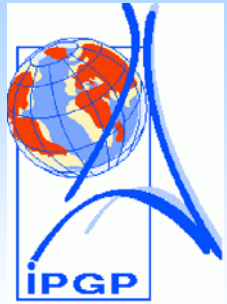


SPECTRE

ESA Space Weather Pilot Project Presentations

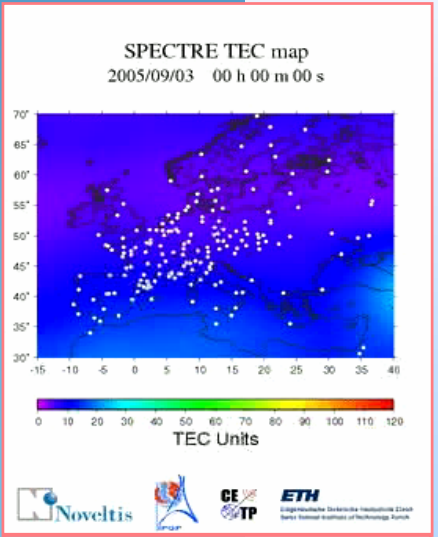
Second European Space Weather Week

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:



★2.5°×2.5° grid
★Time resolution: 30 sec.

- ★ 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

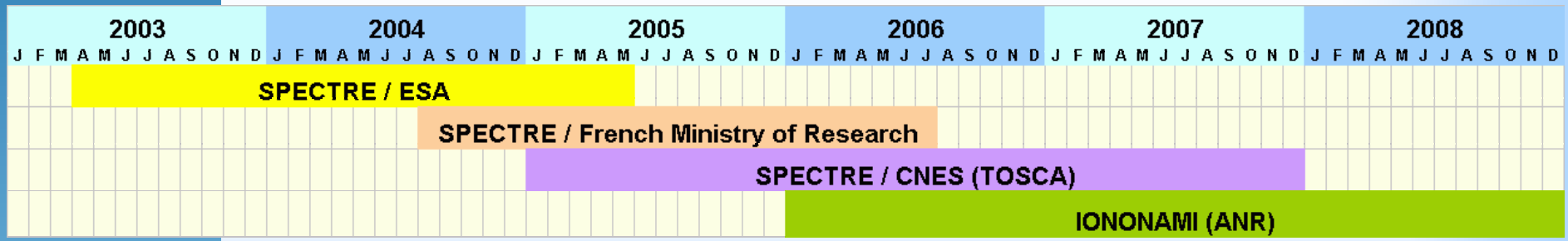
- Products:
  - 2D maps of the Total Electronic Content (TEC)
    - Space resolution: 2.5°X2.5°
    - Time sampling: 30 seconds
  - TEC at the receivers piercing points
  - Instruments biases (TGDs, IFBs)
  - Data format: netcdf
- Data availability: less than one week
- Data distribution: internet
  - 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)

Sustainability of the service

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



- 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

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