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World-wide seasonal variation of 7Be related to large-scale atmospheric circulation dynamics

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Meteorological processes can be deciphered using 7Be as aerosol tracer. Especially ground based observation of 7Be world-wide over a long period of time can reveal information about large-scale atmospheric circulation dynamics. The CTBT through its RN network collects the activity concentration of these tracers since over 15 years and built up unique and powerful datasets that can be interpolated into global concentration maps. Maps of observed 7Be global seasonal variation as an expression of atmospheric cell migration such as Hadley, Ferrel and Polar cells. Previous studies used data from IMS stations to correlate beryllium trends to atmospheric patterns but on a local or regional scale. In this paper, we demonstrate how for the first time a worldwide beryllium concentration map is reconstructed using 15 years of data from 63 IMS radionuclide stations. Findings can be presented on correlation between 7Be global patterns with ITCZ, sun spots, tropopause height, Walker circulation, ENSO, SSW, SEP, Indian Monsoon and QBO. 7Be might possibly serve as an early warning indicator and complement other methodologies for determining global atmospheric phenomena. These relations would benefit from further studies.