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Pollen-inferred past climate reconstruction in the Alps: how to estimate the effect of elevation.

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Six high-resolution pollen sequences from the Belledonne Massif (North-western French Alps) was analysed to reconstruct the evolution of climate during the Lateglacial and the early Holocene. The pollen sequences come from six sites located at various altitudes on the Massif: Le Vivier (340 m), Les Etelles (700 m), La Coche (900 m), Montendry (1400 m), Le Grand Leyat (1660 m), La Gouille (1800 m). The six sites are presently located in different vegetation belts.

The main vegetation changes in the past are recorded at each site, with differences in the local vegetation cover which are related to elevation.

The evolution of climate parameters such as Temperature of the Coldest Month (Tco), Temperature of the Warmest Month (Twa), Annual Temperature (Tann), Annual Precipitation (Pann) was inferred from pollen data using the Modern Analogue Technique (MAT). The Biome constraint was used to limit the effect of pollen blowing uphill by wind on pollen-based climate reconstruction.

The comparison of curves shows consistent trends for climate parameters at the different sites. Differences in temperature values related to the elevation are less marked during the Lateglacial than during the early Holocene. This may indicate that lapse rates have changed since the Lateglacial. The highest differences in temperatures at the six sites are recorded at the beginning of the Holocene, when the vegetation belts were better developed.