*Appendix S3*

*EDAPHOWEB: Web-based control and data display software*

Website: http://edaphoweb.helion.hu

The control software is composed of three subunits: (1) a relational database for permanent data storage, (2) a control unit for tracking the operation of the probes and loggers, and (3) a web-based application for analysis and display. Each unit of EDAPHOLOG System (probes, loggers) is controlled by the Java®-based control software that has been developed specifically for this purpose. The database was developed on Oracle®. Data display is also carried out by the control software. The control software enables us to follow the operation of the system in real time and to handle each probe and logger simultaneously via the Internet. Either raw or processed data can be retrieved and displayed in either table or graph formats.

EDAPHOWEB supports the entire monitoring procedure (Fig. 1):

- the 'Projects' menu box corresponds to the installation of the monitoring sites (Fig.2);

- under the 'Devices' menu EDAPHOLOG units can be set up (Fig.3);

- in 'Options' we can send SMS messages to the loggers (Fig.4);

- and the 'Graphs & Data' menu relates data queries and displays (Fig.5). The spatial distribution of the monitoring sites is shown on an interactive Google Maps application, while incoming and outgoing SMS messages are displayed in an independent window.

**Figure 1.** In the first window **incoming** and **outgoing** SMS messages, **error messages** and **GPRS** data can be seen with their log times. Messages can be filtered by type of message or logger ID by using **Rec ID.** When clicking a message, a new window with detailed information appears. Data and charts corresponding to the project can be viewed in the **Graphs & Data** tab. Data and figures can be queried either for each monitoring site and probes separately, or summarized for the whole project.

**Figure 2.** *Projects window.* You can review which project is active at the current time and which one is shut down, or when it was set up or last modified. By clicking on one row you can enter one monitoring site. Information about the monitoring site is shown, as well as information about the state of the data logger used. If you scroll down, you can see the state of the probes used in the monitoring plots linked to the monitoring site. From Monitoring Sites it is possible to access the following data: Installer, linked receiver, status, last logging date, warning logs, log efficiency, number of probes connected to it, charge level of the batteries, signal strength and temperature at the time of last signal.

**Figure 3.** *Devices window.* Within Devices, data on loggers and probes installed in the EDAPHOLOG System can be seen. Current status, charge and other technical information of the loggers is listed. Probes are handled in the same way. By choosing a logger, further information can be seen: SIM card, phone number, PIN number, project name to which the logger was linked, GPRS signal intensity, etc. Under Probe Devices you can see the current status of the probes. Each probe has its own ID.

**Figure 4**. *Options window.* In Options, an SMS can be sent by Internet phone applications to the loggers. The loggers are configured remotely by sending an SMS which contains a special command message. The drop-down menu is used to choose a logger, and clicking the Send button will then send it an SMS message with the appropriate command. By clicking the icons on the bar, a specific communication window will be made available. In this window, incoming and outgoing messages of the current logger can be tracked.

**Figure 5.** *Graph & Data window*. Here you can set if you want to retrieve data summed or averaged. By clicking **Generate Graph**, graphs will be generated. The data is displayed on a time graph where duration is adjustable with a sliding button. Raw data can be exported into Excel.