



Testing the influence of climate, human impact, and fire on the Holocene population expansion of *Fagus sylvatica* in the southern Prealps (Italy)

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Our study addresses the timing and causes of the Holocene population expansion of *Fagus sylvatica* at two sites in the southern Prealps (Italy): Lago di Fimon and Lago Piccolo di Avigliana. At both sites pollen and microcharcoal have been analyzed at high temporal resolution. The impact of humans and of fire on the forest dynamics is tested by means of time-series analysis and the influence of climatic change has been inferred from summer temperature and precipitation reconstructions in the Alps. The time intervals during which the population expansion of *F. sylvatica* occurred (i.e. phases during which population doubling times were shortest) is determined by fitting linear regressions through the ln-transformed *Fagus* pollen-accumulation rate (ln(PAR)). At Lago di Fimon, the population expansion of *F. sylvatica* occurred at 7300 - 6400 cal yr BP (FIM I). After a marked decline the population re-expanded at 5500 - 4700 cal yr BP (FIM II). At Lago Piccolo di Avigliana *F. sylvatica* expanded ca. 5300 - 4600 cal yr BP (AVP I). Time-series analyses show that *Fagus* expanded after forest fires and declined during FIM I. Human impact likely contributed to the *F. sylvatica* population expansions at the two sites during FIM II and AVP I. The comparison with independent climatic records suggests that favourable climatic conditions (e.g. cool and wet) were a determining factor. Our study suggests that the expansion of *F. sylvatica* populations has been triggered by more than one single factor alone.