ESA Space Weather Pilot Project
Presentations
Second European Space Weather Week
14-18 November 2005
ESTEC, Noordwijk
Summary of SDA objectives

- Distribution of ionospheric products over Europe
- Based on data from GNNS receivers
- Slight time delay (3 days)
- Applications:
  - Study of the earthquake and tsunami signature in the ionosphere
  - Correction for radar signal: InSAR for the monitoring of low small and slow deformations
  - Correction for mono-frequency GNSS receivers
  - Telecommunications
Summary of user needs

Products:
- 2D maps of the Total Electronic Content (TEC)
  - Space resolution: 2.5° x 2.5°
  - Time sampling: 30 seconds
- TEC at the receivers piercing points
- Instruments biases (TGDs, IFBs)
- Data format: netcdf

Data availability: less than one week
Data distribution: internet
- www.noveltis.com/spectre
Evaluation of user satisfaction

- SPECTRE products evaluated by:
  - IPGP
    - Ergonomy of internet service
    - Seism and tsunami detection threshold
      - Far field: (Rayleigh surface waves): $> M 8.0$
      - Near field: (acoustic waves): $> M 6.5$
    - Perturbations due to Traveling Ionospheric Disturbances (TID)
  - Comparison of SPECTRE with other ionospheric products:
    - Global Inospheric Maps (CODE/JPL)
    - Altimetry (TOPEX, Jason-1)
  - CETP
    - Comparison with DEMETER (pre- and co-seismic events)
    - Assimilation in a ionospheric model (provide an evaluation of the plasma density below DEMETER)
  - Evaluation still in progress (cf. other SPECTRE studies)
SPECTRE

Sustainability of the service

- SPECTRE maintained at least until end of 2007 (French Ministry of Research and CNES) for natural hazard studies

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- Submission of proposals to governmental agencies
  - National: ANR (France) : accepted (IONONAMI)
  - Regional (Midi Pyrénées)
  - European calls
  - OSEO/ANVAR

- Effort to run the service as is: 24 days /years (20k€)

- Business plan:
  - Commercial, legal and financial engineering
    - Analysis and segmentation of the market
    - Definition of major targets
SPECTRE

Prospective for improvement of the service

- More flexible internet data interface (Live Access Server)
  - Interactive visualization
  - Interactive data extraction (spatial & time selection)
- Processing of other regions (processing capacity)
  - California => Earthquakes, Tsunami,
  - Japan (requires special agreement) => Tsunami
- Nowcast and Forecast
  - To reach new users needs (radar, telecom)
  - Agreement with real-time data providers (underway)
- Use of radio-occultation observations
- 3D tomography (PhD thesis IPGP/NOVELTIS)
- Advent of Galileo
  - Twice more observations
  - Densification of the GNSS network in Europe
- Benefits of maintaining the service as part of a network (as opposed to stand alone)
  - Being part of a coherent global European effort to develop SW activities
  - Gives visibility the SPECTRE service
  - Facilitates synergy with European SW actors