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Glacial culmination and decay sequences: new data from a core in the Ivrea end-moraine system (NW Italy)

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The Ivrea end-moraine system extends on a surface of about 500 kmq at the outlet of the Aosta Valley, being one of the largest amphitheatres on the southern side of the Alps. Along with the Rivoli-Avigliana amphitheatre, the Ivrea end-moraine system was the first to be studied in Italy during the XIX century, drawing the attention of several scientists from all over Europe for its impressive geomorphology. Most part of the stratigraphic researches on the Ivrea amphitheatre was traditionally performed on outcrops.
In 2013 a 55-m long continuous core was drilled (ProGEO Project) in the western flank of the system, choosing an inward palaeolake location (Torre Canavese) related to the damming by one of the main terminal moraine, within a wide group of moraines whose age is still debated (the so called "Serra Synthem"). The aim was to make available a complete stratigraphic record of the ice-contact lake developed inward to the moraine at time of glacial culmination, or shortly later. This core crossed the entire local glacigenic succession down to the preglacial substrate at 53 m depth. Hopefully, the geochronometric and stratigraphic information obtained from this lake succession may provide time constrains for the glacial culmination.
The Torre Canavese core displays a double sequence of subglacial till passing to glaciolacustrine and finally to fully lacustrine conditions. At its base, the sequence preserves a 12-m thick glacial till, resting on Lower Pleistocene fluvial gravels coming from a different catchment. A lacustrine unit made of laminated silty-clayey sands extends from 41.6 to 29 m depth, directly resting over the glacial till. As shown by a radiocarbon AMS age, this unit is older than 45 ka cal BP. An overconsolidated, 19-m thick glacial till lays on this lacustrine unit and is covered by a further, uppermost lacustrine unit from 10.26 to 0.34 m depth. A thin Holocene alluvial layer ends the sequence at the top.
Both lacustrine units were sampled for geochemistry (Loss-On-Ignition technique), sediment petrography and radiocarbon dating. Magnetic susceptibility was also measured throughout these units. Samples for pollen analysis were taken from different lithological units, to explore the potential of the Torre Canavese succession for palynological investigations and to better address further analyses.
The results of the analyses so far carried out on the Torre Canavese core are presented. In particular, biostratigraphical and chronological indications are provided by pollen spectra from the uppermost lacustrine sequence. They are compared with radiocarbon ages from the core and also with relevant pollen records of Late Glacial to Holocene age from nearby areas.
The two sequences observed in the Torre Canavese core can be ascribed to the last two main glacial culminations and, in the framework of the end-moraine system, a comparable extension of the glacier piedmont lobe. A wide extent of the glacier in the LGM is so attested in the Ivrea end-moraine system, much larger than considered before.