

of the Atmospheric Transport of Beryllium-7 with an Earth System Model and Comparison to the Comprehensive Nuclear-Test-Ban Treaty Organization Radionuclide Monitoring Network Data

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We model the atmospheric transport of cosmogenic Beryllium-7 within the time period 1950-2100, to shed light on the complex interplay of atmospheric dynamics, changing atmospheric background conditions, deposition mechanisms and solar activity. Due to the short half-life of Beryllium-7 (around 53 days), the ground level concentration of this cosmogenic isotope is particularly suitable to be used as a proxy for vertical atmospheric transport, e.g. the Beryllium-7 transport in the tropospheric Hadley-Ferrel convergence zone has been suggested to be useful for the forecast of large weather phenomena, such as a monsoon (Terzi et al., 2019). Our modelling approach with the chemistry-climate model (CCM) EMAC (ECHAM/MESSy Atmospheric Chemistry) incorporates the production of Beryllium-7 from galactic cosmic rays (GCR), full three-dimensional atmospheric dynamics from the mesosphere down to the Earth's surface, as well as different deposition mechanisms such as dry deposition, wet deposition and sedimentation. The results of our simulations will be compared to data on the ground level concentration of Beryllium-7 from the Comprehensive Nuclear-Test-Ban Treaty Organization radionuclide monitoring network to evaluate our simulations for different latitudes and longitudes and give deeper insight into the atmospheric dynamics preceding the data signals near the ground.

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Promotional text

The presented results are a part of my PhD project at FU Berlin with the overall topic "Cosmogenic Proxies: Simulations of the Atmospheric Transport and Deposition of Cosmogenic Isotopes as Proxies of Solar Activity and Atmospheric Dynamics".

Oral preference format

in-person

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