ZAMG
Zentralanstalt für Meteorologie und Geodynamik

BOKU Met
Universität für Bodenkultur Wien
University of Natural Resources and Life Sciences, Vienna

Press Release

Reactor accident Fukushima – New international study on emissions of radioactive substances into the atmosphere

A new study by an international team of researchers estimates the emissions of the radioactive noble gas Xenon-133 and the aerosol-bound nuclide Caesium-137 from the Japanese NPP Fukushima Daiichi by combining a large set of measurements from Japan and worldwide, atmospheric transport model calculations, and available information and reasonable approximations on radionuclide inventories and accident events at the Fukushima Daiichi NPP. One of the key inputs to the study is the radionuclide monitoring data conducted by the Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) in Vienna.

The main result of the investigation is that the emissions from the power plant started earlier, lasted longer and are therefore higher than assumed in most studies conducted before.

Regarding the radioactive noble gas Xenon-133, the results indicate an emission of 16700 Peta-Becquerel (1 Becquerel is one radioactive decay per second, 1 Peta-Becquerel equals 10^{15} Bq). This is the largest civilian noble gas release in history, exceeding the Chernobyl noble gas release by a factor of 2.5. There is strong evidence that emissions started already on 11 March 2011 at 6:00 UTC, which is immediately after the big earthquake. Xenon-133 is neither ingested nor retained in the inhalation process and therefore of less health concern, but it is important for understanding the accident events.

Regarding Cesium-137, which is of high relevance for human health due to its physical properties and the long half-life time of 30 years, the new estimate shows that emissions started earlier and ended later than assumed in most studies so far. The total release amounts to 36 PBq, which equals 40% of

the Chernobyl emissions. About 20% of the caesium was deposited on Japanese territory, while about 80% was deposited in the water.

Dr. Andreas Stohl, Norwegian Institute for Air Research (NILU), lead author of the study: "Our calculations are based on about 1000 measurements of activity concentrations and deposition conducted in Japan, USA and Europe. This is the most comprehensive investigation so far. There is no doubt that the Fukushima accident is, at least in terms of the isotopes Xenon-133 and Caesium-137, the most significant event after the catastrophe in Chernobyl 25 years ago."

Dr. Petra Seibert, University of Natural Resources and Life Sciences, Vienna: „The results of the study again demonstrate the potential for our method of inverse modelling, which is also successfully being applied in assessing ash dispersion after volcanic eruptions."

Dr. Gerhard Wotawa, Central Institute for Meteorology and Geodynamics (ZAMG), adds: "ZAMG was the first institute world-wide that published, as early as ten days after the accident, an estimate of high emissions of radioactive substances from Fukushima-Daiichi. This analysis was based on a few data available to us at this time, and is now fully confirmed by a comprehensive analysis."

The study was conducted by a team of researchers from the Norwegian Institute for Air Research (NILU) in Kjeller, Norway, the Institute for Meteorology of the University of Natural Resources and Life Sciences (BOKU-Met) in Vienna, the Austrian Central Institute for Meteorology and Geodynamics (ZAMG) in Vienna, the Institute of Energy Technologies from the Technical University of Catalonia in Barcelona (INTE), Spain, and by the Universities Space Research Association, Columbia, MD, USA.

The publication containing the complete study, which is still under scientific peer review and thus subject to either acceptance or rejection, is available from the following web page:

http://www.atmos-chem-phys-discuss.net/11/28319/2011/acpd-11-28319-2011.html

Press contacts:

Dr. Andreas Stohl, NILU, E-Mail ast@nilu.no, Tel. +47 6389 8035 (only before 23.10.2011: +498937418029)
Dr. Gerhard Wotawa, ZAMG, E-Mail: gerhard.wotawa@zamg.ac.at, Tel. +43 664 88 414962

Dr. Petra Seibert, BOKU, E-Mail: petra.seibert@boku.ac.at, Tel. +43 664 3259704

Disclaimer: This is a joint press release of ZAMG and BOKU and not a press release of the research team conducting the study