ICT in support of ATMOSnet

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Work package involvement

Work Package No	Work Package title	Responsible Partner	Involved Partners
WP1	Set-up of transnational pollen monitoring network	5	1,2,3,4,5
WP2	Implementation of monitoring pilot sites & training of personnel	2	1,2,3,4,5
WP3	Quality Assurance	4	1,3,4,5
WP4	Potentiality of pollen analysis on climate change forecasting models	3	1,3,4
WP5	Communication & Dissemination and early warning system	5	1,3,4,5
WP6	Management	1	1,3,4,5

Contents

- Data Lifecycle
  - Capture, Interpretation and Storage
    - Data collection and Database systems
  - Analysis
    - Modeling and Forecasting environments
  - Presentation
    - Tabular, Graphical and GIS
  - Dissemination
    - Website and Early Warning System
- Collaboration
  - Data sharing
  - Communications

Top Level Analysis

- Raw Data will be generated by pollen traps and meteorological devices.
- The pollen trap data is captured through a computer interfaced microscope.
- It is then interpreted manually by trained personnel.
- The interpreted data is input into a local database (LD).
- Local site meteorological data is also collected and input into the LD.
- A subset of the local LD data is collected by the central site for further analysis.
- Regional meteorological/climatic data may also be captured and used in the forecasting models.
- The Forecast Models results are stored in the appropriate tabular, graphical and GIS forms and disseminated through the project website to the partners.
- The results are accessed by the partners and may be stored locally for further local processing.
- A subset of results, together with project information and early warning data, shall be made available for public consumption through the website.

ICT processes Identified

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- Local site meteorological data is also collected and input into the LD.
- A subset of the local LD data is collected by the central site for further analysis.
- Regional meteorological/climatic data may also be captured and used in the forecasting models.
- The Model/Forecast results are stored in the appropriate tabular, graphical and GIS forms and disseminated through the project website to the partners.
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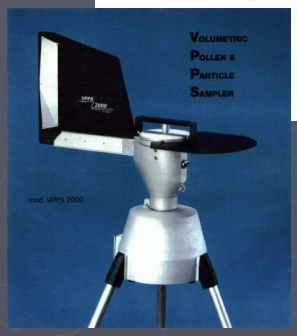
Pilot Sites

- Pilot monitoring sites will be implemented to perform on-site data capture and pollen identification as per deliverable D2.1 in WP2.
- Omni-directional pollen traps will be loaded and unloaded manually, on a daily basis
- Data from the co-located meteorological devices (if any) can be either
  - collected in digital format to save manual input, or
  - collected remotely over a data network



Data Capture

- The pollen trap sampler is analyzed and interpreted by trained personnel through a computer interfaced microscope.
- A first proposal is to use a microscope equipped with a digital camera interfaced to two monitors to allow two persons to work simultaneously.
  - One microscope can be shared by two persons, however
  - the trained persons have to be present simultaneously next to the microscope.
- A second proposal is to adopt a two stage approach
  - A trained person will first scan through the sample, storing the images in digitized format on the computer.
  - Two or more trained persons will then access the images through their desktop PCs from convenient locations.
  - The website access to the image database will allow direct entry into the sample database.
  - The images will be automatically annotated with the interpreted data.
  - This allows versatile task segmentation e.g. a person may interpret one segment of the sample, or the whole sample for particular pollens.
  - One microscope can be shared by more than two persons.

Training

- Automated pollen and spore identification is still a research topic.
- Personnel will have to be trained to correctly identify pollens and spores as part of WP2.
- eLearning techniques *may* be used to improve the efficiency of the training process.
- Online courses would allow trainees to learn at their own pace and to review certain material.
- On-the-job training would also be possible as well as refresher courses.
- Technically, the training programs can be fully defined only after the selection of all the appropriate hardware and the management and dissemination software has been implemented
- Online updating of competences, as deliverables are completed, would help in this respect as well.

Data Capture and Storage

- Raw image data, interpreted pollen data as well as meteorological data has to be captured and stored in a database.
- The implementation of the data management software and network server is deliverable D2.2 in work package WP2.
- Database Issues
  - Which Database Program?
    - MySQL, PostgreSQL, Oracle, MSSQL
  - Data Models have to be set up
    - Captured Raw Data – {Colour Space, Resolution, Compression}
    - Processed Results – {Data model}
    - Dissemination Results – {Dissemination formats}
  - Which Database infrastructure to use?
    - Monolithic and Centralised
      - All data stored centrally on relevant data processing and website servers
    - Hierarchical and Distributed
      - Raw Data Stored Locally
      - Subset transmitted to central repository for further elaboration
      - Results produced by Forecasting Models are stored centrally and available online for partners and website dissemination

Data flow between project sites

- Interpreted data will be collected centrally to build the forecasting models.
- The data collection can be
  - Manual
    - via daily ftp
  - Automatic
    - via automated ftp transfers,
    - database synchronization,
    - webservices … etc.
- Once elaborated, the data will disseminated from the ATMOSnet website using open data formats.
- These open data formats will be defined between WP2 action 2 and WP5 action 3.
- The main data repository server will be in Campania whereas the main web server will be in Malta.

Modeling and Forecasting

- The state of the art in Modeling and Forecasting methodologies in the field of pollen monitoring will be delivered in WP1 as deliverable D1.2
- The forecast models will developed in WP4 as deliverables D4.1, D4.2 and D4.3
- The appropriate software modeling/forecasting environment will have to be identified and developed.
- The EEA published a report - Ambient air quality, pollutant dispersion and transport models – in 1999.
- A more recent database of a wide range of Air Dispersion Models is described at
  - http://air-climate.eionet.europa.eu/databases/MDS/index_html
  - and can be searched at http://pandora.meng.auth.gr/mds/qstart.php

Data Dissemination

- Wide dissemination of the project results is contemplated through
  - Online information and website design
  - Marketing material and
  - Scientific publications
  - as defined under Deliverable D5.1 of WP5.
- The website will also carry pdf copies of marketing material and scientific publications.

Website Development

- The website will support two access modes:
  - Intranet-mode allowing authorized partners to
    - access to the analyzed data as per WP2 action 2
    - internal project information
    - all project deliverables
    - collaboration tools
  - Internet-mode allowing the general public to access all the public data generated by the project.
- The website will be developed to EU norms for example similar to those specified at http://www.eionet.europa.eu/software/design
- And following similar best practices
- A prototyping development methodology will be used to have a website with basic functionality up and running in the shortest possible time.

Partner Accessible Website

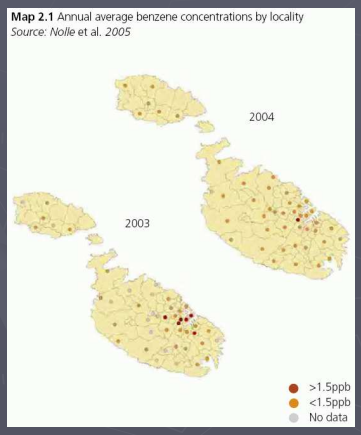
- The following areas shall be accessible only to authorized partners through password authentication.
  - Organigram with work package leaders' and task leaders' coordinates
  - Unrestricted Project Deliverables area with completed work as well as work in progress
  - Data access area giving access to all project results
  - Collaboration Tools area
  - Research material repository

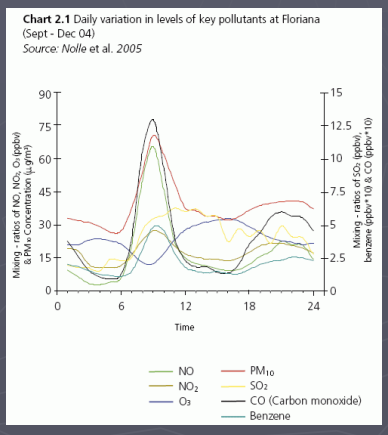
Publicly Accessible Website

- The following areas shall be accessible to the general public without requiring authentication.
  - Project information
  - Partner information
  - Marketing information
  - Released Project Deliverables
  - Released Project Results
  - Early warning data
  - Links to relevant sites
  - Contact Us

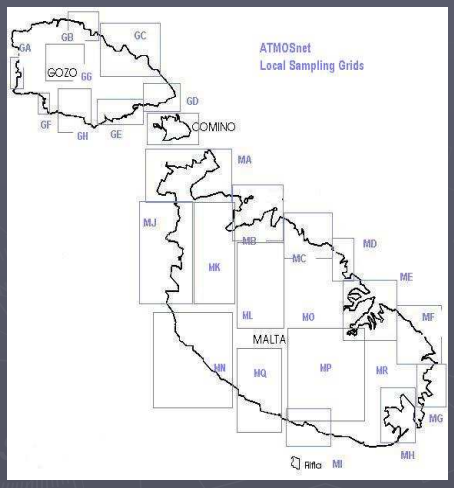
Results Format

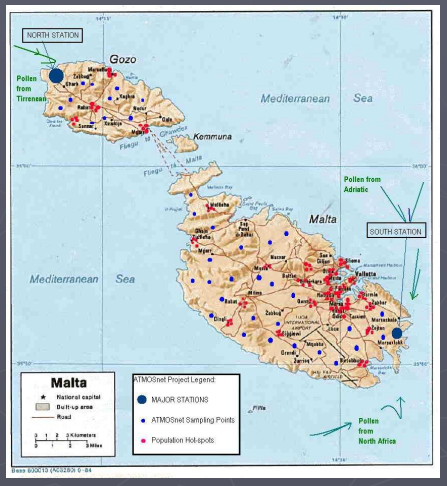
- The format of results has to be defined in the relevant work packages, and delivered in D1.1, D2.1, D2.2, D4.1, D4.2 and D4.3



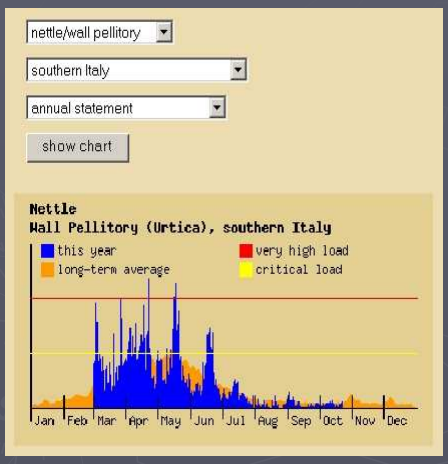


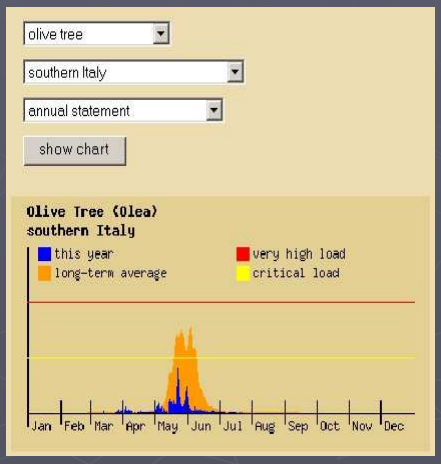
Active Maps





Temporal Distribution Formats





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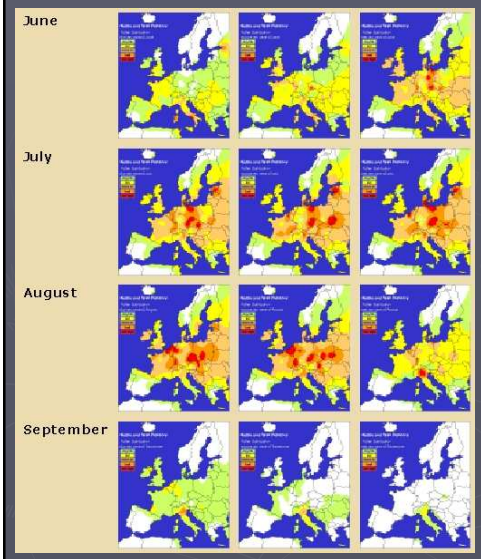
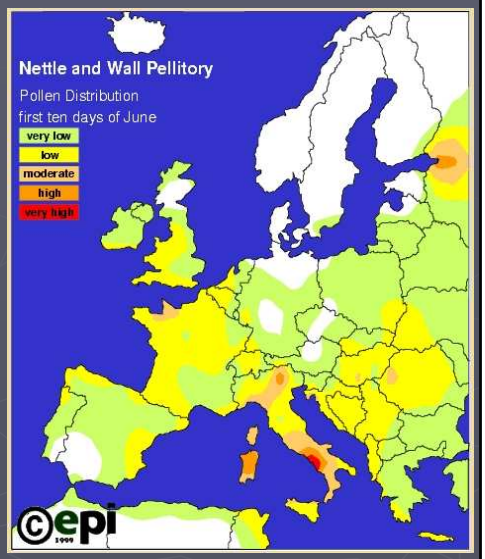
Spatial Distribution Maps





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Collaboration Tools

- The project description specifies that "*in order to support the real-time communication and a repository of the project knowledge-base, a project groupware will be implemented*".
- Features of the groupware will include
  - Open Source groupware e.g. eGroupWare
  - On-line integration of communication tools such as
    - FTP file repository
    - Chat facility
    - Videoconferencing and
    - Work co-operation tools such as calendar, workflow and knowledge management
- These functions shall be accessible through the partner website

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* Exploitation of results

Thank You

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