

## **Convective transport in ATM simulations and its relation to the atmospheric stability conditions**

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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 80 stations, of which more than 60 are certified. The aim of radionuclide stations is a global monitoring of radioactive aerosols and radioactive noble gases, in particular xenon isotopes, supported by the atmospheric transport modeling (ATM).

One of the important noble gases, monitored on a daily basis, is radioxenon. It can be produced either during a nuclear explosion with a high fission yield, and thus be considered as an important tracer to prove the nuclear character of an explosion, or be emitted from nuclear power plants (NPPs) or from isotope production facilities (IPFs). To investigate the transport of xenon emissions, the Provisional Technical Secretariat (PTS) operates an Atmospheric Transport Modelling (ATM) system based on the Lagrangian Particle Dispersion Model FLEXPART.

To address the question whether including the convective transport in ATM simulations will change the results significantly, the differences between the outputs with the convective transport turned off and turned on, were computed and further investigated taking into account the atmospheric stability conditions. For that purpose series of 14 days forward simulations, with convective transport and without it, released daily in the period January 2011 to February 2012, were analysed. The release point was at the ANSTO facility in Australia. The unique opportunity of having access to both daily emission values for ANSTO as well as measured Xe-133 activity concentration (AC) values at the IMS stations, gave a chance to validate the simulations.