The following supplement accompanies the article

Long-term effects of climate and land-use change on larch budmoth outbreaks in the French Alps

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Supplement

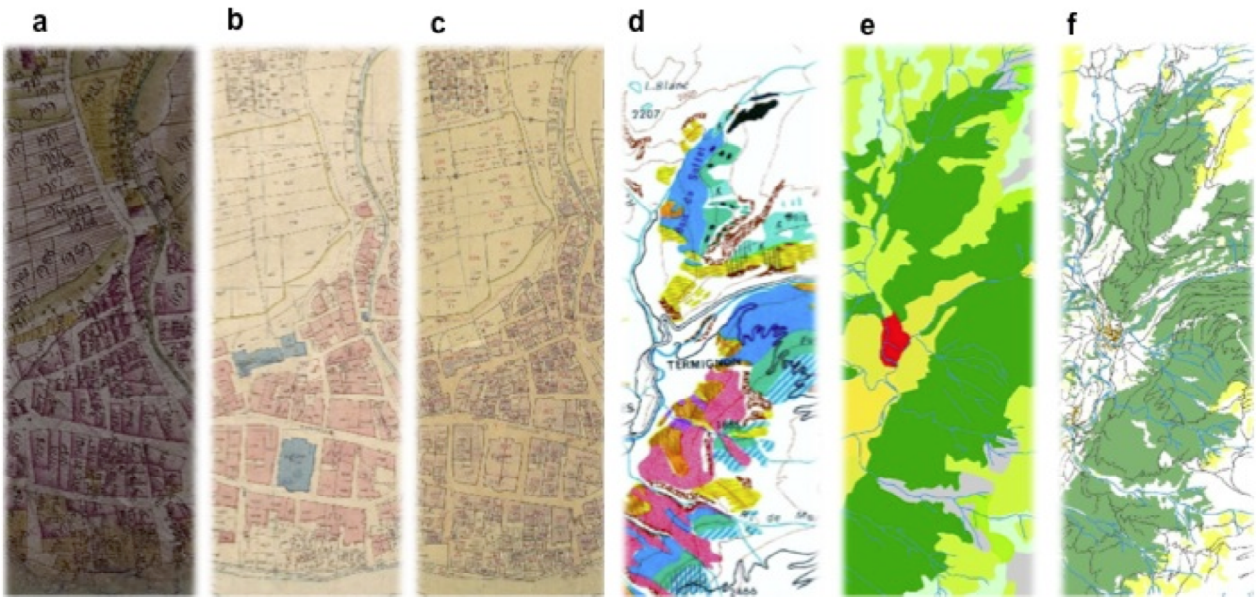

Fig. S1. Original map photos. The historical maps used: (a) Mappe Sarde, the first land-register of the Savoy Duchy, Sardinian Kingdom (established in 1728–1738), (b) the Premier cadastre français (est. 1850–1895), (c) the Cadastre rénové (est. 1927–1939), (d) the phytosociological map (Bartoli, 1996), (e) the 'Corine Land Cover (2000), and (f) the BD topo IGN Database (2010)

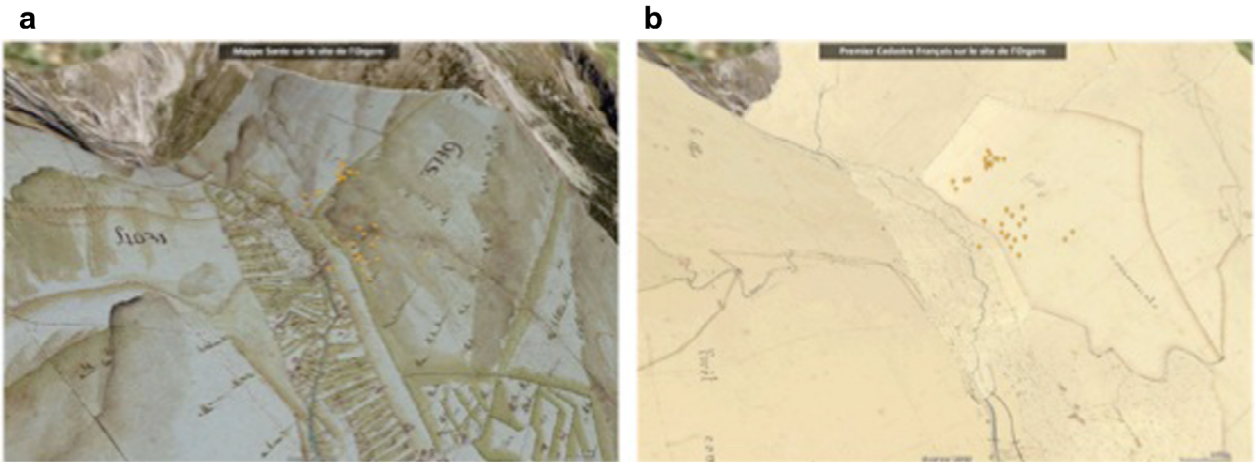

Fig. S2. The first step of the used rubber sheeting process aimed to identify control points on each of the 6 historical maps and on the one used as reference 'BD topo IGN 2010'. The point geo-features which would have not moved from past to present are set as the control points, such as important settlements, rivers, and mountains. The 2 photos show the same points recognized on (a) Mappe Sarde and (b) Premier cadastre français

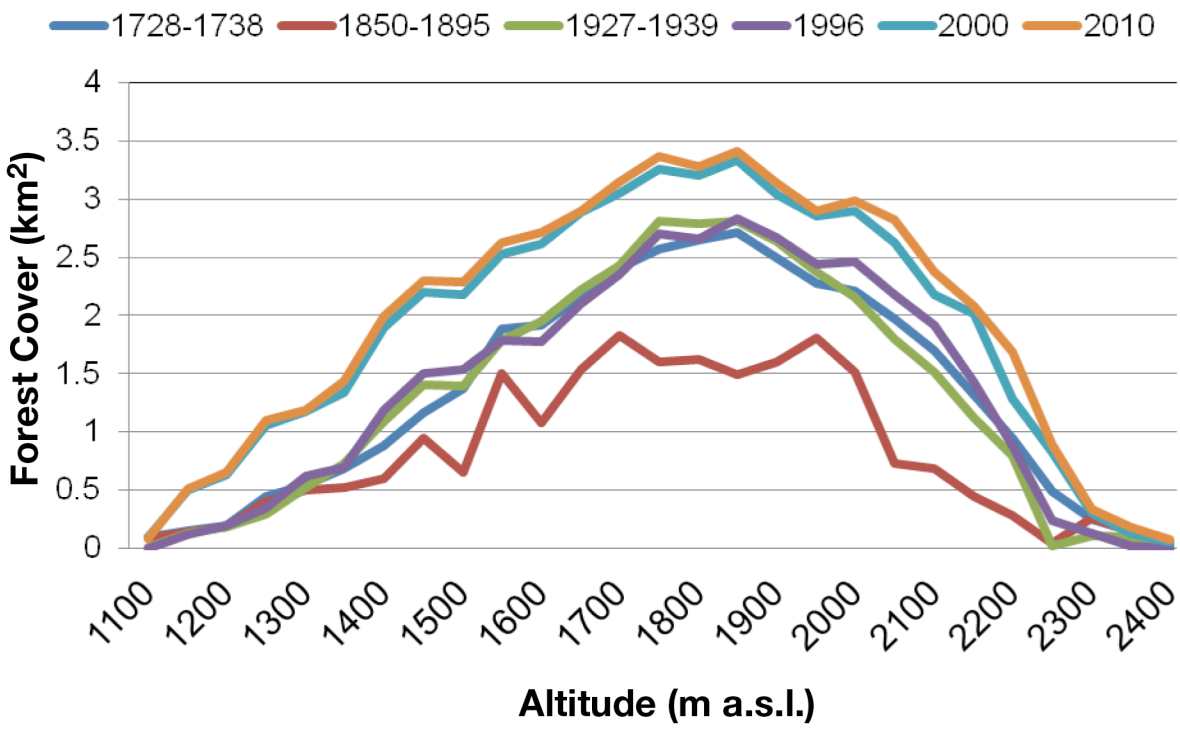

Fig. S3. Altitude/ forest cover analysis. Forest cover was calculated from the antique maps, for an altitude between 1100 and 2400 m a.s.l., in order to cover the entire range of altitude of each site. It is evident that the greatest change in forest cover refers to 1700–2000 m a.s.l., the optimal zone for LBM outbreaks. Different colours indicate the different maps used for forest cover reconstruction (see Table 1)

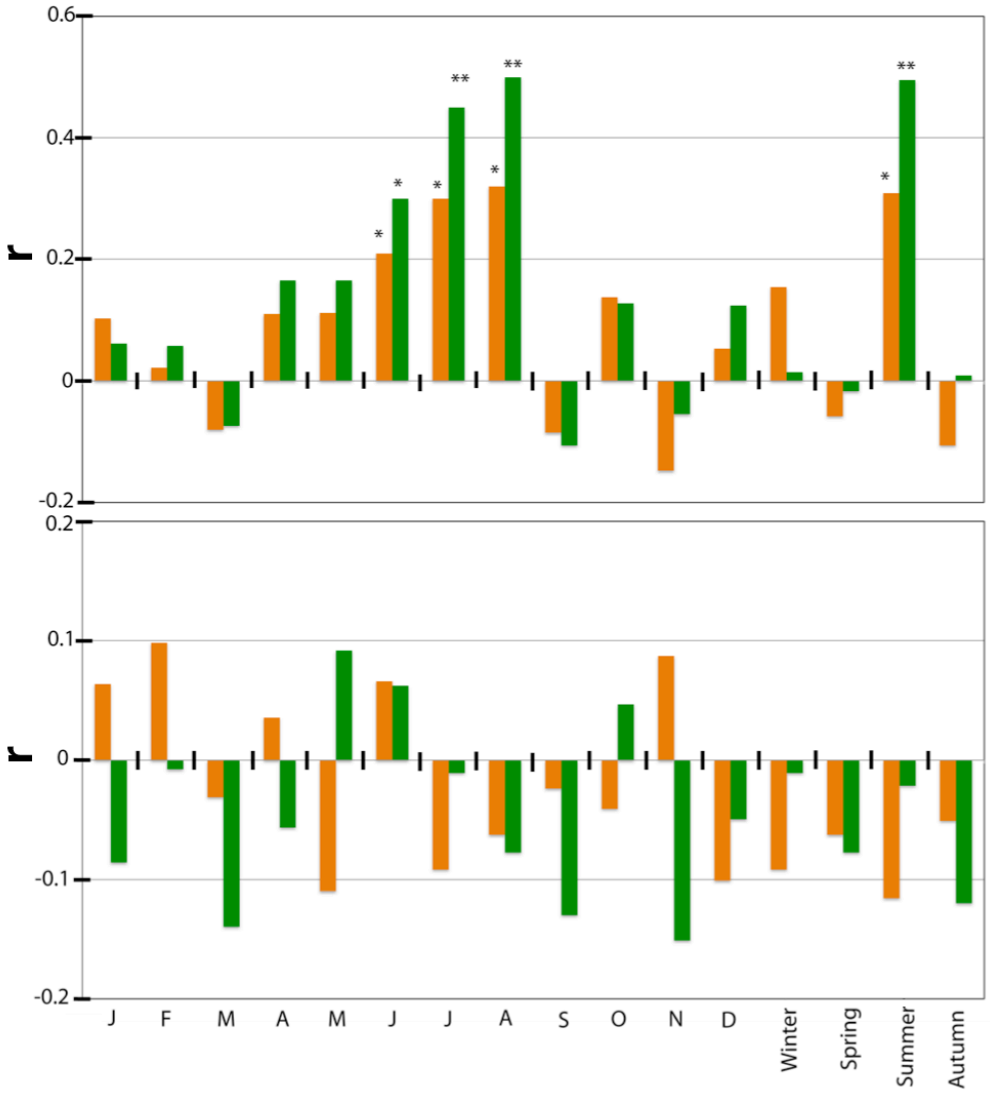

Fig. S4. Climate–growth correlations. Correlations between annual tree-ring width (TRW) and climate variables for the period 1700–2000 were calculated to identify the dominant climate controls of ring formation. High-resolution 0.5 × 0.5° grids (Casty et al. 2005) of monthly temperature means and precipitation totals were used for growth/climate response analysis. Correlation coefficients were performed separately for each month and each season – winter (January to March), spring (April, May), summer (June to August) and autumn (September to December) – and regarding temperature and precipitation, using using bootstrapped correlation analysis for significance testing ($p < 0.05$). Orange bars: *Larix decidua*; green bars: *Picea cembra*. *$p < 0.05$, **$p < 0.01$