



**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

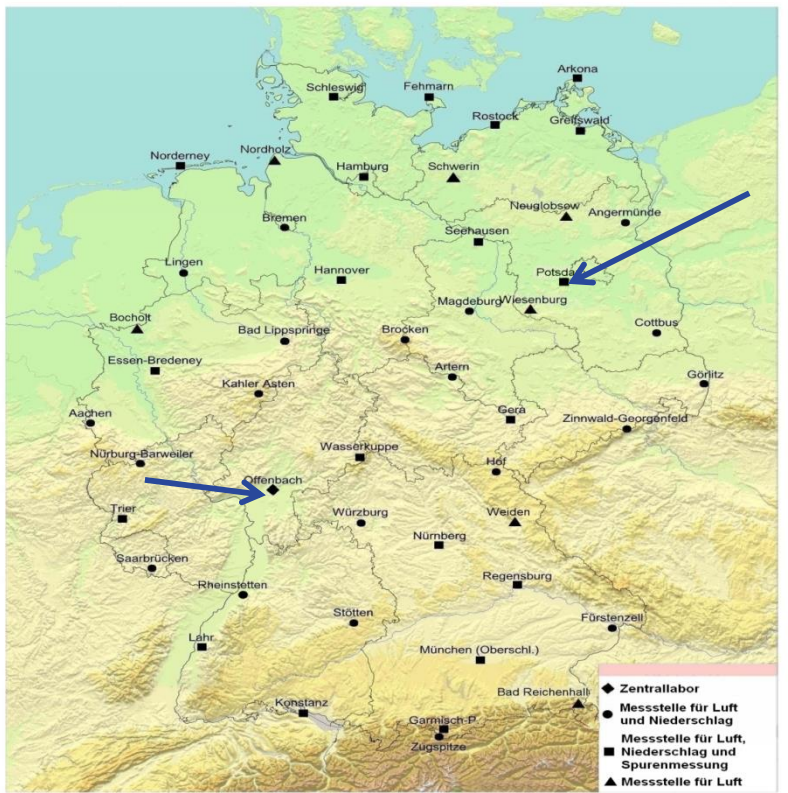
- **Federal Institute of Physics and Metrology (PTB)**

Trace measurements at the measuring site Braunschweig



Measuring sites of DWD

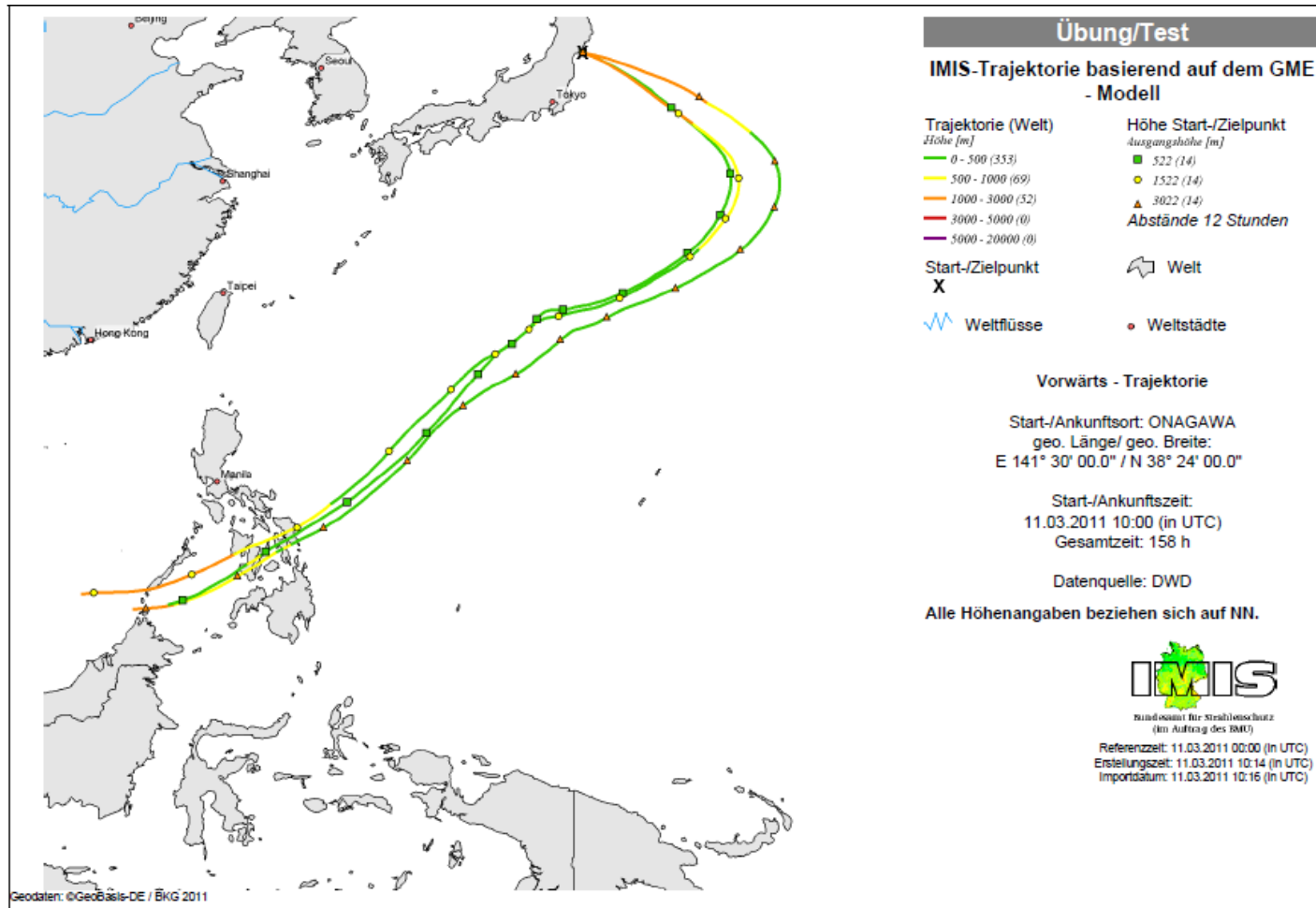
- 48 Measuring sites of DWD with monitoring systems
- Staff available
- Communication infrastructure
- Trace measurements at Offenbach and Potsdam



Scale 1 : 2 900 000

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Stand 06/2010

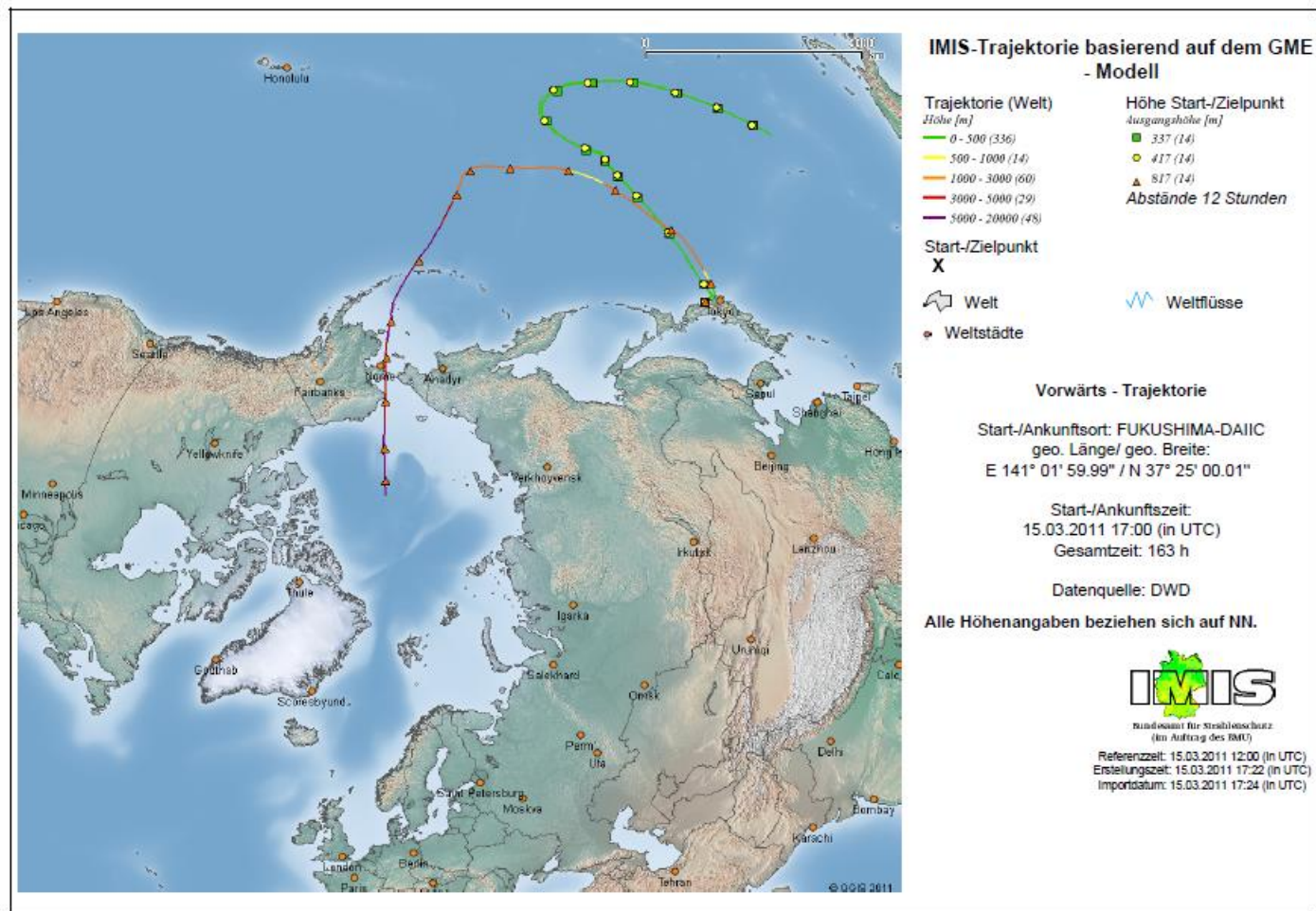
Trajectories from Onagawa, 11.03.2012



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Seite 1 von 1

Trajectories from Fukushima, 15.03.2012





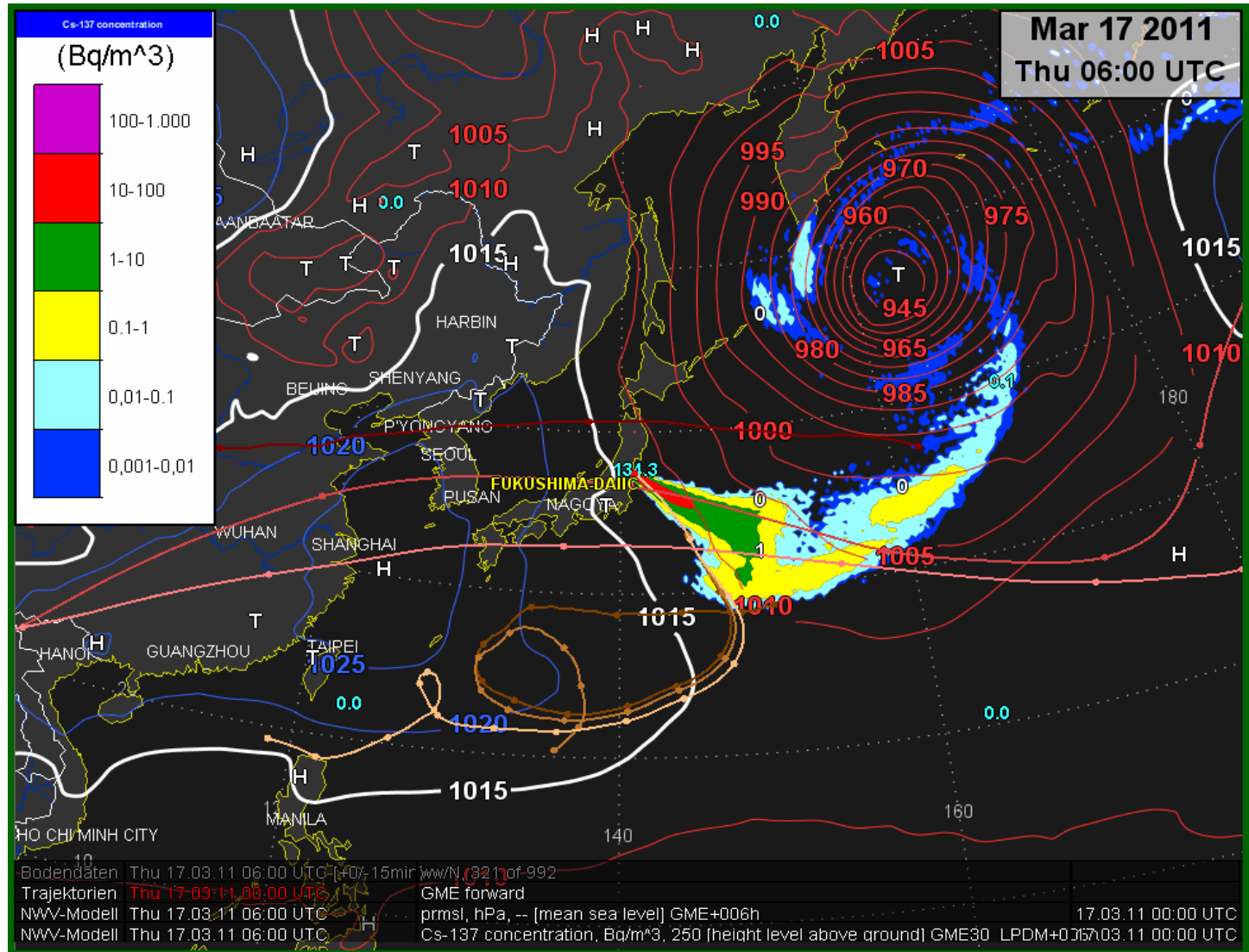
Fukushima-I

72-hours-
animation

GME-LPDM

Assumption:
continuous
release up to
500 m

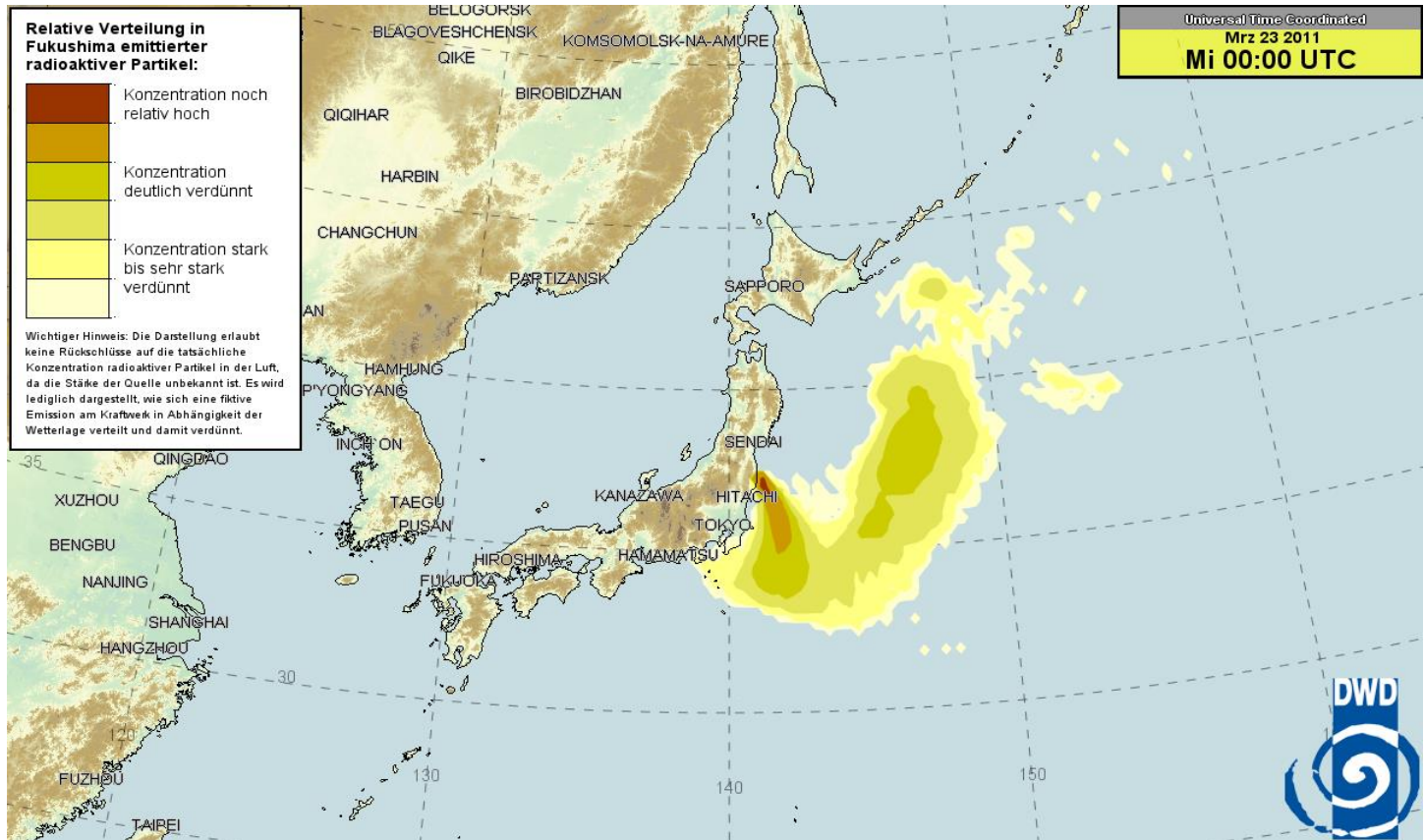
17.-20.03.2011





Fukushima-I

48 h-GME-
LPDM-Prognosis
21.03.2011
00 UTC



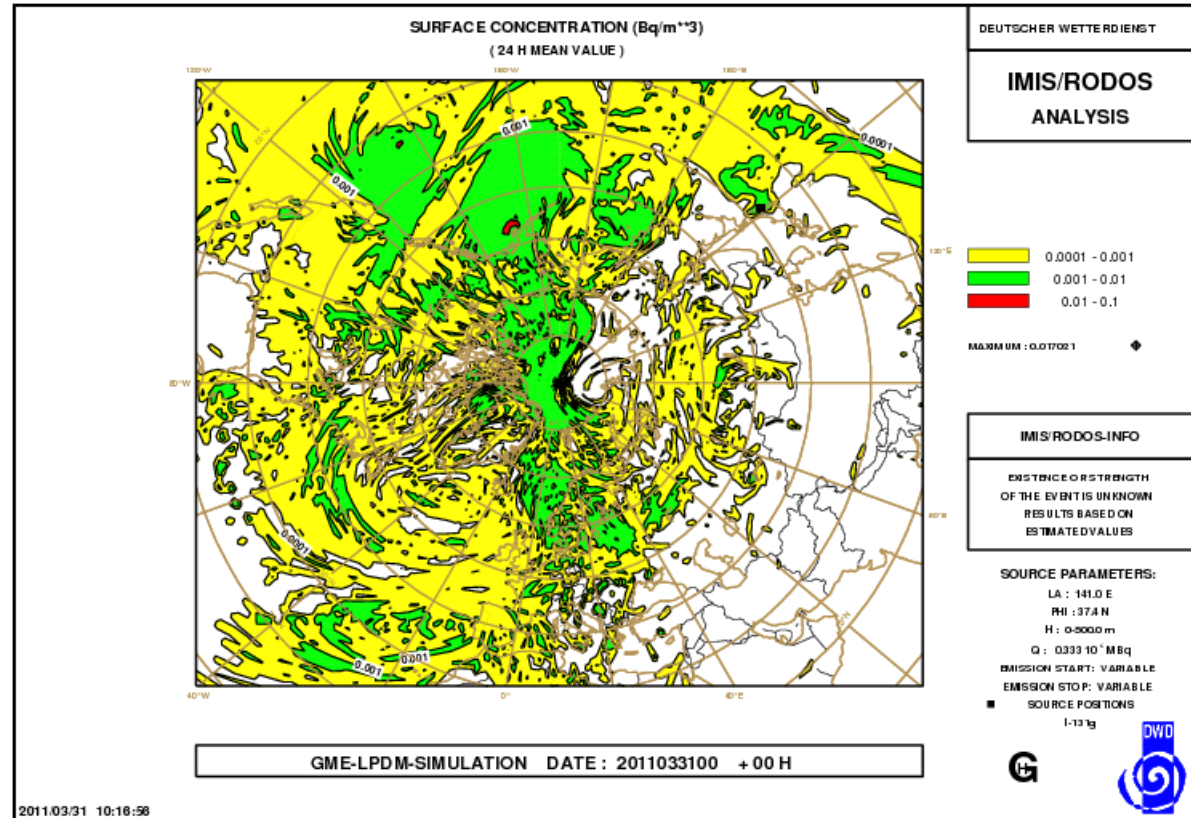
Fukushima-I

GME-LPDM
17-days-Hindcast
(14.03.-31.03.2011)

Scenario:
IAEA/CMC
source term
(30.03.2011)

Emissions:
0 - 500 m

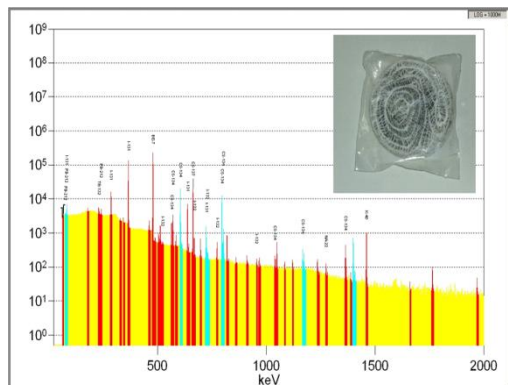
concentrations:
0 - 1,500 m average



Trace measurements of aerosolbound radionuclides



Gamma spectrometry



Gamma spectrum

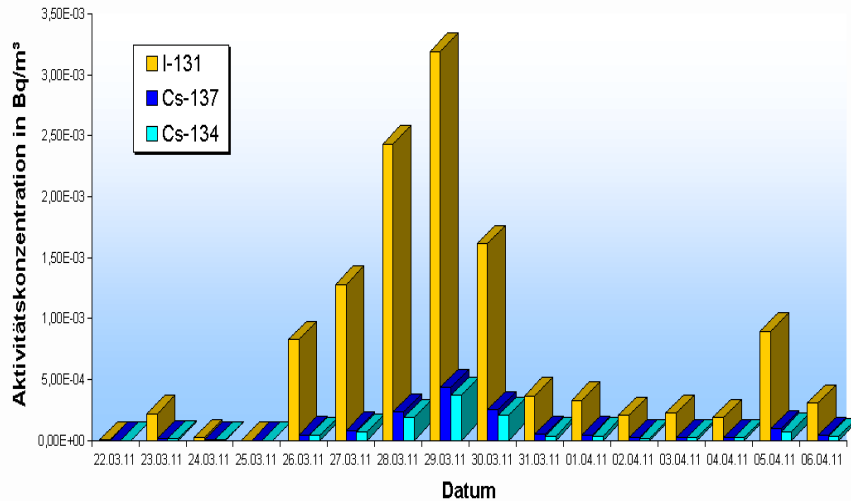


Sampling with 1000 m³/h

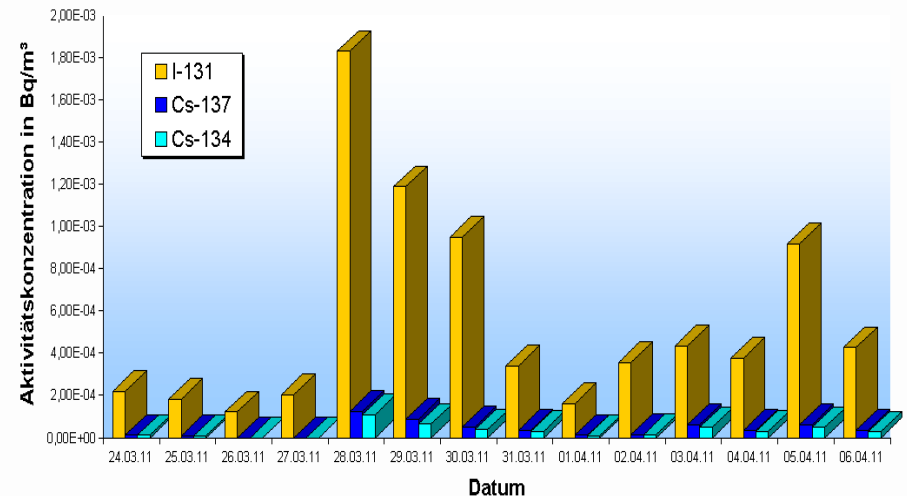
Aerosolbound radionuclides at the measuring sites Potsdam and Offenbach

Gamma spectrometry, daily sampling, Limit of detection 10^{-5} Bq/m³

Spurenmessungen Aerosolfilter
DWD-Messtelle Potsdam



Spurenmessungen Aerosolfilter
DWD-Messtelle Offenbach



Measurement of noble gases Kr-85 and Xe-133



Separation and measurement

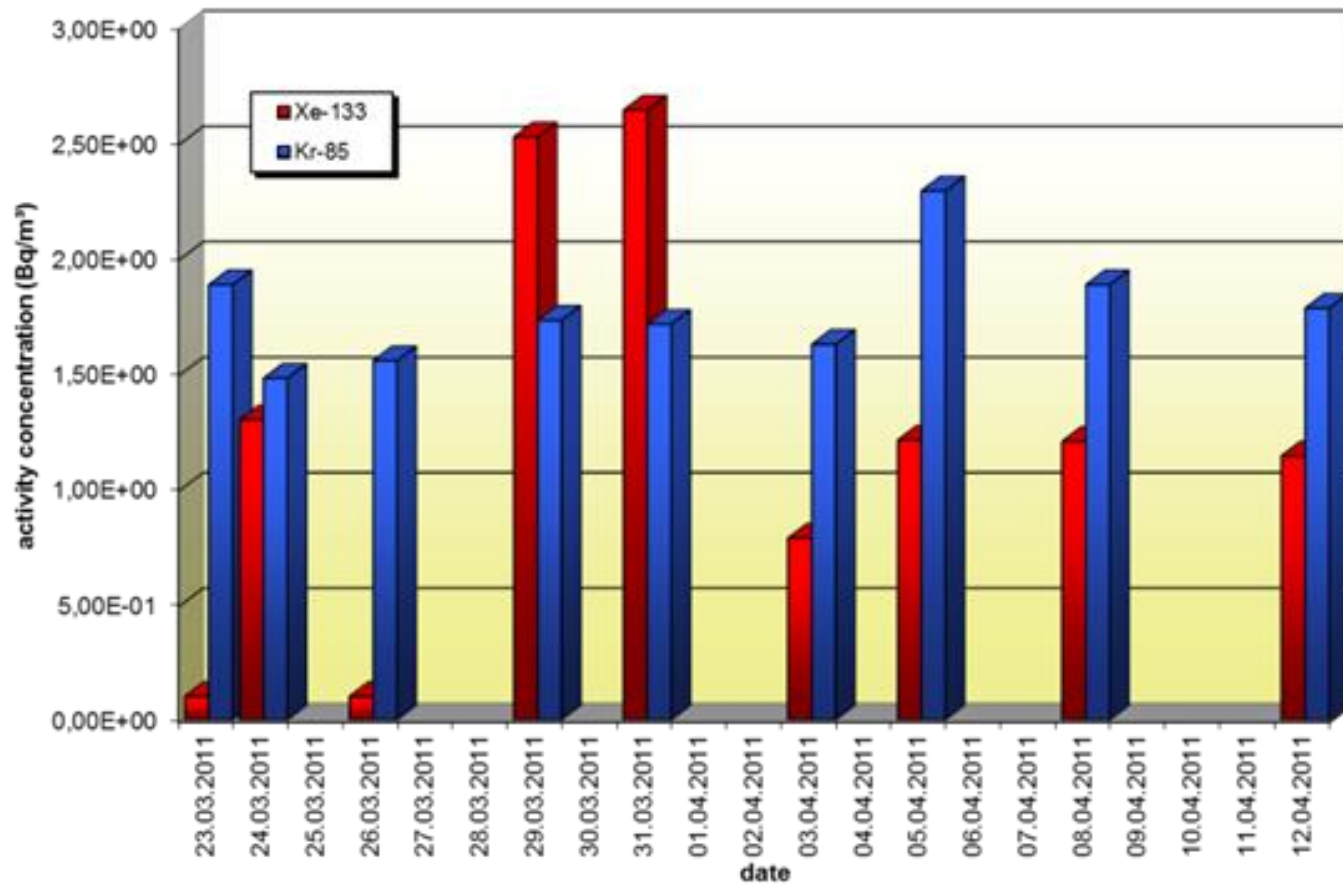


Pretreatment



Sampling on charcoal
in liquid nitrogen

Activity concentrations of Kr-85 and Xe-133
at measuring site Offenbach



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 !

