

Allostratigraphic approach on the Alpine Lateglacial

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The reconstruction of the Alpine deglaciation after the Last Glacial Maximum is the one-of-a-kind chance of understanding glaciers dynamics in a period of climate warming. Long-lasting studies beginning in the 19th Century resulted in the definition of five major phases established on the base of Δ ELA values. However, they have been recently re-discussed on the base of dating results and field evidence. Field based reconstructions in some areas of the Alps (Tyrol, Julian Alps) utilizing allostratigraphy i.e. the use of unconformity-bounded units, provide pinpoint in total to a plausible tripartite subdivision of Lateglacial deposits (Colucci et al., 2014; Bichler et al., 2016; Reitner et al., 2016). From the chronological point no consensus on the start of the Alpine Lateglacial exists: The major Garda and Ticino glaciers persisted until about 17.5 ka (e.g. Ravazzi et al., 2014), whereas the tongue basins and, moreover, even major valleys inside the Alps where ice-free already around 18.5 ka (e.g., Schmidt et al., 2012). For the short phase of ice-decay, as the first expression of activity of rather small local glaciers in contact to dead ice, only luminescence datings are available so far centered around 19 ka. The Gschnitz stadial, at about 16-17 ka, and the Egesen stadial corresponding to the Younger Dryas, are the only two remarkable phases of advance of glacier tongues into the valleys, which stabilized for considerable time. The reconstructions suggest that more effort is needed, in term of sedimentological and (allo-)stratigraphic investigations together with geochronology to understand if this tripartite stratigraphic scheme can be exported in the whole Alpine area, or if stabilization of glacier fronts could have taken place somewhere also due to local mechanisms.

References

- Bichler, M. G., Reindl, M., Reitner, J. M., Drescher-Schneider, R., Wirsig, C., Christl, M., Hajdas, I. & Ivy-Ochs, S., 2016: Landslide deposits as stratigraphical markers for a sequence-based glacial stratigraphy: a case study of a Younger Dryas system in the Eastern Alps. *Boreas*, 45: 537-551.
- Colucci, R. R., Monegato, G., Žebre, M. (2014). Glacial and proglacial deposits of the Resia Valley (NE Italy): New insights on the onset and decay of the last alpine glacial maximum in the Julian Alps. *Alpine and Mediterranean Quaternary*, 27: 85–104.
- Ravazzi, C., Pini, R., Badino, F., De Amicis, M., Londeix, L., Reimer, P.J. (2014). The latest LGM culmination of the Garda Glacier (Italian Alps) and the onset of glacial termination. Age of glacial collapse and vegetation chronosequence. *Quaternary Science Reviews*, 105: 26-47.
- Reitner, J.M., Ivy-Ochs, S., Drescher-Schneider, R., Hajdas, I., Linner, M. (2016). Reconsidering the current stratigraphy of the Alpine Lateglacial: Implications of the sedimentary and morphological record of the Lienz area (Tyrol/Austria). *E&G Quaternary Science Journal*, 65: 113-144.
- Schmidt, R., Weckström, K., Lauterbach, S., Tessadri, R., Huber, K. (2012). North Atlantic climate impact on early late-glacial climate oscillations in the south-eastern Alps inferred from a multi-proxy lake sediment record. *Journal of Quaternary Science*, 27: 40–50.