MAGIS: THE INFORMATION SYSTEM OF IPGP MAGNETIC OBSERVATORIES

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ABSTRACT

The IPGP is in charge of twelve magnetic observatories, including 6 observatories run in cooperation with foreign institutions. These observatories are scattered all over the world. In order to improve collaboration between observers, daily maintenance and magnetic data processing, we created an information system where all technical information relevant to the network and all magnetic data in various stages of processing are archived. This system works like a community content sharing platform. It provides a simple way to access the technical information such as instrument characteristics, calibration data, observatory documentation, pictures, etc. The platform is now our only working tool for data loggers monitoring, routine scheduling, incidents logging, maintenance logging and absolute measurements collecting and pre-processing. The platform is based on web technology. This makes it independent from the local computer system of the user, simplifies software's updates and provides instant access to all technical information and magnetic data wherever the user is located.

MOTIVATION AND GOALS

IPGP observatories (including observatories in cooperation with other institutions) are distributed over five continents (Europe, Asia, Africa, South America and Oceania). About 30 persons (observers) are performing absolute measurements and on site routine observatory work, involving more than hundred pieces of equipment such as magnetometers, data loggers, DI-flux and electronics boards. In order to share and easily access the technical data and the absolute measurement results, both by the technical team in the Chambon la Forêt observatory and by distant observatory teams, it was decided to create an information system based on web technology.
The goals of this project are:

- To monitor the observatory network in real-time
- To keep track of regular maintenance, events, incidents and technical interventions
- To store in one location all the relevant technical information
- To share the data and the technical database
- To streamline data processing

TECHNICAL SOLUTION

The starting point of MAGIS was WEBOVS, an information system developed by François Beauducel for the needs of IPGP's Volcano and Seismological Observatory in Guadeloupe, an island located in the Eastern Caribbean Sea (Beauducel *et al.*, 2004). WEBOVS scripts, which were originally designed for managing data feeds and technical data from hundreds of geophysical / geochemical sensors distributed over a single volcano, were adapted to the case of a network of magnetic observatories.

The MAGIS website is opened only for authorized persons. It is hosted on a Linux server (Fedora Core) and scripts are written in PERL, SHELL and MATLAB.

The magnetic data (variometer data and absolute measurements) as well as the technical data (on observatories, instruments, people, maintenance logs, etc.) are archived on a unique computer server: it confers simplicity to the system and makes it easier to correlate information. The platform is based on web technology. It makes it independent from the local computer of the user, simplifies software updates and provides user-friendly instant access.

PRESENT FUNCTIONALITIES

The MAGIS website is still under development. Its currents functionalities include:

1. A technical database which can easily be updated, both by local observers and IPGP staff. The database provides access to the characteristics of the observatories and equipments in various formats such as texts, measurements, plots, pictures, schemes, manuals (Figure 1). There is one data sheet per observatory, one per magnetometer, one per theodolite, etc., related via hyperlinks. For example, the data sheet for a given magnetometer includes the results of its latest calibration. Every data sheet includes a maintenance / change log, which is regularly updated by users in distant observatories and in Chambon la Forêt. This way, everybody has access to full technical information at any time.

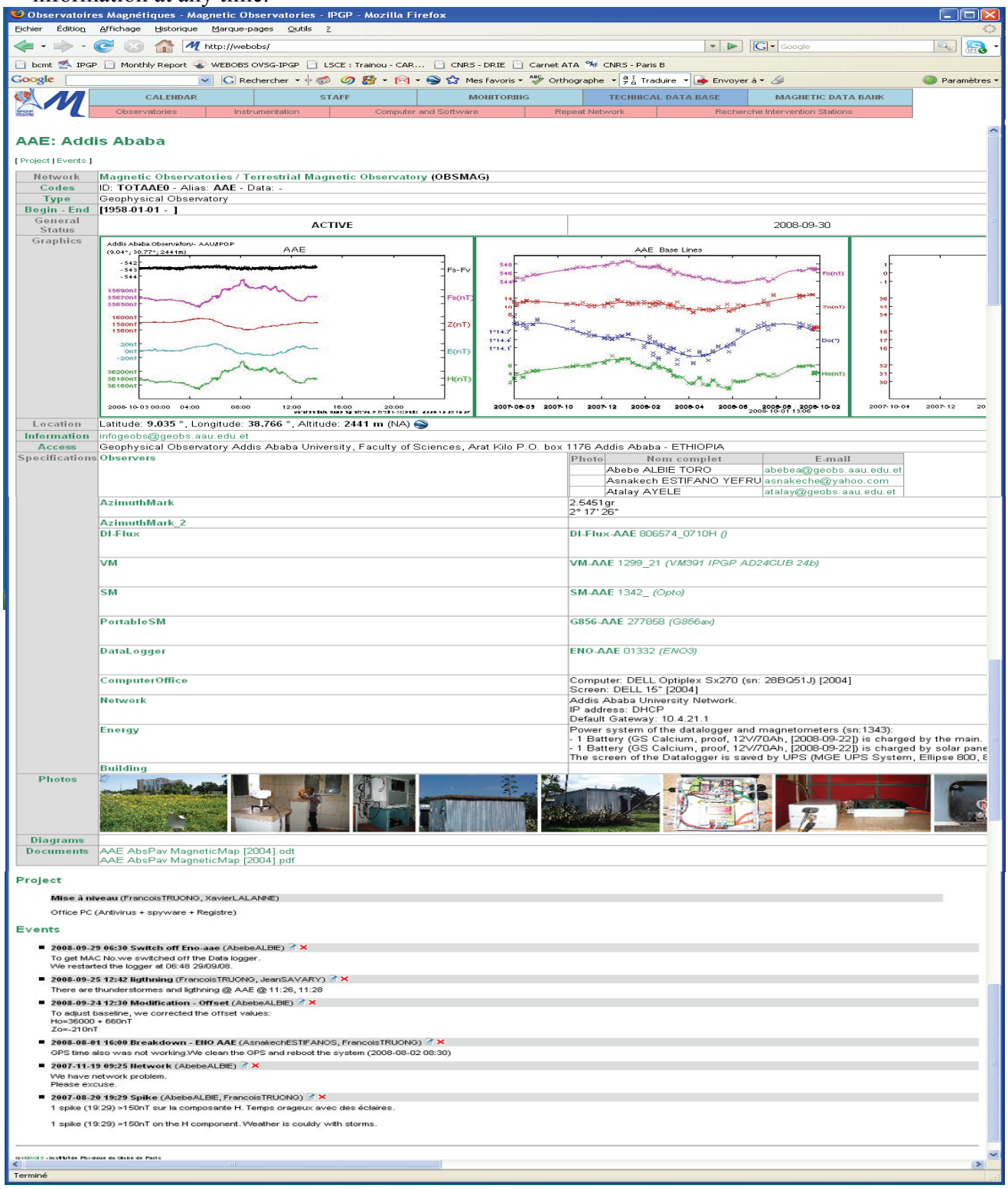

Figure1: Main technical data sheet for the Addis Ababa (AAE) magnetic observatory (hyperlinks in green).

2. A data bank containing all the magnetic data produced by the network, in the various stages of their processing (Figure 2). It also includes temporary baselines and environmental and technical parameters (temperature, power, etc.)

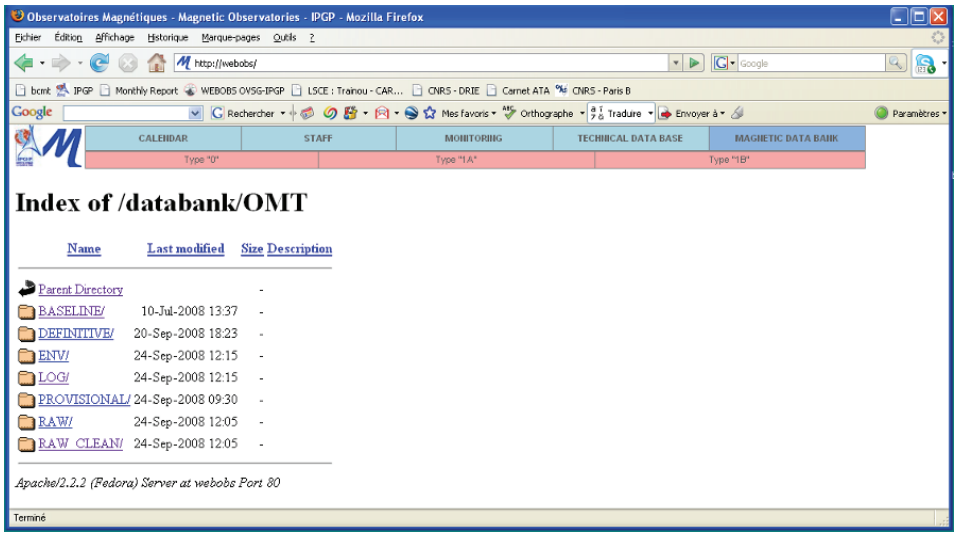

Figure 2: Data bank of magnetic observatories.

3. A tool for entering absolute measurement results into the system and automatically computing temporary baselines (Figure 3). This proved to be very useful for quickly detecting anomalies in absolute measurements.

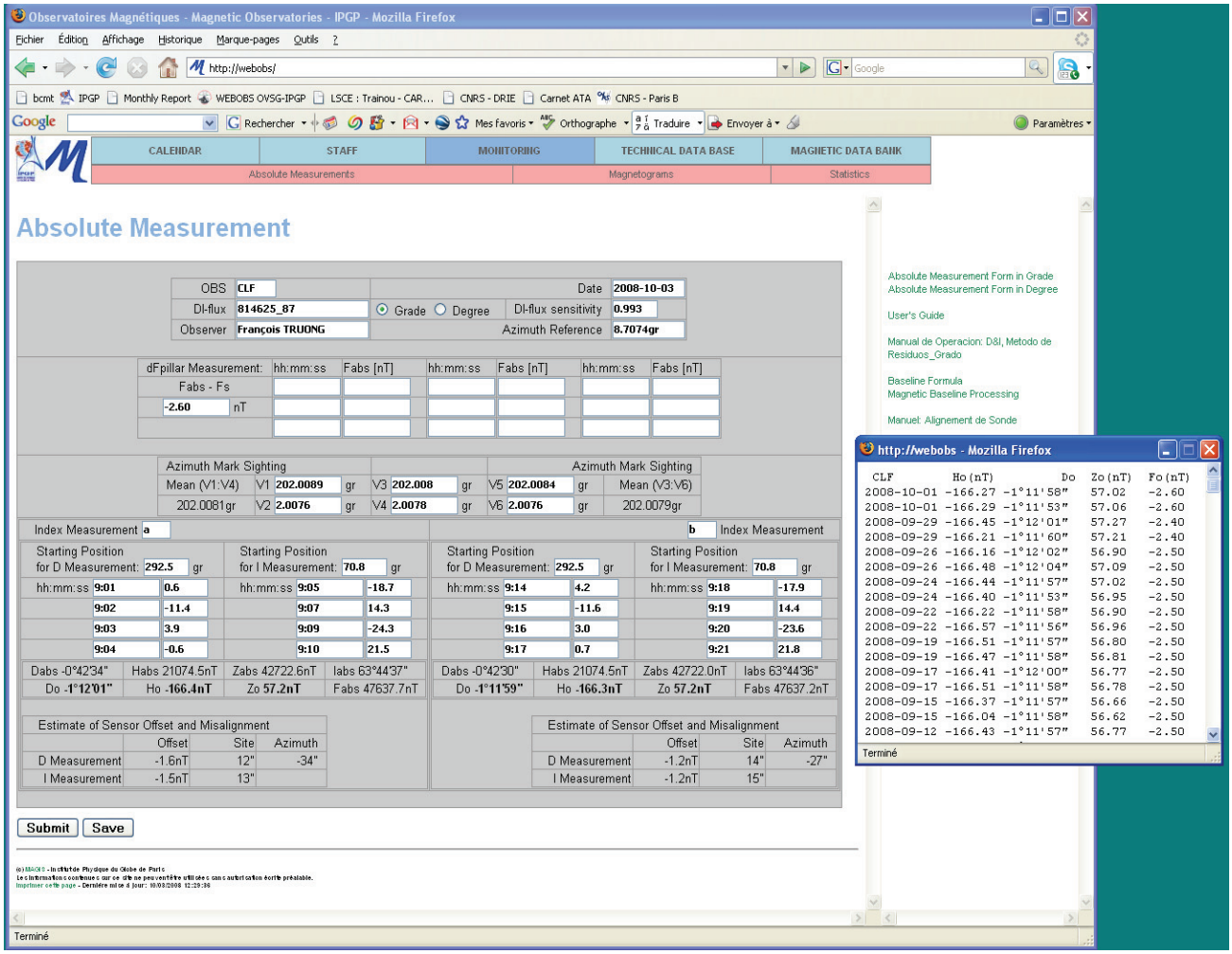

Figure 3: Absolute measurement form.

4. Various tools for monitoring the data quality in distant observatories, such as automatically computed statistics on absolute measurements (Figure 4), a table indicating the date of the last absolute measurement and that of the last data transmission. Such tools help the Chambon la Forêt team to quickly react in the case of a lowering of the data quality and / or transmission rate at one observatory.

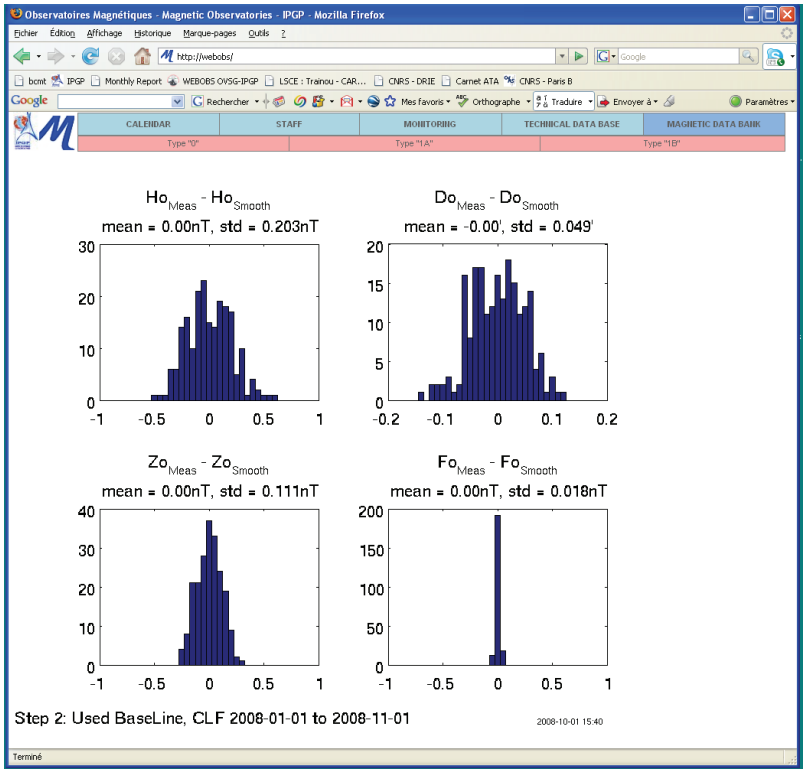

Figure 4: Example of automatically computed statistics: Histograms of differences between absolute measurements and calculated baseline values.

CONCLUSION AND PERSPECTIVES

The MAGIS website is step by step becoming the central working tool of the observatory network: observers process absolute measurements, and share maintenance logging on the website; baselines and provisional magnetic data are automatically computed. Our aim is now to transfer the whole magnetic data processing on MAGIS, including data checking and cleaning, calculation of definitive data, production of K-indices and data distribution to INTERMAGNET.

ACKNOWLEDGEMENTS

We are very grateful to François Beauducel for hosting one of us (François Truong) in OVSG in January 2007 and sharing the WEBOVS scripts and architecture.

IPGP contribution 2477.

REFERENCES

Beauducel, F., C. Anténor-Habazac and D. Mallarino (2004), WEBOVS: Integrated monitoring system interface for volcano observatories, *IAVCEI General Assembly, Chile, Nov 2004.*