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# High obliquity favours centennial-scale variations in the carbon cycle

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Antarctic ice cores are a preferred climate archive to study global carbon cycle changes at multi-centennial timescales as they provide the only direct reconstructions of past atmospheric $CO_2$ changes. Here we present a new atmospheric $CO_2$ record from the EPICA Dome C ice core spanning Termination III (TIII) and Marine Isotope Stage 7 (MIS 7) (~260-190 ka). 203 ice samples were measured using a ball mill dry extraction system and gas chromatography at IGE. With a temporal resolution of about 300 years on average, our new record improves by a factor of three the existing $CO_2$ record that had been measured on the Vostok ice core over this time interval. Based on our new record, we identified seven centennial-scale releases of atmospheric $CO_2$, also referred as Carbon Dioxide Jumps (CDJ). Combining these new results with previously published ones, we evidenced that 18 of the 22 CDJs identified over the past 500 thousand years occurred under a context of high obliquity. New simulations performed with the LOVECLIM model, an Earth system model of intermediate complexity, point toward both the continental biosphere and the Southern Ocean as the two main carbon sources during CDJs connected to Heinrich events. Notably, the continental biosphere appears to be the obliquity-dependent $CO_2$ source for these rapid events. For the first time, we demonstrate that the long-term external forcing directly impacts past abrupt atmospheric $CO_2$ variations.