



Influence of atmospheric convection on the long and short-range transport of Xe133 emissions.

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The International Monitoring System (IMS) developed by the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) is a global system of monitoring stations, using four complementary technologies: seismic, hydroacoustic, infrasound and radionuclide. Data from all stations, belonging to IMS, are collected and transmitted to the International Data Centre (IDC) in Vienna, Austria.

The radionuclide network comprises 79 stations, of which more than 60 are certified. The aim of radionuclide stations is a global monitoring of radioactive aerosols and radioactive noble gases supported by the atmospheric transport modelling (ATM). The ATM system is based on the Lagrangian Particle Dispersion Model, FLEXPART, designed for calculating the long-range and mesoscale dispersion of air pollution from point sources. In the operational configuration only the transport of the passive tracer is simulated. The question arises whether including other atmospheric processes, like convection, will improve results.

To answer this question a series of forward simulations was conducted, assuming the maximum transport of 14 days. Each time 2 runs were performed: one with convection and one without convection. The release point was at the ANSTO facility in Australia. Due to the fact that CTBTO has recently received a noble gas emission inventory from the ANSTO facility we had a chance to do more accurate simulations. Studies have been performed to link Xe133 emissions with detections at the IMS stations supported by the ATM.

The geographical localization to some extent justifies the assumption that the only source of Xe133 observed at the neighbouring stations, e.g. AUX04, AUX09 and NZX46, comes from the ANSTO facility. In simulations the analysed wind data provided by the European Centre for Medium-Range Weather Forecasts (ECMWF) were used with the spatial resolution of 0.5 degree. The results of quantitative and qualitative comparison will be presented.