# Combined Atmospheric $^{1}$Be and $^{3}$Cl Records from the Talos Dome Ice Core (East Antarctica): New Insights into Solar Activity and Geomagnetic Field Across the Last Deglaciation

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**Abstract**

Cosmogenic nuclides provide key constraints on solar variability and geomagnetic field intensity over the past few millennia. However, very few studies have focused on glacial-interglacial transitions. These periods are characterized by strong climatic variability, rising global temperatures, sea-level increase, and changing greenhouse gas concentrations. While the broad features of this transition are well documented, the relative contribution of solar forcing to the observed climatic changes remains poorly understood.
Here we present new high-resolution $^{1}$Be and $^{3}$Cl concentration profiles from the Talos Dome ice core (East Antarctica) spanning the last deglaciation, between 22 and 9 ka BP. Talos Dome represents a particularly suitable site, as its relatively high accumulation rate ensures well-preserved $^{3}$Cl signals compared to other low-accumulation Antarctic sites. With a minimum temporal resolution of 1 year and a mean resolution of 25 years for our $^{1}$Be measurements, these allow us to reconstruct both short- and long-term solar variability across this poorly documented interval. Several reconstructions of the Virtual Axial Dipole Moment are examined, as they differ significantly from one another during the last deglaciation.
Beyond solar and geomagnetic reconstructions, the high-resolution $^{1}$Be and $^{3}$Cl records are compared with atmospheric $\Delta^{1}$C from tree rings, taking advantage of their absolute dating and high temporal resolution while avoiding the influence of the carbon cycle. This comparison enables an improved chronology of the Talos Dome ice core, reducing ice age uncertainties by more than 200% over key intervals and providing a more robust temporal framework for paleoclimate reconstructions.

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