ID: Type: **Oral**

Worldwide Seasonal Variation of Be-7 Related to Large-Scale Atmospheric Circulation Dynamics

Atmosphere dynamics can be studied using radioisotopes long-term data series. Such tracers, like 7Be are recorded by the CTBTO through the radionuclide network of the International Monitoring System (IMS). The worldwide collection of activity concentration provided by the network built up unique data sets for scientific research. IMS data have being previously used to correlate beryllium trends to atmospheric patterns on local or regional study but not at a global scale. In this work, we demonstrate how for the first time a worldwide beryllium concentration map is reconstructed using 15 years of data from 63 IMS radionuclide stations. The scope was to interpolate beryllium data into global concentration maps as an expression of atmospheric cell migration such as Hadley, Ferrel and Polar cells. 7Be data sets might possibly serve as an early warning indicator and complement other methodologies for determining global atmospheric phenomena such as atmospheric cells, ITCZ, sunspots, tropopause height, Walker circulation, ENSO, SSW, SEP, Indian Monsoon and QBO. Resulting correlation can be presented, raising once more the importance of use and potential of IMS data for the scientific community.

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Track Classification: 1. The Earth as a complex system