

Verification science

The network of the International Monitoring System (IMS) with its associated communications infrastructure and the International Data Centre (IDC) was designed by a Group of Scientific Experts at the Conference on Disarmament in Geneva to be fully capable of monitoring compliance with the Treaty. New research and improved communications technology continuously strengthens and refines the detection capabilities of the IMS. This column introduces some of the latest developments in the field of verification science.

Atmospheric transport modelling activities

Among the different technologies applied to verify compliance with the Comprehensive Nuclear-Test-Ban Treaty, radionuclide monitoring may be the only technology capable of detecting an ambitiously disguised, or decoupled, nuclear explosion. In such cases source region association through state-of-the-

art atmospheric transport modelling (ATM) is used to help determine the region from which the suspicious radionuclides may originate.

The main purposes of the CTBTO Preparatory Commission's ATM activities are:

- to attach the best possible source region estimation information, called Field of Regard, to all radionuclide products,
- to describe the transport of nuclear debris from test locations to radionuclide monitoring stations as accurately as possible, taking into account inherent uncertainties, and
- to help monitor the detection capability of the radionuclide verification network.

The Commission cooperates on ATM with the World Meteorological Organization (WMO) and its Specialized Meteorological Centres (RSMCs). This cooperation addresses the uncertainties associated with the dynamics of the atmosphere, providing views from different geographical regions and thus helping to build confidence in the source



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region estimation results delivered to the Member States. The cooperation is governed by the CTBTO-WMO framework agreement which was approved by the Commission in November 2000 and by the WMO Congress in May 2003.

The CTBTO-WMO response system allows the Commission to obtain, within hours, the best possible ATM results from a set of highly experienced and 24-hour operational organizations distributed all over the world. The first co-ordinated experiment using this powerful new system was conducted successfully in March 2003. A small pre-experiment which engaged all relevant RSMCs as well as a couple of National Data Centres took place in early February 2003.

Figure 3 shows overlaid fields of regard identified by the 11 participants to the February 2003 CTBTO-WMO pre-experiment. The colours indicate how many participants agreed on regions where hypothetical radionuclides were sufficiently sensed during a hypothetical 24-hour radioactivity measurement at radionuclide station Tristan da Cunha (RN 68), United Kingdom. The higher the number of participants in agreement on a potential source region, the greater the confidence in focusing on this area in case the sample bears Treaty relevant radionuclides. ■

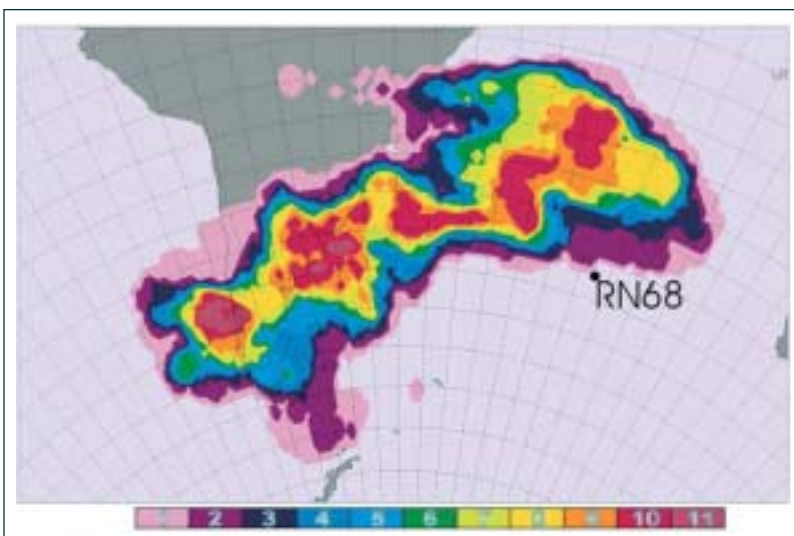


FIGURE 3. OVERLAID FIELDS OF REGARD IDENTIFIED BY THE 11 PARTICIPANTS TO THE FEBRUARY 2003 CTBTO-WMO PRE-EXPERIMENT