Summary of the POLLEN project kick-off meeting

Helsinki 10-11.01.2005

Participants:

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Meeting agenda:

10.01.2005

11:30 Start of the meeting. Project overview

12:00 Participant's self-introduction, overview of available data and tools

14:45 Discussion. Project shaping, organization of work, contacts, information exchange, networking, dissemination of results.

16:00 Wrap-up of the discussion

11.01.2005

9:00 Project work packages: overview, timing, resources, methods, input and output

14:30 Technical arrangements, other matters, general discussion

15:00 Meeting wrap-up

The main discussion topics and key decisions

Below remarks do not reflect the full discussion during the meeting neither they cover all the decisions taken or considered. It rather concentrates on the most difficult and interesting points, leaving the "self-evident" matters to be handled in accordance with the project work plan.

Emission of the pollen grains

Probably the most difficult problem for the whole project is an adequate representation of the pollen emission source. This topic was extensively covered in several items of the meeting programme and considered from different points of views.

Timing of emission is defined by the flowering season, which can be predicted using (i) empirical heat-sum-type (or other) models, (ii) satellite images of the vegetation index (NDVI), (iii) near-real-time phenological (if any) and aerobiological observations at different places (in particular, to the south of the main emission areas) and of different species (in particular, those which start to grow earlier than birch). These three main methods of timing computations should be tested separately and then merged together using, primarily, the data assimilation techniques in order to obtain the highest possible accuracy of this key parameter.

A specific difficulty is that there is no European-wide flowering timing model. All existing approaches mentioned above are not applicable outside comparably small "native" regions. Therefore, the development and calibration of a unified model will be one of the major tasks of the project. A template for such a model can be taken from heat-sum-type formulations or dynamical promoter-inhibitor models. The latter ones are more flexible and elegant-looking but were criticized for lack of physical fundament and a possibility of over-fitting the model to observational noise.

Whatever model is selected, it has to be calibrated in a unified manner for the largest possible territory using phenological/aerobiological and meteorological datasets. An idea of using meteorological model results for calibration was sharply criticized by several participants but still might provide a reasonable trade-off. It is decided that the calibration will be first pushed to the largest possible extent using only observational data. Meteorological modelling results may be then used for the second round of calibration, partially revealing the sensitivity of the developed emission timing model to uncertainties of the input information.

Absolute emission intensity will be defined using the characteristic mean number N_G of pollen grains accumulated in catkins for an "average" year. This value will be corrected to represent actual conditions of the catkins development during preceding year(s) and then modulated following the actual meteorological conditions during the flowering: daytime, insulation, cloudiness, wind speed, humidity, precipitation, etc.

Duration of pollinating season will be evaluated using the "bank account principle": the emission is over when all the pollen has gone off the catkins.

Since most of the above-mentioned parameterizations are uncertain, an explicit tuning of the final model will be performed using the **inverse problem** solutions for a set of selected episodes that will reflect the main conditions of the birch flowering.

Deterministic versus probabilistic forecasts

According to the experience of the feasibility study, information on potential areas of risk regardless the actual pollen emission is a handy piece of information, which should be kept available. Its development to a full-blown statistical ensemble forecast can be based on perturbed meteorological and emission models. An output of such a forecast will include statistically robust parameters, such as percentiles, produced in addition to the usual absolute concentration levels.

Available data.

The following main datasets will be made available for the project:

- Aerobiological observations accumulated in EAN over ~30 years for the most of Europe (except the Netherlands, which need special negotiations)
- Phenological observations in Finland over ~20 years
- Russian aerobiological and phenological observations (all what is possible to get); digital format of forest map of Russia and CIS (all what is available)

- An analysis of a collection of 2-week mean satellite NDVI images for ~20 years
- ECMWF meteorological archives over ~40 years (ERA-40); ECMWF operational and historical forecasts
- Meteorological observations accumulated at ECMWF and FMI.

All datasets will be treated confidential, used strictly for the project research needs and destroyed after the project completion, unless otherwise is explicitly agreed for some datasets.

An additional request has been sent to International Phenological Garden IPG project for the ~30-year-long phenological observations accumulated in that database.

Plan of specific actions

1. Selection of template for the emission timing model and its trial fitting to Finnish data (H.Ranta, T.Linkosalo, P.Siljamo, M.Sofiev)
2. Trial calibration of the NDVI index for ~10 stations selected in different parts of Europe (K.A.Høgda, M.Sofiev, P.Siljamo)
3. Data gathering and pre-processing and opening for the project (all partners, depending on specific dataset possessed by the partner)
4. Technical and other arrangements for the project – Web site, communication with other data holders, project advertising, etc. (all partners, depending on their role and specific tasks)