

The Application of Atmospheric Modeling to the Design and the Verification of the CTBT - a Historical Perspective and Current Areas of Work

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The verification regime of the Comprehensive Nuclear-Test-Ban Treaty requires the establishment of an International Monitoring System (IMS) based on four different monitoring technologies: seismic, hydroacoustic, infrasound and radionuclide. The first three technologies are based on the propagation of various waves in the Earth's mantle, oceans and atmosphere and are designed to detect and possibly locate the site of an explosion and its magnitude. The monitoring of radionuclide is based on the atmospheric long range transport of radionuclides possibly released by the explosion. The propagation of infrasound and the transport of radionuclides are critically dependent on the 3-D structure of the atmosphere.

For these reasons, atmospheric modeling has played an important role in the design of the infrasound and radionuclides IMS network and is expected to play a critical role in CTBT verification work. An overview of past and current applications of atmospheric modeling will be presented for the following topics:

- radionuclide network design with recent applications to changes to stations Treaty coordinates;
- monitoring the state of health of the IMS radionuclide network; and
- synergistic use of IMS data and atmospheric modeling.

This last point has been extensively discussed at the Informal Meeting to Discuss the Application of Atmospheric Modeling to CTBT Verification held in Montreal (Canada) and at the Informal Workshop on Radionuclides held in Paris.

Examples of possible approaches, concepts of operation and potential issues will be presented using historical events.