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Meridional transport and deposition of atmospheric ^{10}Be

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Abstract. ^{10}Be concentrations measured in ice cores exhibit larger temporal variability than expected based on theoretical production calculations. To investigate whether this is due to atmospheric transport a general circulation model study is performed with the ^{10}Be production divided into stratospheric, tropospheric tropical, tropospheric subtropical and tropospheric polar sources. A control run with present day ^{10}Be production rate is compared with a run during a geomagnetic minimum. The present ^{10}Be production rate is 4–5 times higher at high latitudes than in the tropics whereas during a period of no geomagnetic dipole field it is constant at all latitudes. The ^{10}Be deposition fluxes, however, show a very similar latitudinal distribution in both the present day and the geomagnetic minimum run indicating that ^{10}Be is well mixed in the atmosphere before its deposition. This is also confirmed by the fact that the contribution of ^{10}Be produced in the stratosphere is dominant (55%–70%) and relatively constant at all latitudes. The contribution of stratospheric ^{10}Be is approximately 70% in Greenland and 60% in Antarctica reflecting the weaker stratosphere-troposphere air exchange in the Southern Hemisphere.

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