Introduction of PRTR Data Utilization in NITE

21st November 2018

PRTR Division
Chemical Management Center, NITE

Published PRTR[*1] data for FY2016

◇ Released amounts 398,000 t (100%) = Amounts subject to PRTR notification 38% + Estimated amounts not subject to PRTR notification 62%

PRTR business categories subject to notification requirements

Metal mining, manufacturing, electric utilities, and the like

【Total number of notifications received: 34,668】

151,000 t (38%)

Amounts subject to PRTR business categories outside notification requirements

45,000 t (11%)

Business categories that are not subject to PRTR notification

Agriculture, construction, and the like

87,000 t (22%)

Households

Agricultural chemicals, paints, and the like

46,000 t (12%)

Moving objects

Vehicles, motorcycles, special motor vehicles, ships, trains, aircrafts

69,000 t (17%)

◇ Transferred amounts subject to PRTR notification: 224,000 t

* 1 PRTR: Pollutant Release and Transfer Register

Utilization examples of PRTR data in NITE

NITE estimates the concentrations of chemical substances in the atmosphere from PRTR data.

1. Atmospheric concentration simulation over a wide area
   - ◆PRTR map (concentration map) provided by NITE
2. Atmospheric concentration simulation in areas near factories
   - ◆ NITE and local governments collaborate to develop a simulation technique.

Collaboration organization and period

FY2017–FY2018	Tokyo Metropolitan Government
FY2017–FY2018	Local Independent Administrative Agency Hokkaido Research Organization
FY2018–FY2020	Kawasaki city

1. Atmospheric concentration simulation over a wide area

PRTR map provided by NITE

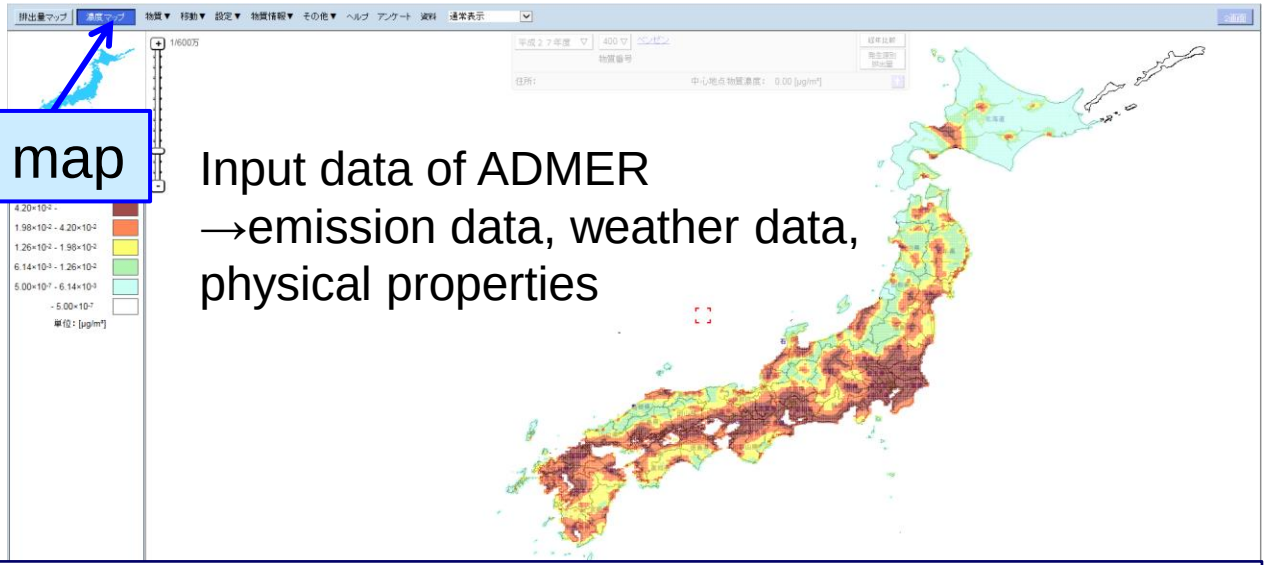
http://www.prtrmap.nite.go.jp/prtr/top.do (Japanese website)

NITE estimates the distribution of atmosphere concentrations of chemical substances with the atmosphere model AIST-ADMER*2 based on plume and puff models from "the amounts subject to PRTR notification" and "the estimated amounts not subject to PRTR notification".

*2 National Institute of Advanced Industrial Science and Technology - Atmospheric Dispersion Model for Exposure and Risk Assessment

Concentration map

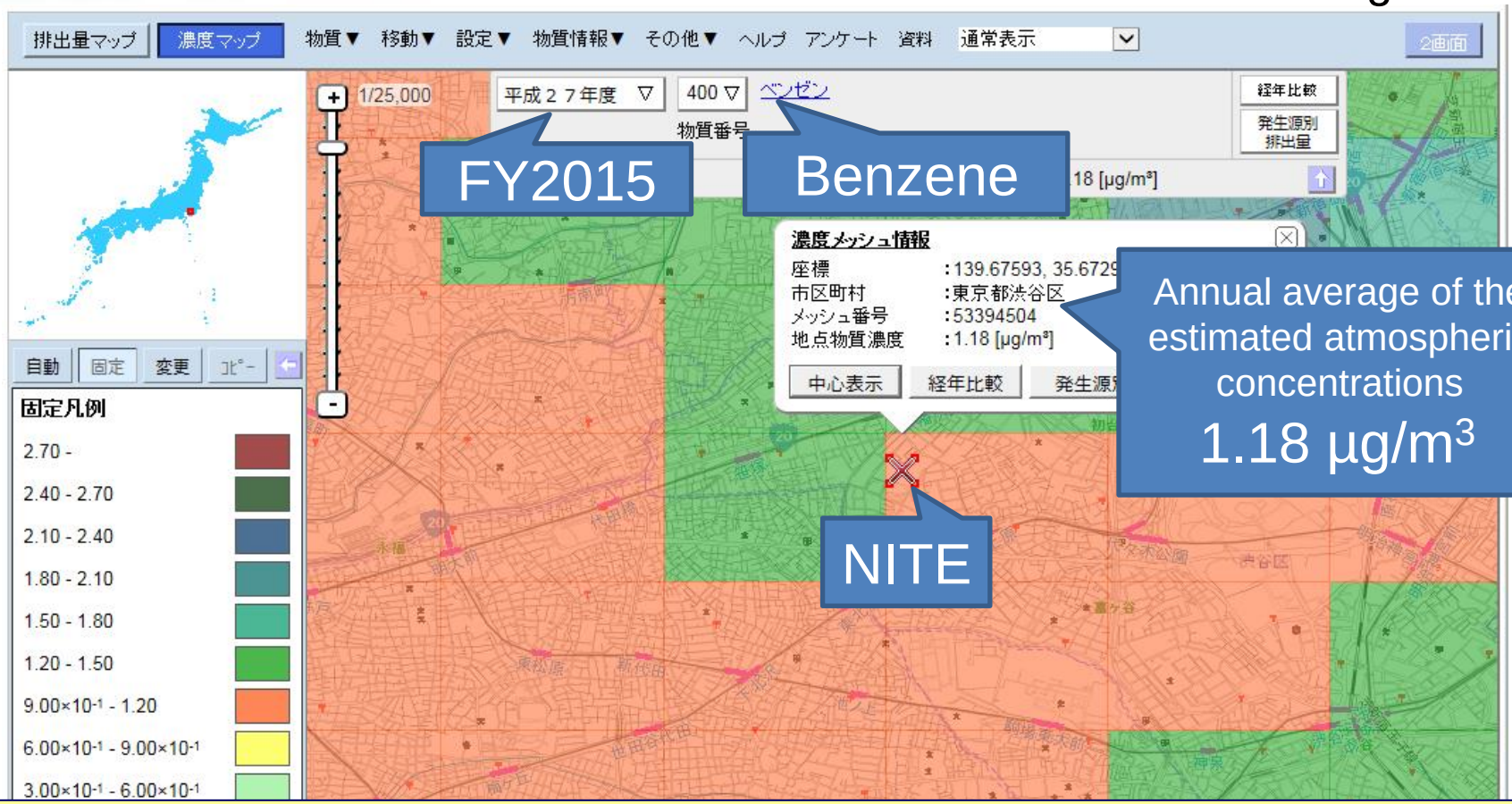
Input data of ADMER
→emission data, weather data, physical properties



Estimated benzene concentrations in the atmosphere (FY2015)

PRTR map

The estimation results are shown on a 5 km × 5 km or 1 km × 1km grid map.

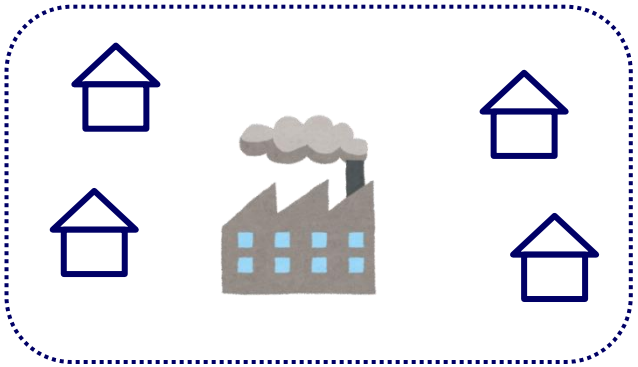


Annual averages of the estimated atmospheric concentrations of benzene around NITE in FY2015

Environmental quality standard (EQS) for benzene in Japan
→The annual average concentrations in the atmospheric shall not exceed 3 μg/m^3.

2. Atmospheric concentration simulation in areas near factories

- Subject in the environmental policy of local governments
  - Risk concern of chemicals relating to human health impacts via air in the vicinity of factories



Monitoring investigation: places, periods, and substances are limited.

To solve these problems

Simulation techniques are essential to complement the monitoring investigation.

Collaboration between NITE and local governments

Development of a technique to estimate the atmospheric concentrations in areas surrounding factories

Collaborative investigation by NITE and local governments

Concentrations estimated from the emissions from factories

Calculation with the atmosphere model METI-LIS[*3] from "the amounts subject to PRTR notification"

Estimated background concentrations

Calculation with the atmosphere model ADMER[*2], from "the estimated amounts not subject to PRTR notification," which are households, moving objects, etc.

Exposure assessment

Effective and reliable atmospheric concentration estimation

Hazard assessment

Risk assessment on the human health of chemical substances via air in areas surrounding factories

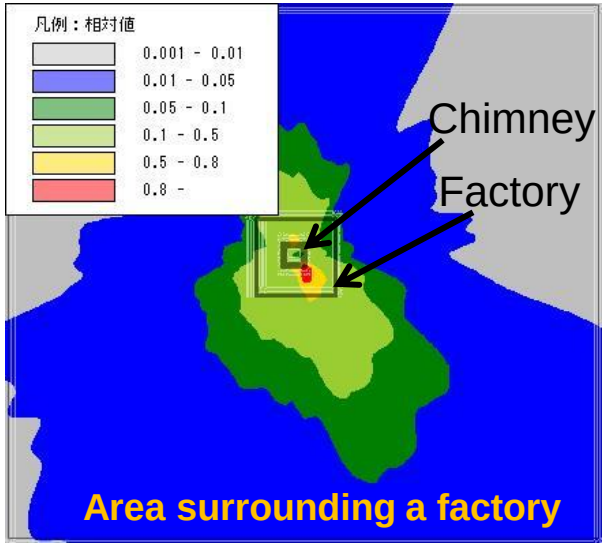
- Identification of chemical substances and regions where the likelihood of environmental risk exists
- Selection of priority chemical substances to be reduced

*3 Ministry of Economy, Trade and Industry–Low-rise Industrial Source dispersion model: an atmosphere model based on plume and puff models

Summary

➢PRTR data utilization in NITE

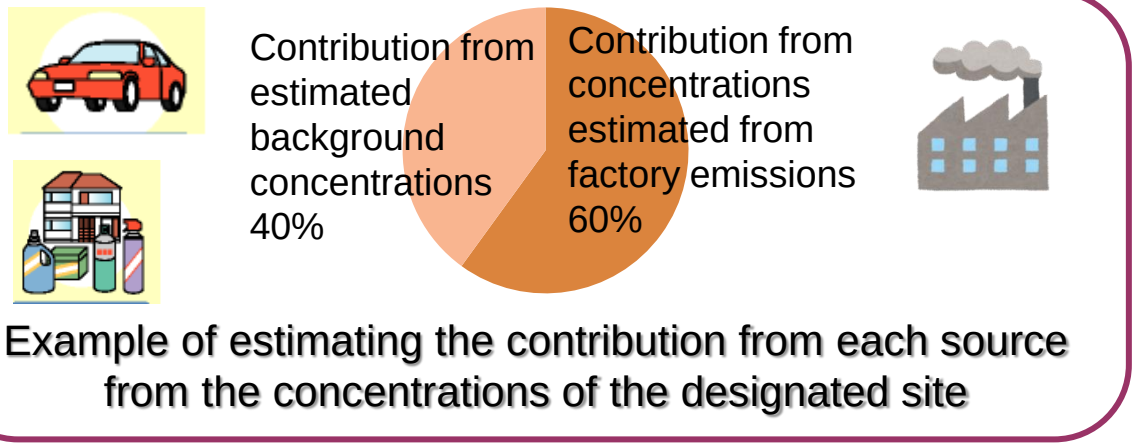
- PRTR map
- Atmospheric concentration simulation near factories



Example of atmospheric concentration distribution around a factory estimated with METI-LIS

◆ Combination of METI-LIS and ADMER

The combination can find the contribution from each emission source in the concentration for the designated site.



Example of estimating the contribution from each source from the concentrations of the designated site

◆ Evaluation of estimation accuracy

$$\text{Factor} = \frac{\text{Estimated results}}{\text{Monitoring results}} \cdots *4$$

If Factor is from 1/2 to 2, then the initial risk assessments can be used.

*4 Luecken, D. J., Hutzell, W. T., Gipson, G. L. (2006) Development and analysis of air quality modeling simulations for hazardous air pollutants, Atmos. Env., 40, 5087-5096

Thank you for your attention.