Research Platforms: SwissEx

A cross-disciplinary infrastructure for data-intensive science: SwissEx

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Note: This work is the product of many authors from EPFL, ETHZ, WSL/SLF and EAWAG. This poster is an overview of the whole project.

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SwissEx Goals

SwissEx is the CCES platform for bringing cutting edge technology to environmental science. The aim is to bring new technologies into environmental research along the whole data life cycle: from the sensor to the user interface.

Applications of new sensor technologies are being researched, such as the use of RFID for tracking sediment transport or the use of X-Band radars for looking at fine scale precipitation distribution and type.

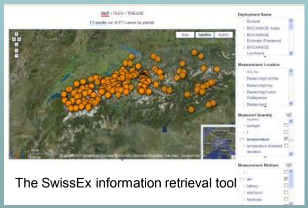
New, low power sensors are being developed such that they may be deployed in remote locations within dense sensor networks. These wireless, self-organising sensor networks have been developed to intensively monitor small areas so that the fine scale processes may be understood.

SwissEx has developed a generic distributed data system for the storage and mining of all types of data. One application is that the dense sensors deployments can be viewed or processed together with large scale existing sensor networks. Data are of limited use without their associated metadata, hence SwissEx has developed a generic measurement metadata system that is to be closely integrated with the data. All data and metadata are made securely available online. Methods are provided for calling this data directly from desktop processing tools such as R, Matlab or LabVIEW, or for processing it collaboratively online in R.

Why should I integrate my data?

SwissEx is the CCES infrastructure, not just a research project for the use of the researchers who work on it. It is there for the safekeeping of your data and for discovery of their availability by others. Information retrieval, data mining and data quality tagging will form a large part of SwissEx research in the next 2 years. This will eventually provide a platform with unparalleled capabilities for the discovery of data and metadata to ensure their correct usage.

Documenting your data properly will help you (and others) to understand the data and make the work that you have done more valuable.



The SwissEx information retrieval tool

SwissEx provides vital tools for collaboration between institutes. Web-based data mining products such as that seen on the left will further increase the value of such a platform.

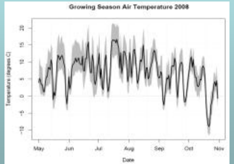
How do I integrate my data?

Integrating your metadata is the easiest way to start integrating your data. Contact SwissEx to get a log-in to the wiki, and start to add your sensors / measurements. Instructions are provided and inline help is also available. The metadata bulk upload system is extremely useful for those integrating an entire new experiment.

To get time-series data online, you will need to install GSN or find an instance that is available to you. Contact the SwissEx admin to find out which is best for you. Assistance in getting your data online is available.

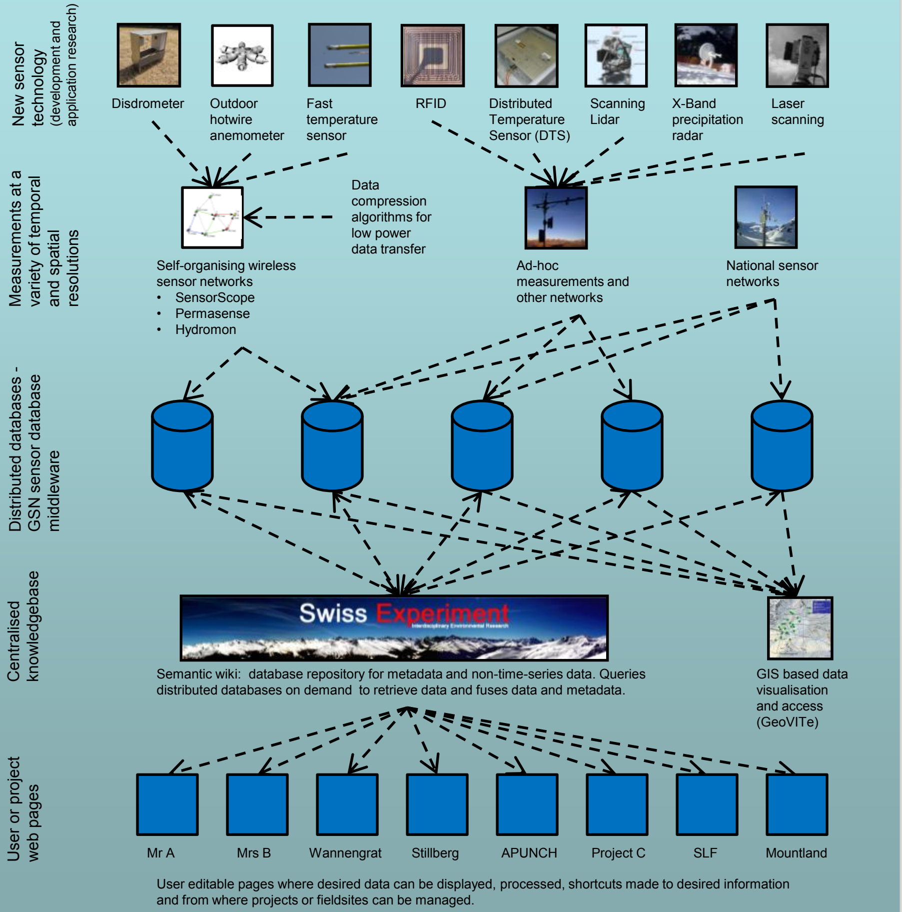
How can I find data within SwissEx?

SwissEx is a research project and therefore, we are still working on some things, such as the centralised access point. Currently, each institute stores their own data and metadata are stored in a centralised repository. This repository (the SwissEx wiki), which also stores the data location, will eventually be the centralised data access point. The first demonstrations of this data access are already available and an initial system should be ready by the end of 2011.



Swiss Experiment Schematic Diagram

The figure below shows examples of the work being carried out within SwissEx and how they fit into the overall concept.



Correct use of data and data citation

Whilst full documentation of the data should make the misinterpretation of data less likely, we understand that it is still a concern. Within the data infrastructure, we have made it possible to keep your data private or to make them public. If you choose to keep them private, anyone wishing to use your data will have to apply for permission. At this point, you can contact the user and ensure that the data is used correctly.

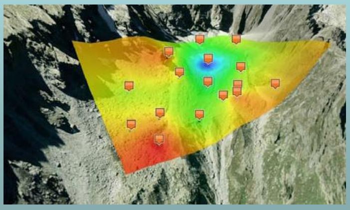
Data citation is currently a hot topic. SwissEx will summarise the latest ‚standards' on the wiki in the near future.

Acknowledgements

This work is the product of many postdocs and PhD students, whose names could not all be included as authors, Only the originating PIs and poster contributors are shown as authors.

How 'futureproof' is the infrastructure?

The SwissEx infrastructure will conform to the latest web standards to ensure that data added to the infrastructure remain accessible in future. The project itself is expanding rapidly. Funding and partnerships are under negotiation for the next stage of development which will make SwissEx the ETH data platform.



Standard web interfaces provide data to 3rd party tools such as Sensormap and to any model through the MeteoIO plugin