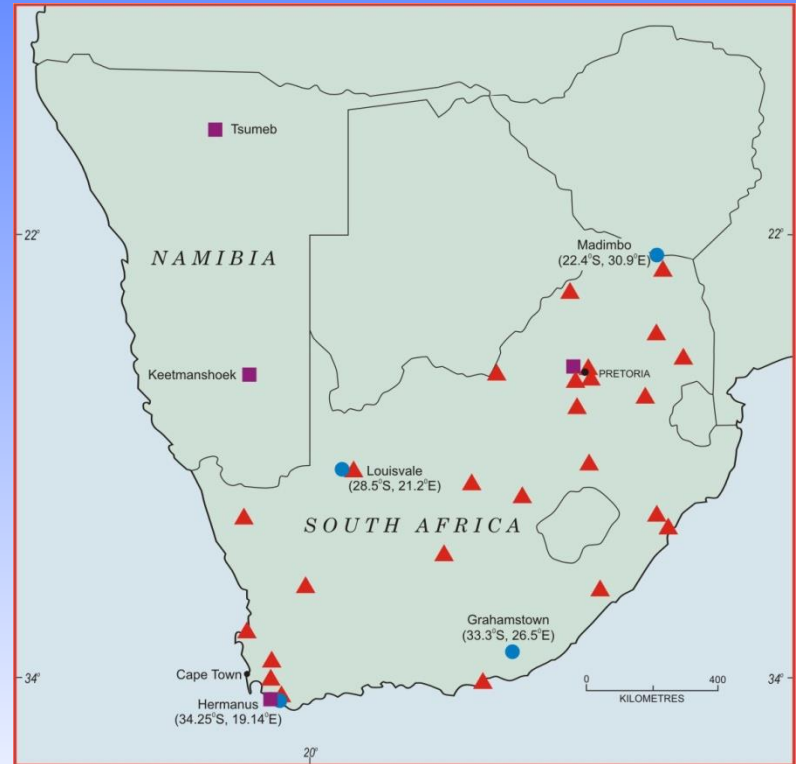
Some History

- 2009



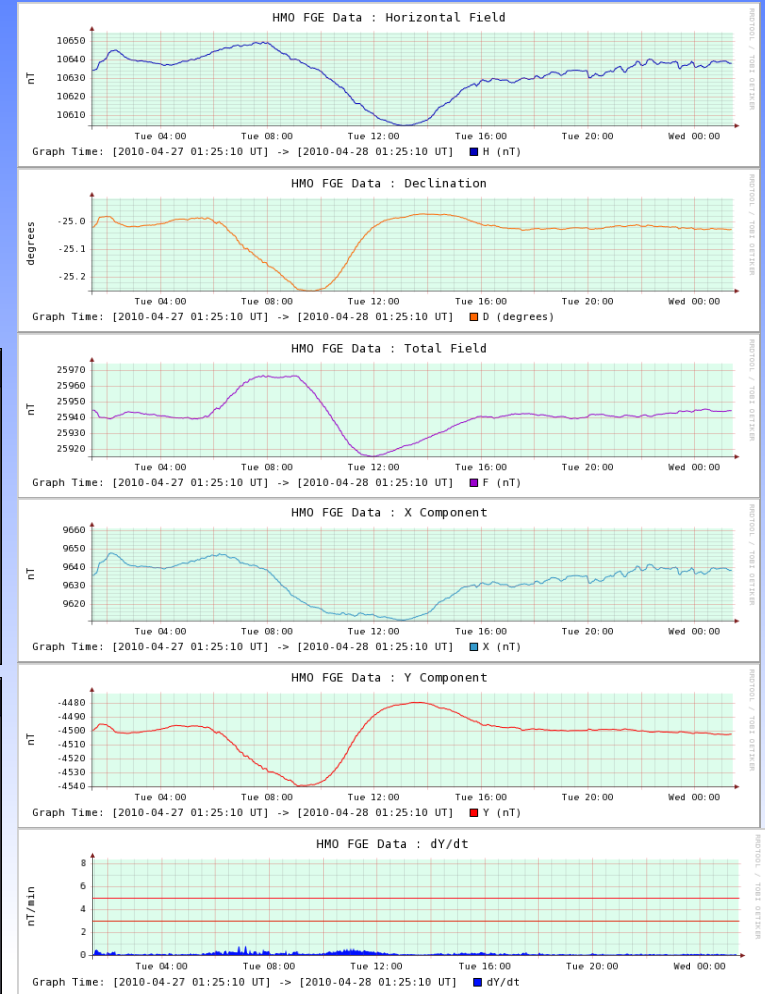
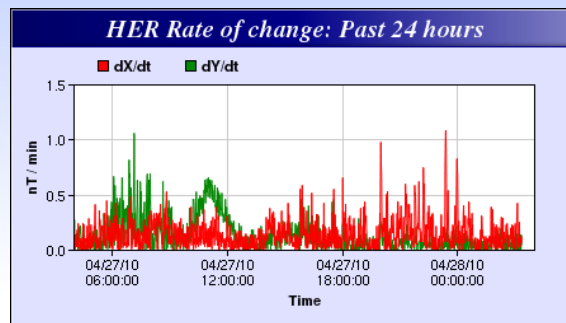
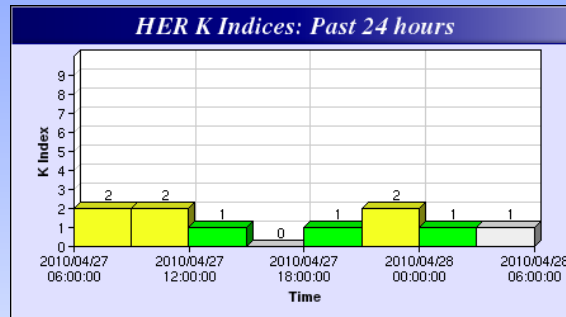
Some History

- Geomagnetic Activities
 - INTERMAGNET
 - k, A indices
 - Contribute to DST ring current index
 - Operates 3 magnetic observatories –
Hermanus,
Hartbeesthoek, Tsumeb



Some History

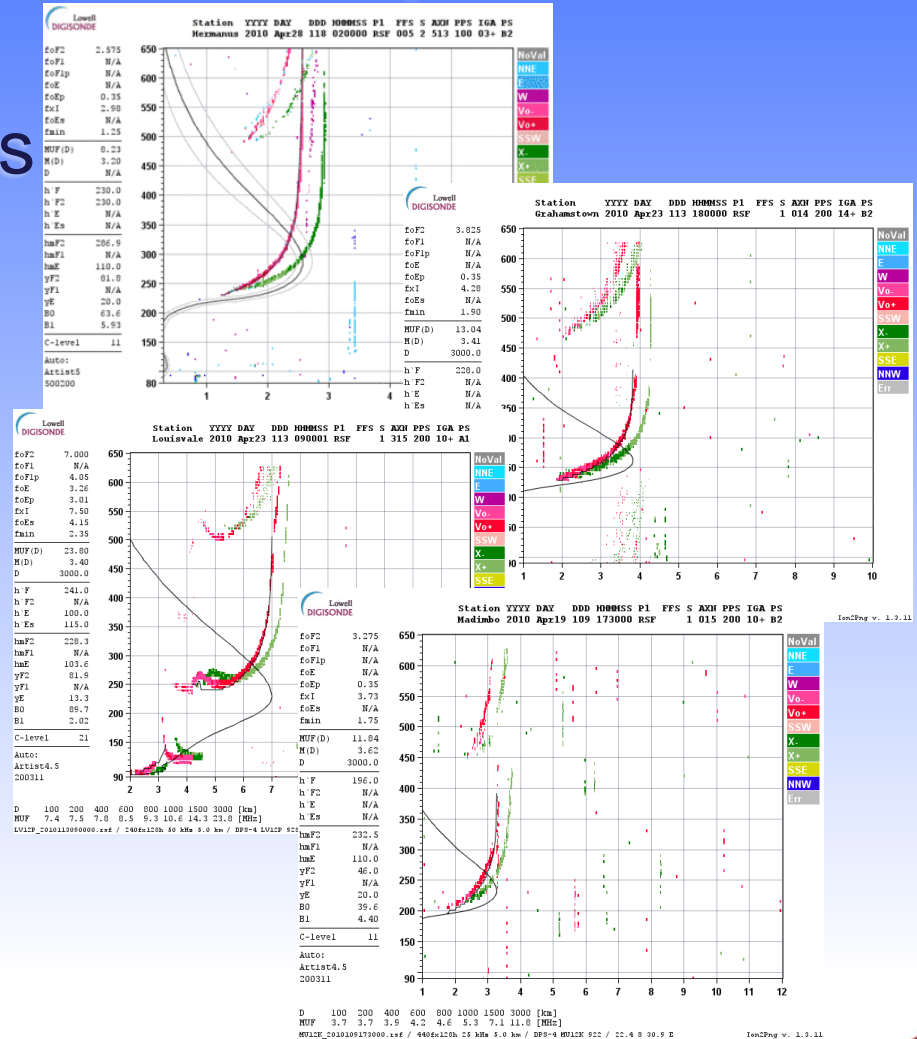
- Geomagnetic Activities
 - 1 Min real-time data
 - Indices



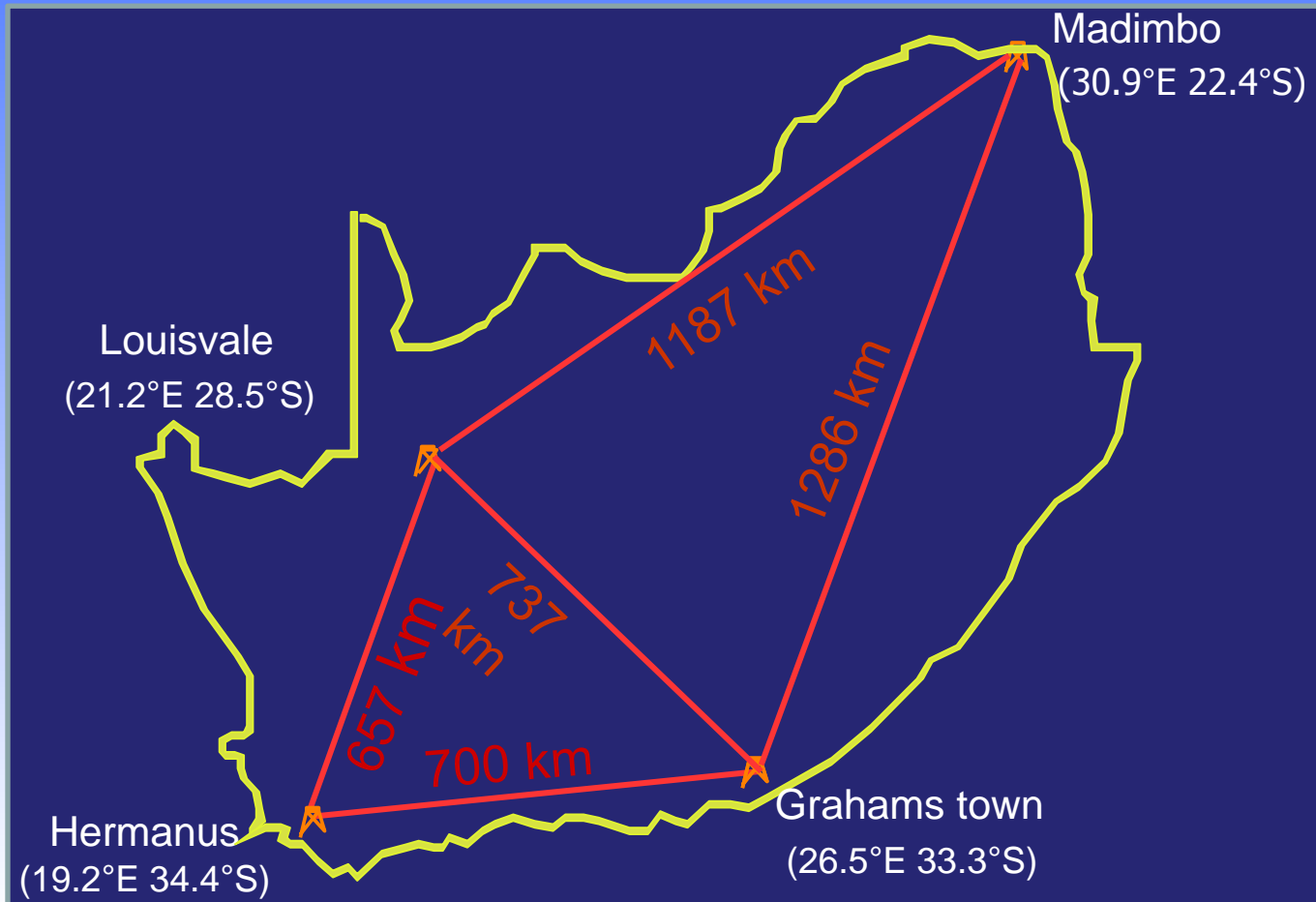
Some History

- Ionospheric Activities

- Grahams Town (1972-)
- Madimbo (2000-)
- Louisvale (2000-)
- Hermanus (2008-)
- SPIDR
- DIDBASE

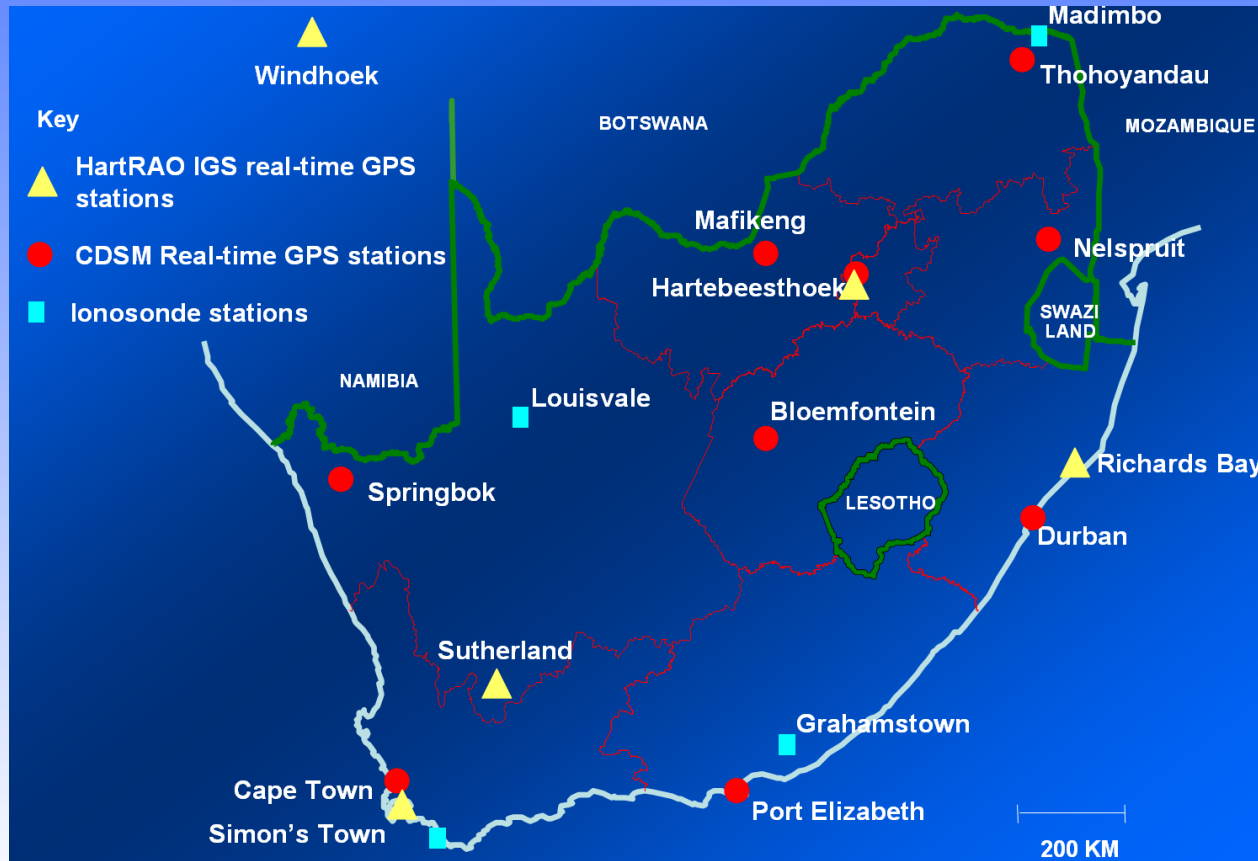


Some History



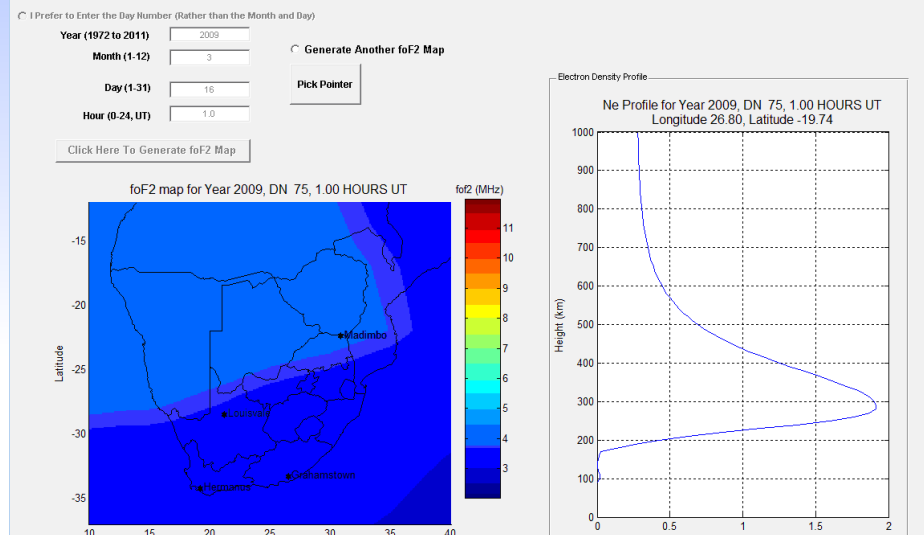
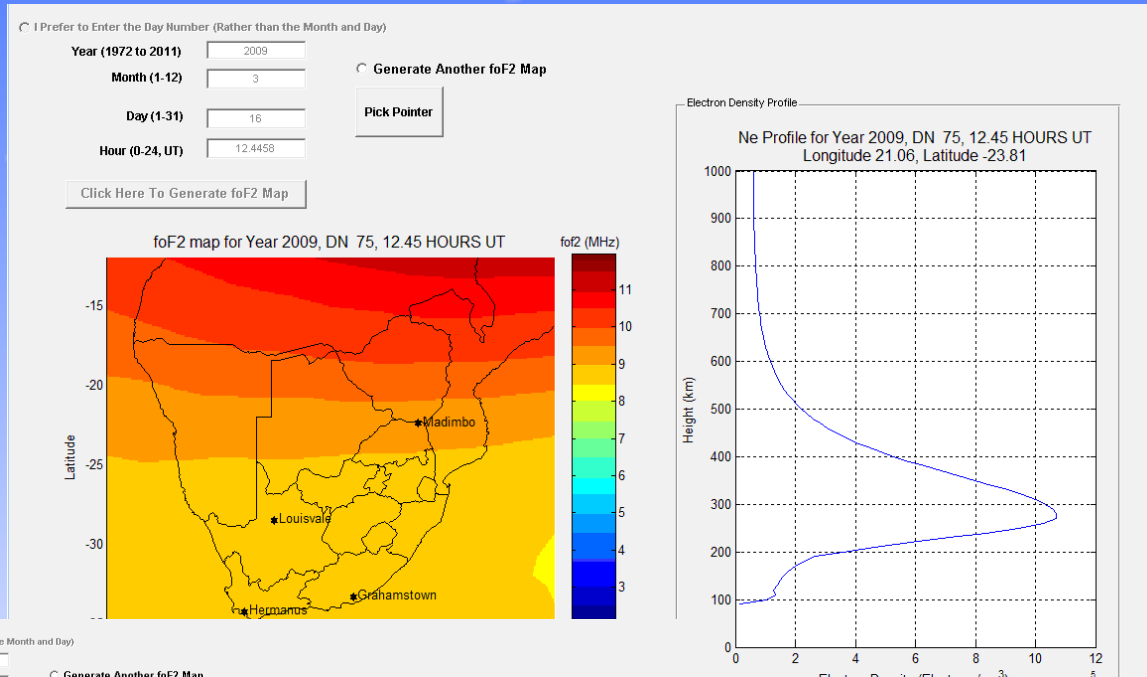
Some History

Real-time sites



Some History

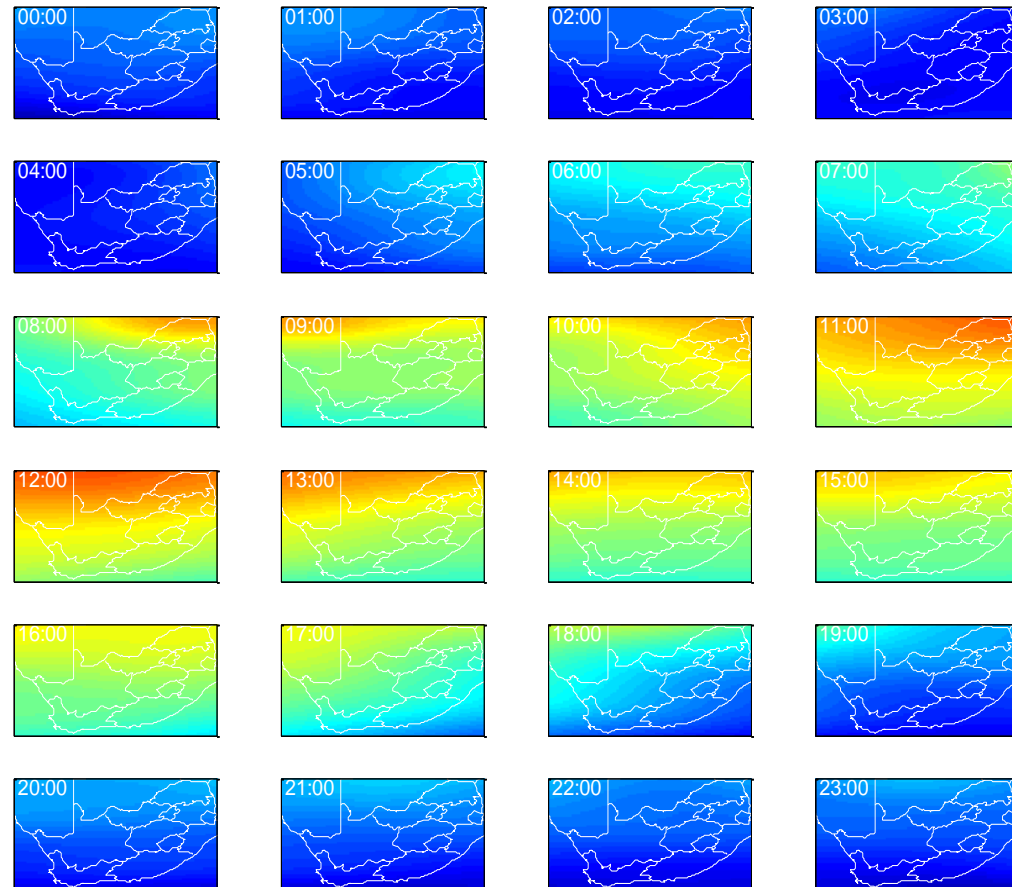
- Ionospheric Map Southern Africa



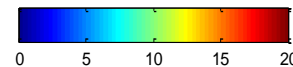
Some History

- TEC Map Model
 - Southern Africa

Hourly GNSS-derived Ionospheric Total electron Content maps over Southern Africa for 3 March 2009



Hermanus Magnetic Observatory
South Africa
<http://spaceweather.hmo.ac.za>



TEC Units ($\times 10^{16} \text{ e}^- \cdot \text{m}^{-2}$)

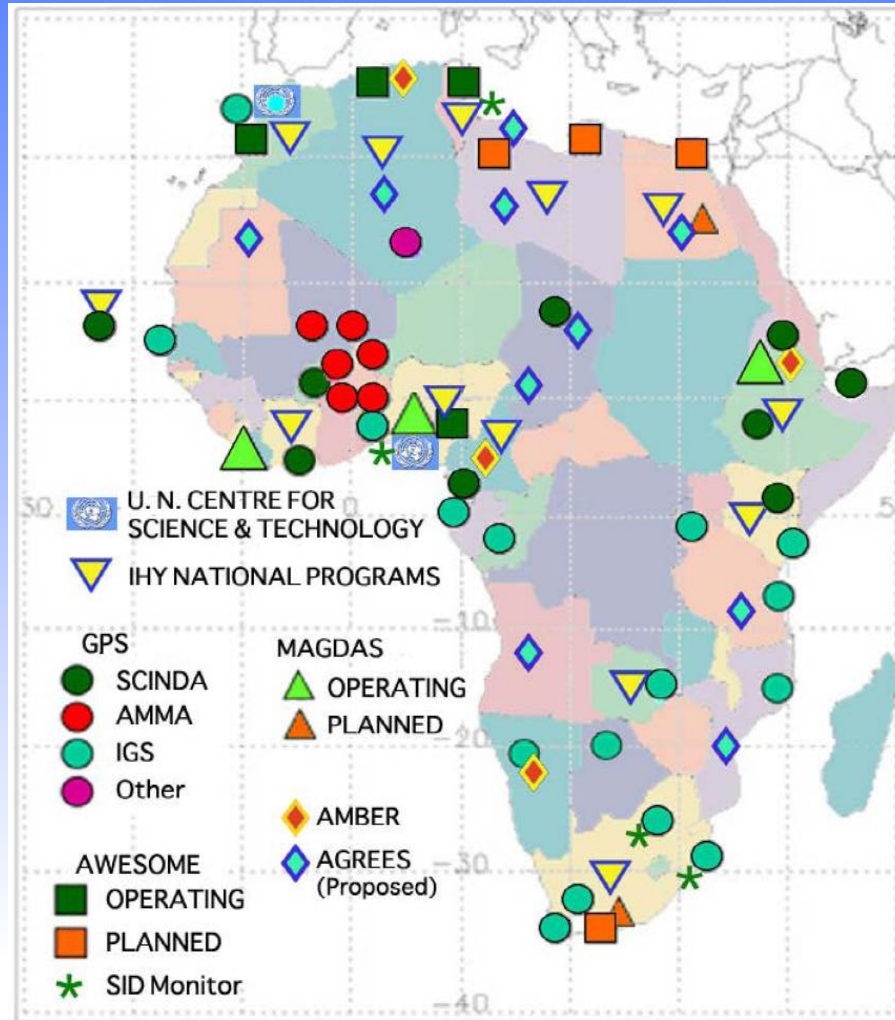
Some History

- Physical Science Instrumentation at SANAE base: Antarctica
 - HF radar
 - Aurora cameras
 - Riometers
 - Magnetometers
 - Neutron Monitors
 - VLF-receiver
 - GPS receiver for geodecy
 - Seismometer
 - Meteorology



Some History

- African Networks

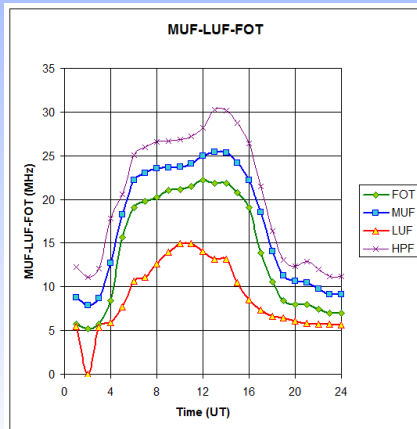


Some History

- SA Space Weather Site
 - Started with bulletin board in 1985
 - First published on internet 1993
 - Warnings and bulletins
 - Indices
 - Current and predicted ionosphere over region
 - HF conditions and predictions
 - 24/7 Space Weather conditions and warnings
 - Operated from Simons Town until Dec 2009

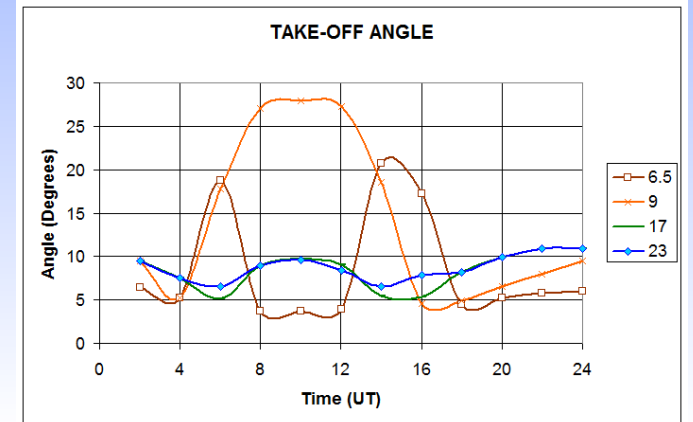
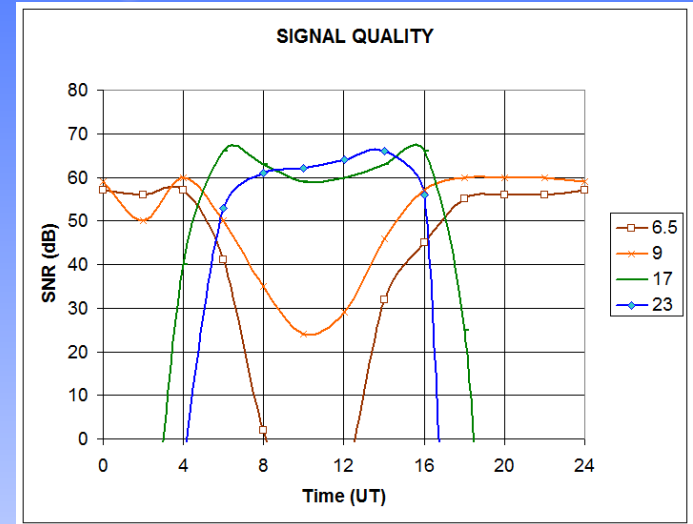
Some History

- HF Link Predictions
- Currently 37links



Frequency Plan
(Best of available frequencies)

Time from	to (UT)	Best Freq	Alt Freq
1h00	3h00	3.6MHz	7.1MHz
3h00	5h00	7.1MHz	3.6MHz
5h00	7h00	10.1MHz	7.1MHz
7h00	9h00	14.1MHz	10.1MHz
9h00	11h00	14.1MHz	10.1MHz
11h00	13h00	14.1MHz	10.1MHz
13h00	15h00	14.1MHz	10.1MHz
15h00	17h00	10.1MHz	7.1MHz
17h00	19h00	7.1MHz	3.6MHz
19h00	21h00	3.6MHz	7.1MHz
21h00	23h00	3.6MHz	7.1MHz
23h00	1h00	3.6MHz	7.1MHz



Some History

- SA Space Weather Site until 2009



Today

- HMO and SA Space Weather Site now ISES Regional Warning Centre for Africa
- Services: all of the above
- Better co-ordinated
- Part of ISES and other partners
- Expanding into Southern Africa
- Working with- and training new scientists from African countries

Today

- Research partners in Africa
 - Kenya
 - Nigeria research collaboration
 - GPS scintillation studies
 - Zambia
 - moves to start a Space Physics program
 - Installation of MAGDAS system
 - Namibia (magnetic observatories, GPS)
 - Working on Uganda, Rwanda

Future 2010 - RWC

- August 2010
 - Space Weather building additions completed
 - Hardware installed
 - Operate on current SWSA software and protocols
 - Start reach-out to African countries sub- and trans-Saharan

Future >2010 – RWC

- Mid 2011
 - Finish database, source data interfaces
 - Agreements with first African countries in place
- End 2011
 - Finish GUIs, client interfaces
 - Start providing services to first African clients

