



Expression of the Younger Dryas cold event in the Carpathian Mountains, Ukraine

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Past glacial activity in the Ukrainian Carpathian Mountains is characterized by cirques, glacial valleys and moraine ridges at altitudes 1350-1850 m. a.s.l. Although the geomorphology of this area was extensively studied, the deposition time of these glacial forms, and specifically the moraines was never determined by physical methods.

We extensively surveyed and mapped the geomorphology of the glacial valley of the Pozhizhevs'ka Mountain (Charnogora Ridge), conducted surface exposure dating and developed a data base of this area using remote sensing and Geographic Information System. A well developed and continuous lateral and end moraine crosses the valley floor at ~1400 m a.s.l. Ten sandstone boulders were sampled to determine the deposition time of the moraine. Samples were prepared at the Glasgow University Cosmogenic Nuclide Laboratory and analyzed at the SUERC AMS Laboratory. Surface exposure ages were calculated using the CRONUS-Earth online ^{10}Be exposure age calculator and a constant production rate model. No corrections were made for erosion or possible snow cover. Our exposure ages for nine samples (UKR-2 to UKR-10) range from 10.8 ± 0.4 ^{10}Be kyr to 13.8 ± 0.4 ^{10}Be kyr. One sample (UKR-1) produced no current and thus no exposure age is available. The weighted mean deposition time for the moraine is 12.1 ± 0.3 ^{10}Be kyr (the error corresponds to the standard deviation of the mean exposure ages). These results provide the first direct indication, using surface exposure dating, of a possible glacier response in the Ukrainian Carpathian Mountains to a cold event contemporary with the Younger Dryas.