

EGU22-12618

<https://doi.org/10.5194/egusphere-egu22-12618>

EGU General Assembly 2022

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Zonal distribution of cosmogenic isotopes in stratosphere and troposphere via CCM SOCOL

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Cosmogenic isotopes are mostly produced in the stratosphere and troposphere, and the corresponding fractions depend on solar activity and tropopause altitude. Solar-cycle variability of cosmogenic isotope production is the strongest at high latitudes due to the lack of geomagnetic shielding. However, the exact zonal distribution of the production in troposphere and stratosphere regions, that is needed for the precise modelling of their transport and deposition, is not clear. In this work, we provide numerical estimates of cosmogenic isotopes production in the atmosphere for different conditions. Using the SOCOL-AER2-BE Chemical Climatic model (CCM), we present simulations of the production of cosmogenic isotopes (^{14}C , ^{36}Cl , ^{10}Be , and ^7Be) and provide zonal distributions (tropical, subtropical, and polar regions) in the stratosphere and troposphere. The model is driven by four solar activity scenarios: 1) solar minimum year with solar modulation function - $\phi = 400$ MeV and 2) solar maxima year with $\phi = 1100$ MeV. In these cases, the production is modulated by Galactic Cosmic Rays (GCR). Two other scenarios are 3) ground-level enhancement (GLE) event number 5 with hard spectrum on February 23, 1956 and 4) GLE event number 24 with soft spectrum on August 04, 1972. The production rates were calculated using a combination of the SOCOL and CRAC models.