



Variation of trace element concentrations in a lake sediment sequence in the AI-YD transition zone (NW Russia)

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The Late Pleistocene climate oscillation known as Younger Dryas (YD) cooling event is connected predominantly to a sharp decrease of thermohaline circulation in the Atlantic Ocean. Recently, a hypothesis was proposed relating the YD cooling to an extraterrestrial (ET) bolide impact. This hypothesis suggested that just before the onset of the YD cooling, 12.9 ka BP, a large bolide exploded over the North American Laurentide Ice Sheet. The consequences of such a catastrophic event might have led to an abrupt climate change. Several studies showed that in the Late Pleistocene sediments of W. Europe material that could be related to meteorite impact is present. Many lakes of NW Russia are known to exist as long as from 14-15 ka BP, i.e. continuing sedimentations started there before time of the suggested meteorite impact. Therefore, geochemical fingerprints of such an event could be preserved in such lake sediments. In a search for fingerprints of the ET impact the Late Pleistocene sediments of Lake Medvedevskoye (60°14'N, 29°54'E, 102.2 m a.s.l., the Karelian Isthmus, NW Russia) have been studied. The studied lake sediment sequence can be divided into two major units: the lowermost minerogenic, mostly grey-colored with very low organic content, and the uppermost organogenic, represented by dark-brown organic gyttja. The boundary between these two major lithological units is a very sharp. In the sequence, continuous change from more sandy to more clayey sediments has been observed in the lowermost units. The thickness of the minerogenic part of the sequence is approximately 1 m. Concentration and distribution of trace elements (especially those, which are much more abundant in meteorites than in terrestrial material) across the lowermost minerogenic unit of the studied sediment sequence corresponding to the Late Pleistocene, display features consistent with the addition of materials other than those from a common source for the lake sediments of the region. We suggest that sediments of Lake Medvedevskoye carry microparticles related to the ET event that occurred at ca. 12,9 ka BP. However, whether this event was responsible for the YD climate oscillation is still unknown.

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