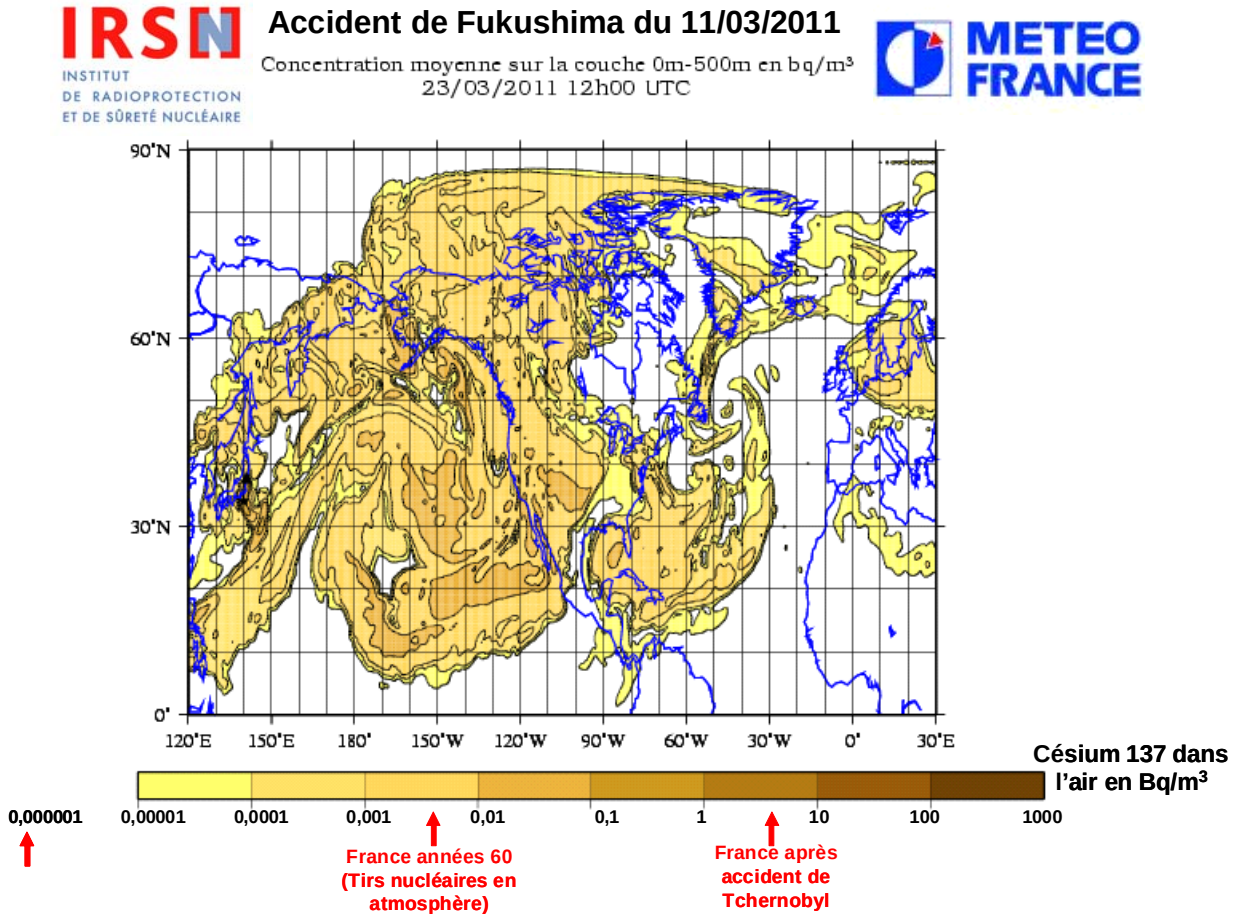
IRSN
INSTITUT
DE RADIOPROTECTION
ET DE SÛRETÉ NUCLÉAIRE

Dispersion model of the radioactive releases in the atmosphere on a worldwide scale

Update of March 22, 2011

Based on radioactive releases estimated by IRSN, Météo France (the national organisation weather forecast France) simulated the radioactive release dispersion on a large scale forecasted till March 26.



>> View the simulation (in french)

According to this simulation, the radioactive plume would have reached the United States as of March the 16 or 17. This forecast is coherent with the observation, of traces of iodine and caesium radioactive measured in the air on March 18 in Sacramento in California, as reported on the web site of the Agency of Environmental protection (US-EPA). The measured values were of 0,165 mBq/m3 for iodine 131, of 0,03 mBq/m3 for iodine 132 and of 0,002 mBq/m3 for caesium 137

The radioactive elements dispersed in the air then reached the French West Indies as from March 21 and Saint-Pierre-and-Miquelon March 23. The concentration levels of radionuclides in the air, estimated lower than 1 mBq/m3, are extremely low and cannot be detected by permanent radioactivity measurements in the environment (Téléray network) implemented at Point-à-Pitre, at Fort-de-France, at Cayenne and at Saint-Pierre-et-Miquelon. Moreover, EPA which is equipped with an alarm network similar to Téléray (Radnet network) currently does not announce any

abnormal radioactivity level on the American territory. The IRSN should soon receive samples of rainwater and plants taken in the French West Indies, in Guyana and Saint-Pierre-and-Miquelon.
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Europe would be affected by the radioactive plume from the 22 or 23 March on. In France, it is mainly as from March 24 that traces of radioactive particles would be present in the air, on very low levels which should be around 1 mBq/m3 to the maximum. These very low concentrations, which would last several days even several weeks (in the absence of new significant releases coming from the power station of Fukushima), will not be detected by the Téléray network (163 radiation monitors in Metropolitan France) and will be not easily detectable by the usual means of monitoring. It is probable that only measurements of airborne samples of dusts collected by very high air flowrate stations of IRSN and then analysed with techniques allowing very low radioactive rate detection to quantify the radioactive elements released in the air at the time of the accident of Fukushima.
These samples and these analyzes will require several days before the first results are available. The results will make it possible to check the forecasts expressed by modelling.

As expected, the southern hemisphere is not significantly affected by the radioactive dispersion on a large scale.

The concentration levels in the air expected in America and Europe are too low to present any risk for health and the environment, even if they were to continue over several months.

As comparison, the values measured during the days following the accident of Tchernobyl were exceeded 100 000 Bq/m3 in the first kilometres around the nuclear power plant; they were around 100 to 1000 Bq/m3 in the most affected countries by the radioactive plume (Ukraine, Byelorussia).in France, the values measured in the East were about 1 to 10 Bq/m3 (on May 1, 1986). Today, a very low activity of caesium 137 remains in the air, about 0,000001 Bq/m3.