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Observations of radioiodine by the CTBT International Monitoring System

For the purpose of global monitoring for nuclear explosion signatures under the Comprehensive Nuclear-Test-Ban Treaty (CTBT), a unique International Monitoring System (IMS) with 80 radionuclide stations is being established. The daily samples are analysed with focus on the 83 CTBT-relevant radionuclides including I-130, I-131, I-133 and I-135, being all fission products. In addition, separate systems of noble gas detectors at initially 40 sites analyse the atmospheric air for radioxenon isotopes of interest. I-131 is of special interest for nuclear explosion monitoring because it is a direct precursor of Xe-131m that is most relevant for possible detection of underground nuclear tests. This paper summarizes the observations made at all IMS stations since their beginning of operation. It discusses the trends and global radioiodine distributions with a special emphasis on the nuclear debris observed as a consequence of the Fukushima accident when multiple radioiodine isotopes were observed, including I-132. The implications of radioiodine observations for CTBT verification are investigated. The isotopic activity ratios are an opportunity to distinguish nuclear explosion signatures from normal anthropogenic background.

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