

of CCM SOCOL-AERv2-BE to Cosmogenic Beryllium Isotopes: Description and Validation for Polar Regions

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Beryllium-10, as measured in polar ice cores with an annual resolution, is a proxy for long term cosmic ray variability. Beryllium-10 concentration can not be used directly as a proxy for solar behavior since the signal can be distorted by atmospheric transport and deposition processes. The data on atmospheric Be-10 concentrations are rather scarce due to the laborious nature of Be-10 measurements. Beryllium-7 is also a cosmogenic isotope with a half-life of 54 days and is commonly observed in particulate airborne radioactivity monitoring. The transport of Be-7 can be modeled with high accuracy using the known meteorological fields. This study used Chemistry-Climate model Solar-Climate Ozone Links coupled with the second versions of the aerosol transport model and the beryllium production model in atmosphere (CCM SOCOL-AERv2-Be) to model the formation, transport and the removal of beryllium isotopes from the atmosphere. The model results were compared with the measured concentrations observed in Finland, Canada, Chile and in Kerguelen Island in the Indian Ocean from 2002 to 2008. The data for Kerguelen Island and Chile were downloaded from the CTBTO vDEC database. The modelled and the measured concentrations were in good agreement in all four locations proving the validity of the CCM SOCOL-AERv2-BE model.

E-mail

ari.leppanen@stuk.fi

Promotional text

This study took advantage of the CTBTO's vDEC open data to validate an atmospheric transport model. The aim of the validated model is to study Be-10 deposition in ice cores which in turn can be used to study long term solar behaviour.

Oral preference format

in-person

Primary author: Dr GOLUBENKO, Kseniia (University of Oulu, Finland)

Co-authors: LEPPÄNEN, Ari-Pekka (Radiation and Nuclear Safety Authority - STUK); Prof. ROZANOV, Eugene (Physikalisch-Meteorologisches Observatorium Davos and World Radiation Center); Prof. KOVALTSOV, Gennady (Ioffe Physical-Technical Institute); USOSKIN, Ilya (University of Oulu, Finland); Dr SUKHODOLOV, Timofei (Physikalisch-Meteorologisches Observatorium Davos and World Radiation Center)

Presenter: LEPPÄNEN, Ari-Pekka (Radiation and Nuclear Safety Authority - STUK)

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