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The Allerød-Younger Dryas Transition: vegetation and geomorphological responses to rapid climate change in the Netherlands and surroundings

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The transition from the Allerød interstadial to Younger Dryas stadial marks one of the most rapid changes in climate over the last thousands of years, with a temperature drop of several degrees within a few years, as recorded in Greenland ice core records. The rapid climate and environmental changes that occurred during the transition ca 13,000 years ago can be used to test ideas about ecological and geomorphological responses to abrupt climate change. Vegetation reconstruction based on palynology has been used to define the classic Lateglacial subdivision. Generally, vegetation development is supposed to lag behind the abrupt climate changes as recorded in ice core records. Therefore, vegetation as a single proxy has become less important in paleoclimate research over the last decades. A large number of studies from the Netherlands and surrounding lowlands however, record this transition in detail, not only using palynology, but also other biological, lithological, and geomorphological proxies combined with 14C-dating. Vegetation response should not be regarded as a direct shift, but like other proxies, underwent a certain transition phase. Comparison between the responses in the different proxies shows that vegetation is likely to have responded directly to these abrupt climate changes.