Radioxenon Background in Africa

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BACKGROUND

The main idea is to correlate the presence of radioactive elements between the CMX13 station in Cameroon, the FRX29 station and the mobile laboratory TXL measurement performed in Burkina Faso. The study has been conducted during April to August 2013, the mobile laboratory TXL was present in Burkina Faso during this period for tests.

CMX13, FRX29 station and TXL

The movement of the wind and its direction in two weeks data calculation

The results of five months of data collections are recorded on the table based on the abundances rate of the detected elements for April to August 2013.

129 Xe is the product of the β decay of 129I (half-life 16 million years). Like the latter, the Xe isotopes 131m; 13e, 135 and 133m, are part of the uranium 235 or plutonium 239 fission products, and thus can be used as nuclear explosion indicators.

RESULTS

The FRX29 and CMX13 data table for the study period

All detected events have a value below the critical limit of detectability in red color. And the detected events has an origin shown on fig xx

PSR of CMX13 spectrum for 14 days animation

PSR: Possible Source of Region

EVENTS DETECTED BY TXL ON THE STUDY PERIOD

During the TXL campaigning most of the Xe-133 measurements have been below the detection limit (which is around 0.15mBq/m3 in normal situation).

DISCUSSION

It appears from this study that the detected radionuclide elements are particularly the natural elements. These elements come from the decay of natural uranium 235 and 238, which are as old as the earth.

The 99% of the items detected by the Cameroonian station are natural elements in MDC. Therefore, it can be used as reference elements in the sub-region.

The FRX29 station carries traces of Tc, Ge and Mo. Germanium has 32 isotopes and 13 nuclear isomers five of these isotopes are present in nature: 70Ge, 72Ge, 73Ge, 74Ge and 76Ge.

During the five months of data collect, CMX 13 station has detected that natural elements with their MDC. CMX 13 data can be used therefore as a reference base for detection of radio-xenon in the sub-region.

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