GPS for Weather and Space Weather Forecasting (GWSWF)
SCAR Business Meeting, 1 August 2010, 15.30-17.30.
Hotel Panamericano, Room Rio Parana B,
Buenos Aires,
Argentina

AGENDA:

15.30-17.00-Presentations

Giorgiana De Franceschi INGV, Italy. Action Group state of the art (bi-polar permanent experimental network, web page, latest investigations and results)

Pierre Cilliers, Hermanus Magnetic Observatory, South Africa. Antarctic and South Atlantic (Marion & Gough Islands) GPS Campaign

Larry D. Hothem, US Geological Survey, USA. Overview on GPS/GNSS observations at the remote sites of the POLENET in Antarctica

Emília Correia, INPE-CRAAM, São Paulo, Brazil, GPS and other radio sounding techniques (VLF, ionossonde and riometer) in the Brazilian Antarctic Station

Paul Prikryl, Communications Research Centre, Canada, CHAIN (Canadian High Arctic Ionospheric Network) related research activities and future plans.

Gary Johnston, Geospatial & Earth Monitoring Division, Geoscience, Australia, Summary of the GIANT (Geospatial Information) activities and current work program.

Mauricio Gende. Universidad de La Plata, Argentina. Recent Studies in Antartic Ionospheric Characterization

17.00-17.30- Open discussion

1. *WEB AND DATA*
2. *COLLABORATIONS*
3. *NEXT MEETINGS and Sessions organization*
4. *INTERACTIONS WITH OTHER SCAR GROUPS*
5. *AOB*

PRESENTATIONS HIGHLIGHTS

Giorgiana De Franceschi INGV, Italy. Action Group state of the art (bi-polar permanent experimental network, web page, latest investigations and results)

- Experimental observations:

- Two maps show the current GISTM (GPS for Ionospheric Scintillation and TEC monitor) bi-polar network available. In Antarctica, 7 more receivers deployed in 2009.

- Scientific results:

  - First attempt of *ionospheric tomography* over Antarctica (Yin et al., *JASTP* 2009).

  - Estimation of *drift irregularities velocity* from space-based receivers experiment in Hornsund (Northern Hemisphere), (Wernik & Grzesiak, *Ann. Geophys.*, 2009).

  - Comparison of *scintillation events at conjugated sites* (Prikryl et al., in preparation 2010); details in the poster on August 4th during OSC.

  - *Positioning errors mitigation* on the GNSS signal at BTNO & Concordia (Silva et al., in preparation 2010); details in the poster on August 4th during OSC.

- GWSWF Web site (at INGV)

  - data, products and tools available soon after the discussion with stakeholders, on-line Metadata form including data-analysis tools (e.g. INGV scintillation maps of percentage of scintillation (S4))

Pierre Cilliers, Hermanus Magnetic Observatory, South Africa. Antarctic and South Atlantic (Marion & Gough Islands) GPS Campaign

- Interest in GPS receiver on SA Agulhas by EU Icebreaker design group - what are the caveats?
- Instruments from other members of the group can be deployed and maintained at SANAE-IV with the assistance of the HMO through mutual agreements.
- SANAE IV hosts several kind of instruments such as: GISTM receivers, SuperDARN radar, riometers, magnetometers. Data are available at: http://spaceweather.hmo.ac.za/

Larry D. Hothem, US Geological Survey, USA. Overview on GPS/GNSS observations at the remote sites of the POLENET in Antarctica

- 6 IGS stations in Antarctica, mostly campaign (30 s) stations.

- POLENET (Antarctic & Arctic) - GPS & co-located seismic instruments - 30 s sampling. Many stations unmanned. Data sent in 1 hour packets to UNAVCO. 2010-2011 Field season + 2 years commitment by US support.

- TAMDEF & VLNDEF networks (Italian) - started 1997, mostly seasonal summer data.

- Current USA POLENET: GPS & GLONASS, 30 s, L1/L2, data transmission via satellite

- UNAVCO Special study planned for testing 1 s data, with attempts at 10 Hz.

- Recommended Future capability: Late model receivers to be able to receive GLONASS & GALILEO, Data over line-of-sight by HF radio, and then via satellite modem.
- Planned GNSS: GPS(24), GLONASS(30), GALILEO(?): Total >100
- Web Links: POLENET & IGS

Emília Correia, INPE-CRAAM, São Paulo, Brazil, GPS and other radio sounding techniques (VLF, ionosonde and riometer) in the Brazilian Antarctic Station

- IPY project followed up by new Space Weather Project (University of La Plata – Argentina, involved)
- GPS-TEC (since 2004), Ionosonde (since Mar 09) & Riometer (since Mar 09)& VLF (since '85, Stanford system since 2009) co- located at Comandante Ferraz – EACF. GISTM receiver to be installed next summer 2011.
- Networks used : SAVNET - VLF (5 Rx), SARINET - Riometer; RBMC - GPS (IBGE-Brazil)
- VLF (21 kHz) shows precipitation events predominantly during the night during the recovering phase of geomagnetic storms. VLF can also detect Solar Flares, and indicate solar forcing from below.

Paul Prikryl, Communications Research Centre, Canada, CHAIN (Canadian High Arctic Ionospheric Network) related research activities and future plans - *greetings to Ben Opperman.*

- Univ New-Brunswick involved.
- CHAIN Canadian High Arctic Ionosphere Network (Ionosondes & GPS 50 Hz) - temporal and spatial variability of scintillation, e.g. Tongue of ionization (>1000 km), Polar patches (100 km). Near real time data transfer using Intelsat. http://chain.physics,unb.ca/chain, near real time scintillation activity.
- Canadian GeoSpace Monitoring array: ePOP satellite experiment for high-resolution plasma measurements.
- Canadian Space Weather Forecasting Centre (Natural Resources Canada): Space weather data & products - GICs and Scintillation
- Canadian Riometer Array: Very dense - used in conjunction with all-sky cameras and scintillation receivers. In cusp region SuperDARN shows events that are correlated with phase scintillation, and polar cap patches moving away from radar. Vertical TEC maps & STEC & scintillation statistical (climatology) studies using GISTM receivers and HF radar.
- Future: CASSIOPE satellite, expansion of CHAIN array.

Gary Johnston, Geospatial & Earth Monitoring Division, Geoscience, Australia, Summary of the GIANT (Geospatial Information) activities and current work program.

- ICSU GIANT= Geodetic Infrastructure of Antarctica
- Common geospatial reference system for Antarctica and global geodesy
- **Data available free to all**.
- Advise on establishing geodetic observatories
- Provides analysis solutions to POLENET and other initiatives and applications as requested.
- Tide Gauge data distributed
- Evaluation of models used in analysis of GNSS observations in Antarctica - e.g. effects of scintillation on GPS observations
- GNSS Modernization Program: Monitors developments and advises members on interference, satellites
- **Summer School on Antarctic Geodesy in Austral Summer 2011/2012 at Bellinghausen**
- GIANT webpage being developed with links to SCAR

Mauricio Gende. Universidad de La Plata, Argentina. Recent Studies in Antartic Ionospheric Characterization

- Original Argentina interest in Geodesy - now ionospheric & water vapour
- Aeronomy Groups in LaPlata, San Juan, Tucuman
- Argentina - 2 ionosondes operating in Antarctica
- Studies on the effects of scintillation on GPS positioning
- LPIM model (La Plate Ionospheric Model): Unique feature- Uses modip latitude, & arc-by-arc correction for hardware biases, hourly TEC maps since 2005.
- foF2 (ionosonde) and VTEC (GPS) comparison results - summer diurnal peaks as expected, winter peaks differ, both during low and high solar activity.