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Press Release

Nippon Telegraph and Telephone Corporation
Japan Weather Association

**Beginning of Pollen Forecast Service Field Trials in Tokyo:
Environmental IT-Based Services
that Enhance the Quality of Peoples' Life**

NTT and the Japan Weather Association began a series of field trials in January 2001 to demonstrate the predictive accuracy of an advanced pollen forecasting system in the Tokyo Metropolitan area.

Replacing the old manual pollen forecasting system that relied largely on the experience of the forecaster, NTT is making rapid progress in developing a new system that obtains accurate pollen counts using sensors deployed in the outlying areas where the pollens are produced. Combining these more accurate pollen counts with computer simulations done by the Japan Weather Association permits fast and accurate pollen forecasts which are then reported to the local media for publication in newscasts. The first phase of the field trials, conducted from March to June 2000 in Yamagata Prefecture, demonstrated the accuracy of the pollen sensors that were developed primarily by NTT and also proved the online measurement capabilities of the sensing network system linking the sensors.

The collaborative field trials now in progress represent the next step toward practical implementation of the system, and will test the predictive accuracy that can be achieved with improved forecast technology and simulations. At the same time, we are also exploring ways in which the new pollen data can be utilized by medical institutions. The current trials are being conducted in and around Tokyo, an area 4.3 times larger than that of the earlier Yamagata study, where the greatest number of people suffering from allergic reactions to pollen reside. Sensors were deployed at 15 sites for the phase-two trials, three times more sensors than were used in the phase-one Yamagata trials. In the joint project, NTT is responsible for verifying the pollen sensing network system and the method of delivering the pollen data (current and projected) to the general public through the local media. The Japan Weather Association's role is to verify the accuracy of the forecast simulations of pollen concentrations reaching the populated areas based on the pollen counts from NTT's pollen sensing network system and from weather data provided by Japan's Meteorological Agency.

Background and Efforts Leading up to the Current Trials

The sugi, or Japanese cedar (*Cryptomeria japonica*), is a pollen emitting conifer that brings discomfort to about one in ten Japanese nationwide and as many as one in five in the larger cities every spring.

Pollen forecasting services have been provided for some time, but past efforts have proved somewhat unreliable. The traditional approach was based on the gravimetric

Durham method in which pollen is collected over a one-day period and examined under a microscope. The resulting pollen count is then combined with local weather conditions and a forecast is offered that is based in large part on the experience of the forecaster. The primary drawbacks of this approach are that (1) considerable work is required to measure the pollen count and the count that is obtained is fairly incomplete, (2) it is difficult to estimate the amount of pollen that will reach population centers from outlying areas within a specific time-frame, and (3) the accuracy of the forecast is very much dependent on the experience of the forecaster and the agency providing the forecast. The first-phase Yamagata trials demonstrated that the first problem was effectively resolved by networking NTT-developed pollen sensors that are deployed in outlying regions where the pollen emitting conifers grow. This permits accurate pollen counts to be obtained remotely on line from the sugi forests where the pollen is emitted. The second-phase trials that are now in progress will verify the accuracy of the computer simulations in determining how the airborne pollens get from the surrounding regions into the city by comparing pollen counts from sensors deployed in both the outlying areas and in the populated areas and by factoring in weather conditions such as wind speed, wind direction, and so on. The project is a collaborative effort because it combines the Japan Weather Association's expertise in weather forecasting with NTT's knowhow in networking and sensor technologies.

Closer Look at the Field Trials

The airborne sugi pollen in Tokyo comes from the vast cryptomeria forests in Izu, Tanzawa, Chichibu, Boso, and other areas surrounding the Tokyo plain. Pollen sensors for the trial were deployed at a total of 15 sites in outlying forested areas where the pollen is produced, and in the city at NTT's Shinagawa office and other offices and at a number of hospitals. The sensors calculate the concentration of airborne pollen grains every other hour, and convey the data online to NTT's Lifestyle and Environmental Technology Laboratories in Atsugi and to the Japan Weather Association located in Ikebukuro. The forecast is made by a pollen concentration numerical model that calculates the production of pollen by sugi, dispersion by wind, and transport to populated areas close to ground level as a continuous process. More specifically, a detailed estimate of the current state of pollen dispersion is projected by computer simulation based on the concentration of pollen in the outlying areas where it is produced and on relevant weather data-temperature, wind direction and intensity, barometric pressure, weather fronts, and so on. To ensure the most advanced forecasting and the highest degree of predictive accuracy, the calculation model is corrected if need be by comparing the simulation results against actual pollen counts measured in the city.

Data measured by the pollen sensors (current levels) will be made available to the public from January 20, and forecasts will be made available when the concentration of pollens in the air peaks from March 1 at two web sites:

iMode: <http://www.ene-unet.ocn.ne.jp/pollen/>
Internet: <http://www.ene-unet.ocn.ne.jp/web/pollen/>

Aside from proving the accuracy of the pollen forecasting system, these trials are significant for other reasons as well. In cooperation with Toho University, Jikei University School of Medicine, and other institutions involved in the treatment and study of pollinosis, airborne pollen counts obtained from the trial system are being used to amass clinical data on the susceptibility of individuals to different concentrations of pollens in the air as part of an ongoing "Comprehensive Study to

Overcome Sugi Based Pollinosis" supported by the Ministry of Education, Culture, Sports, Science and Technology. Innovative ways in which the pollen data provided by the system can be effectively utilized by medical institutions is also being investigated.

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