

>> SYNTHESIZE MOUNTAINS OF KNOWLEDGE <<

Submitted Abstract

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Abstract

Tree species in high elevation may react differently to climate change with consequences for the composition and vitality of future mountain forests. We used tree ring analysis and automatic dendrometers to analyze long- and short-term growth dynamics of *Larix decidua*, *Picea abies*, and *Pinus cembra* and their relation to climatic drivers in the subalpine zone and at the forest line in the LTSER platform Matsch|Mazia in the Italian Alps. With increasing temperatures since the 1980s, tree ring widths increased stronger in *Larix* and *Picea* than in *Pinus*. *Larix* and *Picea* also showed a stronger positive correlation of tree ring width and temperature than *Pinus* while correlations with precipitation were hardly found. However, in short-term dendrometer data, we observed a distinct limitation of growth by vapor pressure deficit in *Pinus* but not in *Larix* which could be an explanation for the difference in long-term growth responses. Overall, our study indicates that *Larix decidua* and *Picea abies* might actually benefit from climate warming at high elevation at the expense of *Pinus cembra*.