Contribution ID: **165** Type: **Oral presentation**

Assessing changes in the carbon cycle during Dansgaard-Oeschger events from cosmogenic radionuclides

Friday, 7 October 2022 11:00 (20 minutes)

The last glacial cycle was characterized by strong millennial-scale climate variability. Rapid transitions between cold stadial and warm interstadial conditions (known as Dansgaard-Oeschger Events) had widespread effects on the Earth system. Changes in the carbon cycle accompanied these climate swings, but the underlying processes remain unresolved. Radiocarbon (14C) provides a tool to assess some of the proposed mechanisms. Combining measured atmospheric 14C with independent 14C-production rate estimates (e.g., from 10Be or geomagnetic field records) produces a residual signal that informs about past carbon cycle changes. We will present new data from New Zealand subfossil kauri-trees that provide a high-precision, high-resolution and truly atmospheric 14C-record for large parts of MIS-3. In combination with ice core 10Be and geomagnetic field data, we investigate the imprint of Dansgaard-Oeschger events on the carbon cycle and discuss potential mechanisms using carbon-cycle modelling.

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Track Classification: Biogeochemical Cycles in the Earth system –data and models