Figure S1: PI wind origins and associated precipitation for four alpine glaciers. Seasonal windroses and precipitation intensity frequency associated to every wind event for Rhine, Inn-Salzach-Traun (IST), Tagliamento and Dora Baltea glaciers. Precipitation is daily cumulated. The shadow in the map is the glacier extension (Ehlers et al., 2011) and the color lines as well as the full color in the boxes represent the topography (yellow for higher elevation and green for the lowers) and the black line the present-day political boundaries.
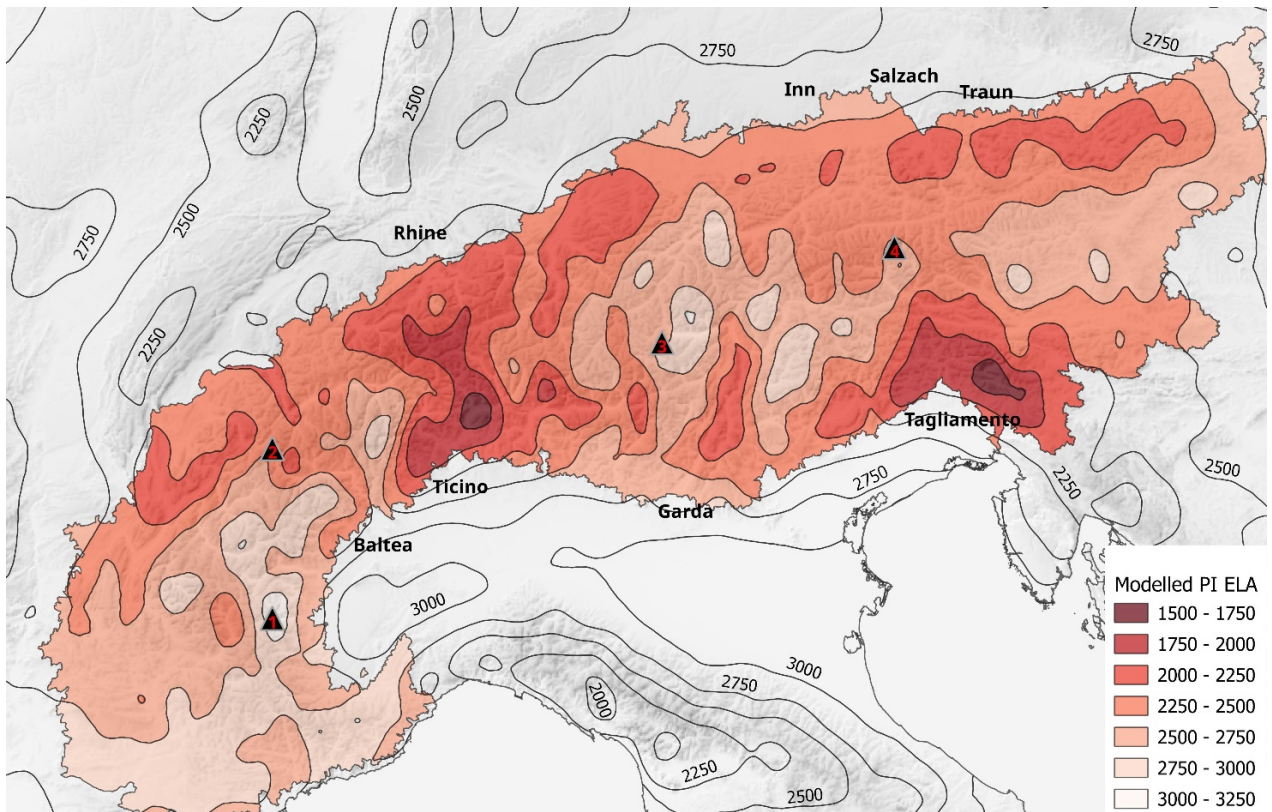
Figure S2: PI envELA. Env ELA calculated following the method of Žebre et al., 2020 over the greater alpine region. The black triangles indicate: 1) Monviso, 2) M. Blanc, 3) Ortler, and 4) Großglockner.

10
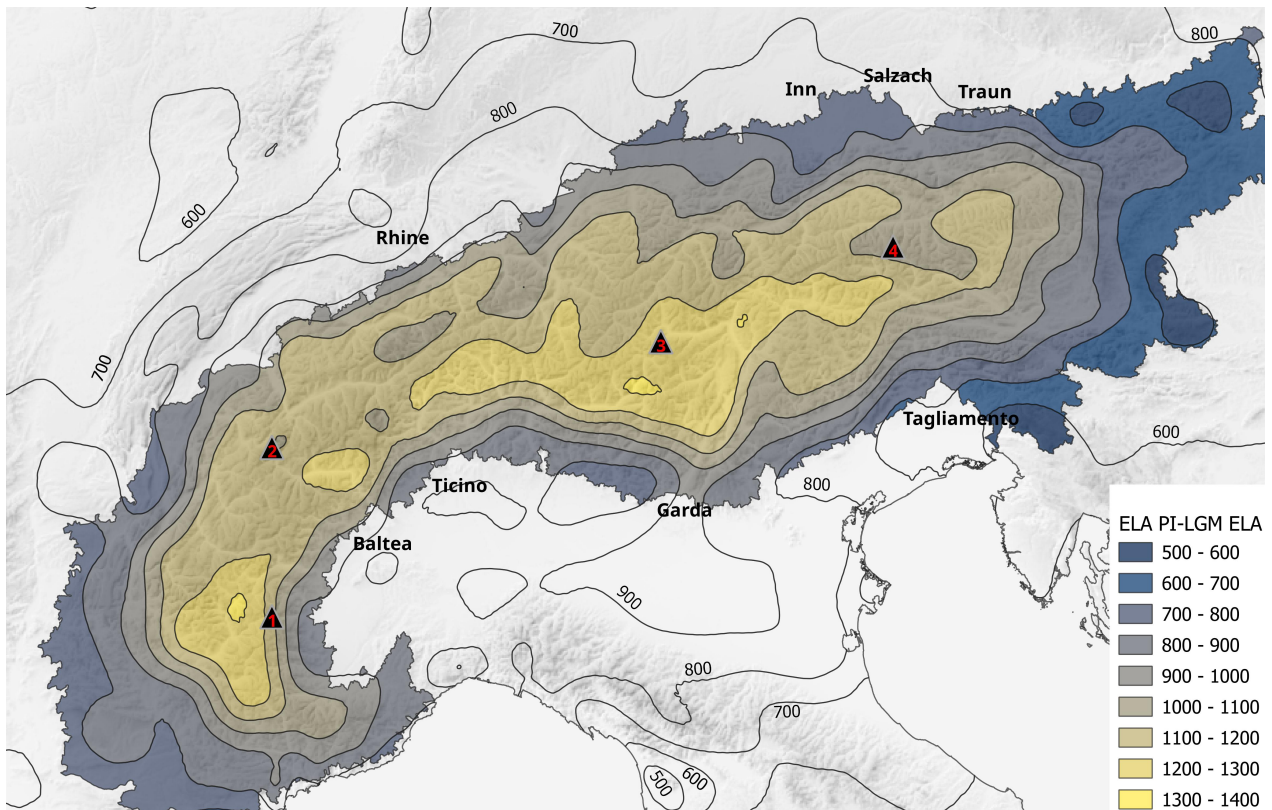
Figure S3: EnvELA drop. Env ELA difference from PI to LGM. The black triangles indicate: 1) Monviso, 2) M. Blanc, 3) Ortler, and 4) Großglockner.