Measurements and Dispersion Calculations by the Deutscher Wetterdienst Regarding the Release of Radionuclides at Fukushima Daiichi Nuclear Power Plant

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Surview

- Surveillance of radioactivity in the atmosphere by DWD
- Meteorological products by DWD
- Measurements of airborne and gaseous radionuclides in Germany
- Lessons learnt
Surveillance of Radioactivity in the Atmosphere in Germany

- **German Meteorological Service (DWD)**
  Provision of dispersion forecasts, measurement of activity concentrations in the atmosphere and in precipitation at 48 measuring sites, trace measurements at the measuring sites Offenbach and Potsdam, aircraft measurements in the upper atmosphere

- **Federal Office for Radiation Protection (BfS)**
  Measurement of gamma radiation dose rates at 1800 measuring sites, trace measurements at the measuring sites Freiburg/Schauinsland, helicopter measurements

- **Federal Institute of Physics and Metrology (PTB)**
  Trace measurements at the measuring site Braunschweig
Measuring sites of DWD

- 48 Measuring sites of DWD with monitoring systems
- Staff available
- Communication infrastructure
- Trace measurements at Offenbach and Potsdam
Trajectories from Onagawa, 11.03.2012
Trajectories from Fukushima, 15.03.2012
Fukushima-I

72-hours- animation

GME-LPDM

Assumption: continuous release up to 500 m

17.-20.03.2011
Fukushima-I

48 h-GME-LPDM-Prognose
21.03.2011
00 UTC
**Fukushima-I**

**GME-LPDM**

17-days-Hindcast (14.03.-31.03.2011)

**Scenario:**
IAEA/CMC source term (30.03.2011)

**Emissions:**
0 - 500 m

**concentrations:**
0 - 1,500 m average
Trace measurements of aerosol-bound radionuclides

Gammaspectrometry

Gammaspectrum

Sampling with 1000 m³/h
Aerosol bound radionuclides at the measuring sites Potsdam and Offenbach

Gammaspectrometry, daily sampling, Limit of detection $10^{-5}$ Bq/m$^3$
Measurement of noble gases Kr-85 and Xe-133

Separation and measurement

Pretreatment

Sampling on charcoal in liquid nitrogen
Activity concentrations of Kr-85 and Xe-133 at measuring site Offenbach

![Graph showing activity concentrations of Kr-85 and Xe-133 from 23.03.2011 to 12.04.2011]
Aircraft measurements, 30 March 2011

Measuring flights: blue 4,500 m, red 10,000 m

Learjet 35A

Sampling device
Experiences and lessons learnt

• With precise dispersion calculations the time of arrival and the activity concentration were estimated providing important information for the public

• Equipment and staff available at DWD, BfS and PTB to measure low activity concentrations daily

• Measuring data were provided for IMIS/ELAN but also published in addition on Internet of DWD, PTB and BfS

• Personal resources are limited in case of providing suitable information to the public simultaneously as demanded

• Aircraft measurements show results for the upper atmosphere, consequences for the air traffic have to be taken into account

• Demand of information was higher than expected

• Social media have to be provided with information rapidly, using it as an important platform for the distribution of information
Thank you for your attention!