Updates and Developments of the SWENET Software Infrastructure

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Overview

- Overview of the SWENET Infrastructure
  - Current Status
  - SDAs
- Updates and developments
  - Maintenance tasks
  - Indices and statistics
  - Web services
  - Plotting
- Summary

SWENET Infrastructure capabilities

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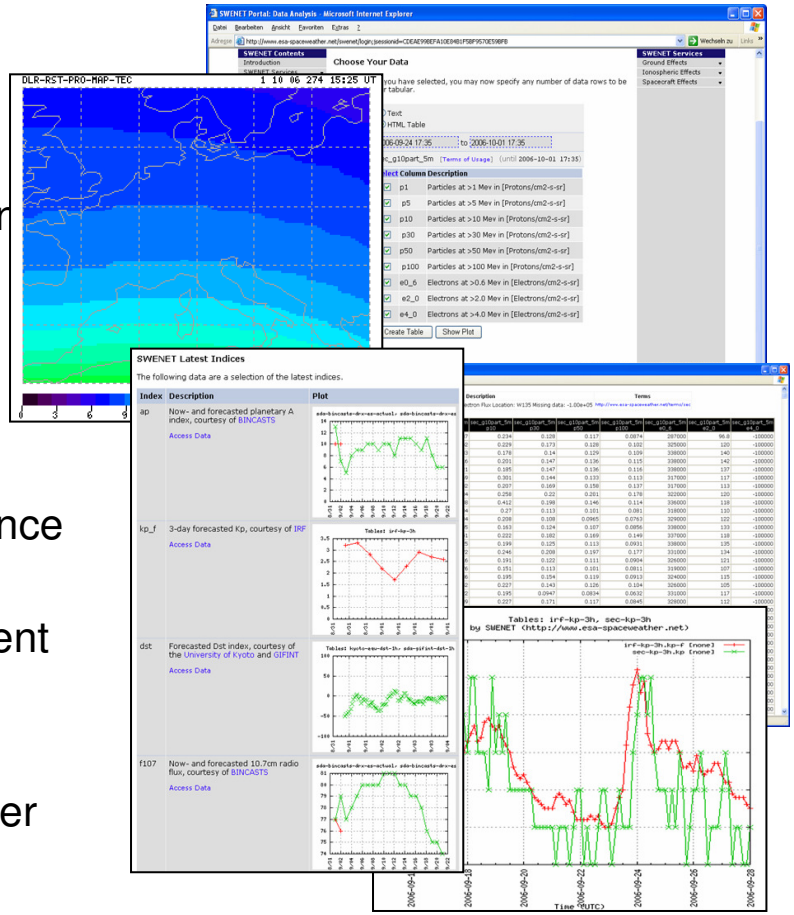
- SWENET provides a wide range of services and data related to space weather
  - A central access point to the services developed in the SDAs
  - A browseable database containing
    - Space weather data from external resources
    - Data generated by the SDAs in the pilot project.
  - Large volumes of space weather data collected since the beginning of SWENET operations
  - Capability to search and combine data from different sources
  - Graphical display and data analysis tools
  - Overview of the latest SDA data and space weather indices
  - Daily reports, alerts and data sets via email



1. Web interface for the database
2. Access to graphics and images
3. Daily reports of relevant data
4. Provision of numerical data (a) and plotting tools (b)

www.esa-spaceweather.net/swenet

Maintenance and extensions

- Current Status
  - Initial project (SWENET development) finalised in March 2006
  - Currently planned maintenance phase planned up to the beginning of 2008
    - General software maintenance tasks
    - Hosting of the server at eta_max facilities
    - Maintenance and monitoring of the server hardware
  - Additional tasks include
    - Addition of new SDAs and data sources
    - Performance of polishing tasks and addition of small functionalities to the SWENET portal.
- Extensions to the tool
  - Index nowcast & forecast quality statistics
  - Data Access via Web Service
  - Upgraded plotting capabilities

New and extended SDA Integration

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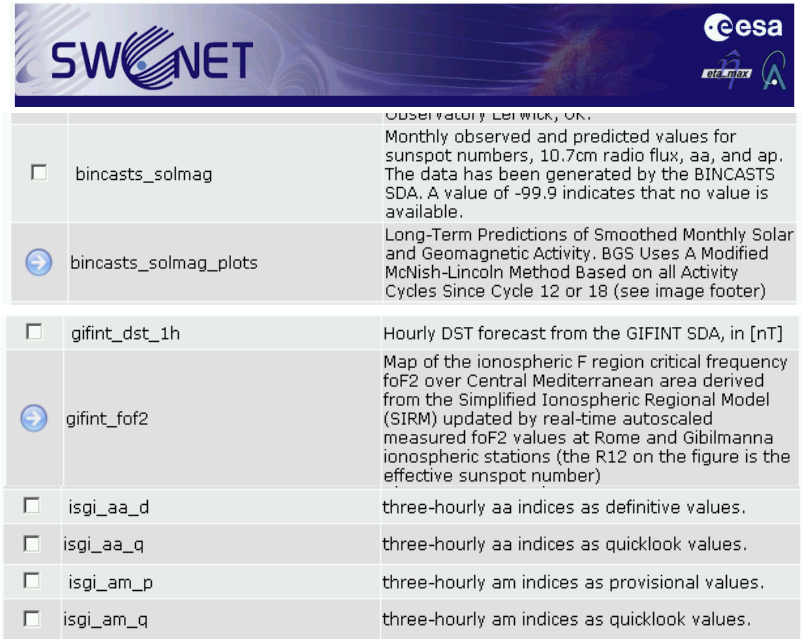
- BINCASTS
  - Aa, Ap now- and forecasts
  - DRX, Ap, F10.7 now- and forecasts from three stations in UK



- GIFINT
  - WP 200: foF2 and M(3000)F2 maps of central mediterran area

- ISGI
  - aa, am quicklook, provisional, definitive values
  - ... work in progress.

- Thanks for your continued efforts, SDAs!

SDA Services

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Technical Groups	Service Examples	SDAs
Ionospheric Effects & Activity Forecast ➢ Effects of space weather on the ionosphere and those technical fields affected by it.	• Ionosphere fore- & nowcasting • TEC Maps • GPS quality services • Solar activity fore- & nowcasting • Radio and SatCom conditions	DIFS GIFINT GPS Validation Ionosfera Scint. Quickm. SFC SIDC SOARS SPECTRE STIF SWIPPA TSRS
GIC & Ground Effects ➢ Effects of Ground Induced Currents and other ground effects associated to space weather	• Geomagnetic indices • Aurora forecast • Ground Induced Current fore- & nowcasting	BINCASTS GAFS GIC Forecast GIC Now! GIC Simulator GIFINT GPS Validation ISGI MuSTAnG PipelineSWS SWIMIC
Spacecraft and Aircraft ➢ Effects of space weather on on-orbit Spacecrafts and high flying aircraft.	• Radiation and Space Environment effects on satellites • Radiation effects on aircraft	GEISHA GEOSHAFT MuSTAnG SAAPS SEIS SOARS

Index nowcast & forecast quality statistics

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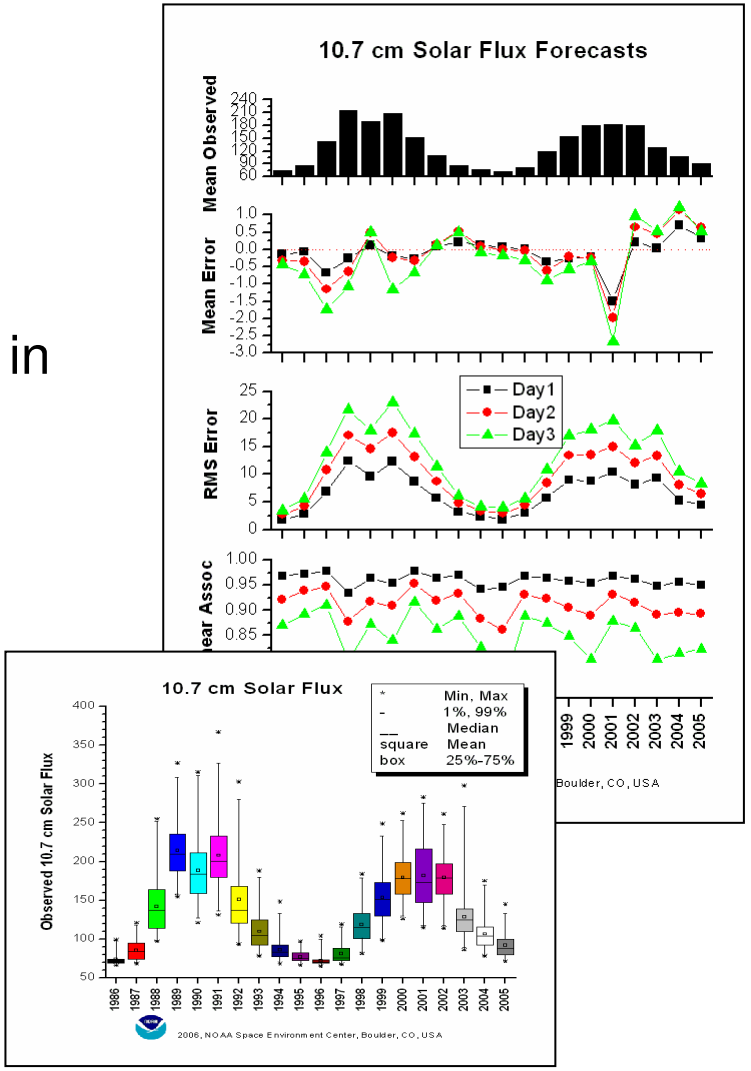
- Index nowcast & forecast quality statistics
  - Automatic generation of statistic on the accuracy of forecasts of indices available in the database
    - Automatic comparison of indices and predictions available in the SWENET database.
    - Same forecast verification methods as NOAA's Space Environment Center.
  - Results will be stored in the database.
  - Results and plots will be displayed on the web interface



New: Unified Data Browsing

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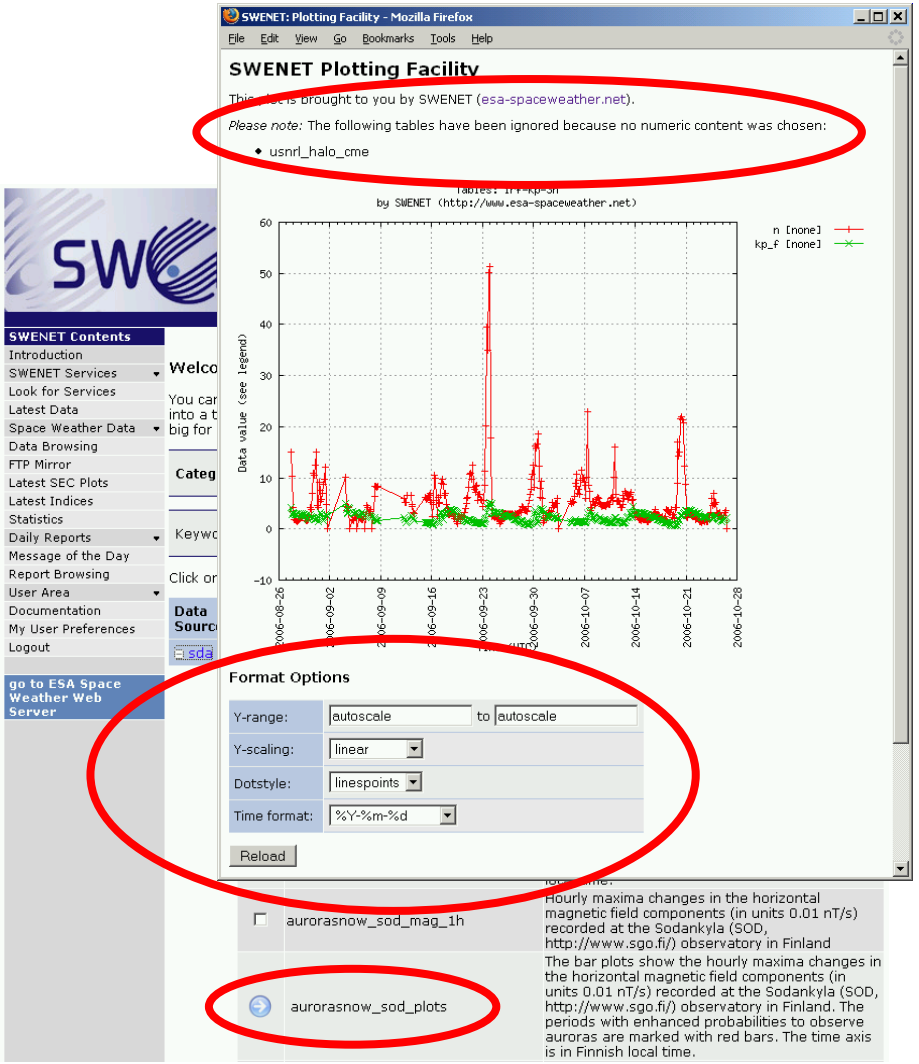
- Previously: Access to data separated for textual, numerial and binary (images) data
  - Cannot browse all tables for keywords etc.
- Now: Unified access to all data
  - Textual data browsing links to other (numerical; binary) sections:
    - Plots: Post-configuring of GNUplot options possible
    - Images: Leads to image browsing section
  - Plots: Ignored data (when non-numeric) are reported



New: 3D Plotting

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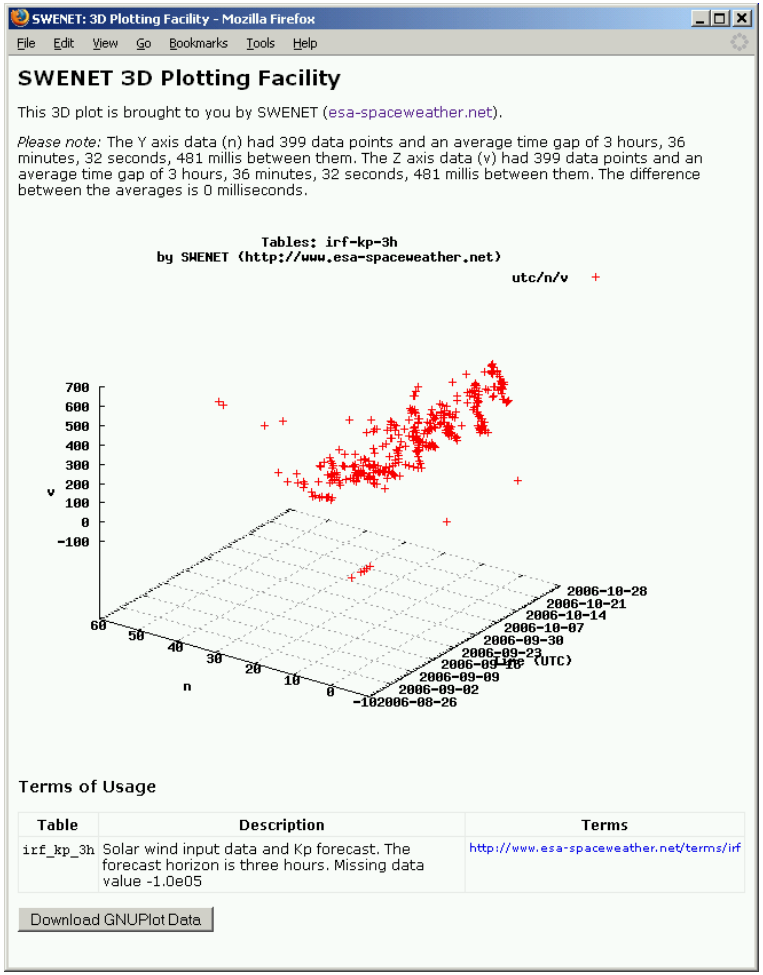
- Previously: 2D plots
  - All numeric data indexed by UTC
- Now possible: 3D plots
  - X-Axis = UTC
  - Y-Axis = user defined
  - Z-Axis = user defined
- Animated (rotating) GIF for improved viewing possibilities
  - GNUplot driver can be downloaded
  - Planned: Carpet plots



New: Data Access via Web Service

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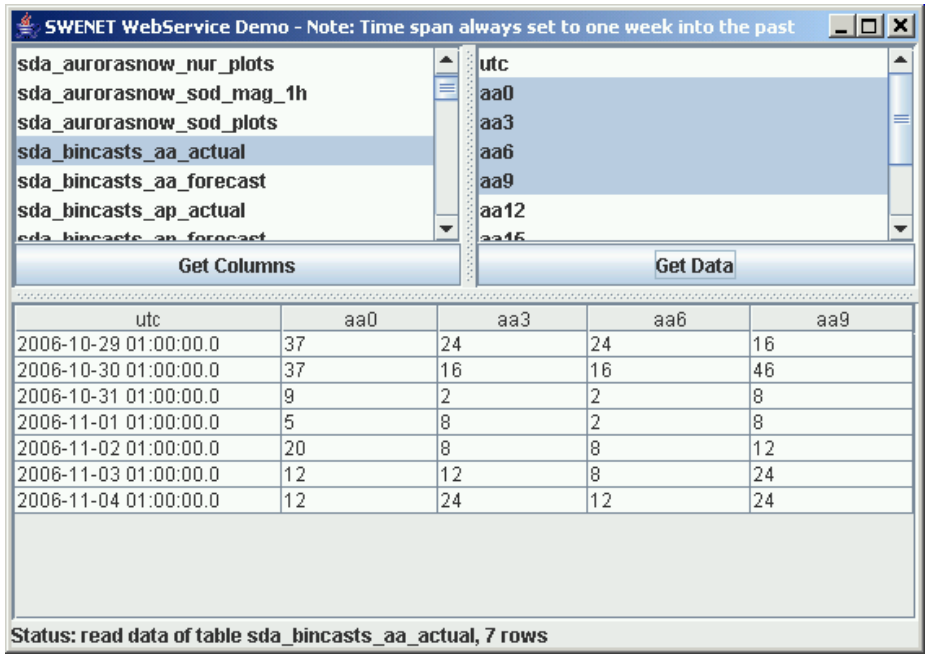
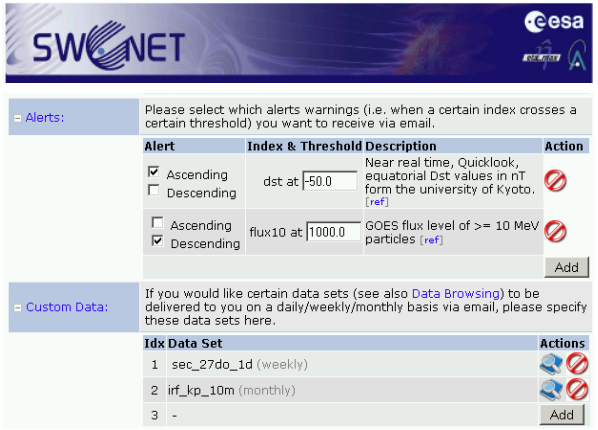


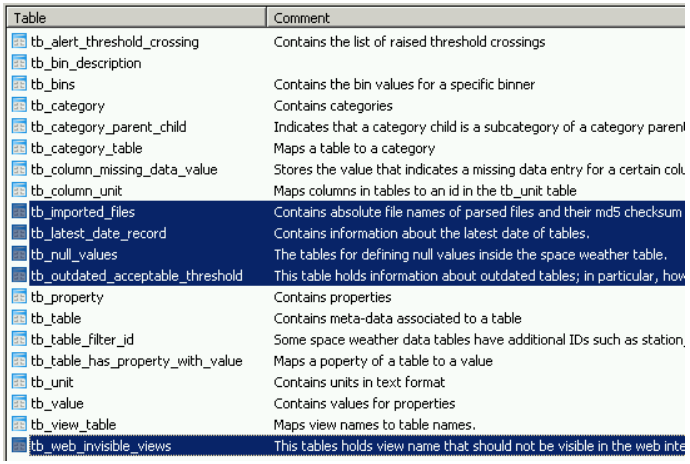
- Web services are a standard for RPC over internet
  - Remote Procedure Call
  - XML for request and response
- SWENET provides 100 million data sets
  - Previously: Via web interface
  - Now also via web service
    - Data accessible for applications
    - Available for all programming languages (WDSL file gives instructions)
  - Demo application (written in Java with Axis2) available
  - Planned: Encryption (HTTPS)
- Anyone can program their own access to the data from their tools

Other Activities

- Many minor user interface enhancements
  - Filtering "null" values, better plot legends, new Alert wizard, admin tools for the web interface, improved data browsing filter, etc.



- Structural improvements
  - Refined monitoring tools, unification of database schemata, additional metadata, easier deployment of upgrades, etc.



- Planned: Continued improvements
  - Extended monitoring tools
  - Performance boosts through meta data

Summary

- SWENET is available since the beginning of 2006
- The web portal provides access to a wide range of services of data
  - integrates the results of the pilot project with data from external resources
- A “power maintenance” phase is planned up to the beginning of 2008
  - General software maintenance tasks
  - Hosting of the server at eta_max facilities
  - Maintenance and monitoring of the server hardware
  - Addition of new SDAs and data sources
  - Performance of polishing tasks and addition of small functionalities to the SWENET portal.
- Extensions to the tool
  - Data Access via Web Service (finalised)
  - Upgraded plotting capabilities (3D plotting available)
  - Index nowcast & forecast quality statistics (1st quarter 2007)