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Direct vegetation response to abrupt climate change during the Last Glacial-Interglacial Transition

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The Last Glacial-Interglacial Transition (LGIT) is one of the most intensively studied periods in Earth History. The stratigraphy of this period has been thoroughly investigated and, in particular, the recently proposed event stratigraphy for the Last Glacial-Interglacial Transition based on the Greenland ice core records serves as a tool for synchronisation of records from the ice, marine and terrestrial environment. The rapid climate and environmental changes that occurred during the transition can be used to test ideas about the functioning of our climate system. One of the components that have been used to determine the effects of climate change on the continent, as well as defining the classical Lateglacial interstadial and stadial phases, is vegetation. Because vegetation development during the LGIT is generally supposed to lag behind the abrupt climate changes as recorded in the Greenland ice core records, vegetation has become less important in paleoclimate research over the last decades.
The development of the GICC05 timescale and this new event stratigraphy based on the Greenland ice core records, in combination with developments in 14C calibration opens up the possibility to correlate the boundaries of the Greenland Interstadial (GI-1) and stadial (GS-1) events with 14C dated changes in vegetation that occurred on the continent. In The Netherlands, for example, the onset of the Lateglacial Interstadial based on palynology falls between 12,500 and 12,450 14C yrs BP while the start and end of the Younger Dryas stadial in the Netherlands have been dated at 10,950 and 10,150 14C yrs BP, respectively. A comparison between these dated and calibrated vegetation shifts and the climate events shows that vegetation is likely to have responded directly to the abrupt climate changes.