Geophysical Research Abstracts,
Vol. 10, EGU2008-A-09240, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-09240
EGU General Assembly 2008


# Xenon X-ray de-convolution algorithm in Xe-SAINT

**R.Plenteda**

Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO)

Vienna International Centre P.O. BOX 1200, A-1400 Vienna

The Preparatory Commission for the Comprehensive Nuclear-Test-Ban Treaty Organization is the international organization establishing the global verification system under the CTBT, which bans all nuclear weapon test explosion or any other nuclear explosion. The verification system includes the International Monitoring System (IMS), a global network of 321 monitoring stations (radionuclide technologies: particulate and noble gases; waveform technologies: seismic, hydro acoustic and infrasound), a communications infrastructure, an International Data Centre (hereinafter referred to as the IDC) and the capability to carry out on-site inspections.

Part of the treaty verification is made through noble gas (specifically four Xe radioisotopes) detections.

The calculation of the correct proportion between the different Xe radioisotopes is of fundamental importance for forensic judgments since Xe isotopes can also come from nuclear power plants and radiochemical laboratories but with particular ratios distributions.

In the SPALAX system (one of the two main technologies to detect noble gas) the data acquired consist just of a gamma spectrum where each of the four the Xe radioisotopes share the same X-ray region. In fact the couples Xe-131m, Xe-133m and Xe-133, Xe-135 share exactly the same X-rays.

This paper describes the algorithms used in the software Xe-SAINT to de-convolute the X-ray region and therefore to calculate the contribution of each of the four.

Two methods are used:

1. Full spectrum analysis
2. Preliminaries difference analysis

The second one takes the advantage of the presence of intermediate spectra (every two hours) for the same final spectra. In fact the very different half lives of the four Xe radioisotopes can be used for the Xe de-convolution having statistical independent information (preliminary differences) during the acquisition time.