

7-6 Prediction of Atmospheric Dispersion of Radionuclides by Accidental Discharge in the World — Development of WSPEEDI-II: Worldwide Version of System for Prediction of Environmental Emergency Dose Information 2nd Version —

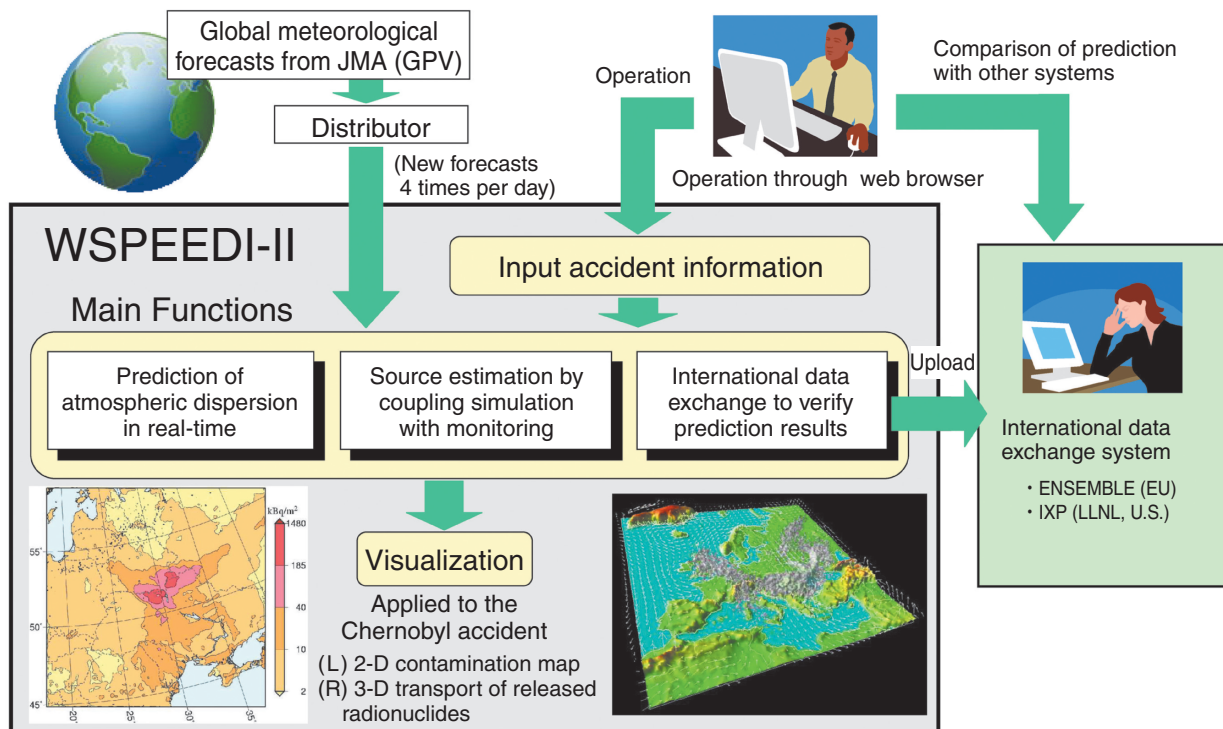


Fig.7-15 Overview of WSPEEDI-II

Due to the increase in the demand for energy and the global warming problem, it is expected that the number of nuclear power plants will increase in China, India and other countries. In the worst case when a large-scale nuclear accident like the one at Chernobyl occurs, radionuclides would be transported to other countries in addition to the environmental contamination around the accident site.

To prepare for such an accident, the computer-based emergency response system “WSPEEDI-II: Worldwide version of System for Prediction of Environmental Emergency Dose Information 2nd Version” has been developed. It is capable of predicting the atmospheric dispersion of radionuclides discharged from an accident site quickly, estimating the location of the source, and exchanging prediction information internationally (Fig.7-15).

The development of the 1st version of WSPEEDI was started after the Chernobyl accident in 1986, and was completed in 1997. As a result of successive improvements based on operation experience, the 2nd version with high-performance functions has been completed.

The new functions of WSPEEDI-II are as follows:(1) It can predict the atmospheric dispersion and the deposition on the ground precisely in areas ranging from several tens of km

square around an accident site to a hemisphere by computational simulation, (2) It can predict the source conditions, e.g., release point, release time, discharged amount, by coupling simulation with monitoring, in the case when air dose rates increase at domestic monitoring points before the accident information is acquired, and (3) It can exchange its prediction results with other emergency response systems in the United States and Europe to evaluate the accuracy of predictions.

The prediction capability of WSPEEDI-II has been evaluated using monitoring data of the Chernobyl accident and of a field tracer experiment in Europe in 1994, ETEX, and it was shown that the capability of WSPEEDI-II is one of the highest in the world.

By the practical operation in future, WSPEEDI-II is expected to play important roles supporting emergency measures for public safety, airplane monitoring, etc. in case of nuclear accidents. It will also be utilized for research on atmospheric environments.

The development of WSPEEDI-II was honored with an award for distinguished technology by the Atomic Energy Society of Japan in March, 2009.

Reference

Terada, H. et al., Development of Worldwide Version of System for Prediction of Environmental Emergency Dose Information: WSPEEDI 2nd Version, Nippon Genshiryoku Gakkai Wabun Ronbunshi, vol.7, no.3, 2008, p.257-267 (in Japanese).