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- towards climate change services

A 500-year reconstruction of May-July temperatures for the region of Western Hungary and Eastern Austria, based on biophysical (vine and grain) indicators

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We present an almost 500-year May-July temperature reconstruction, based on 24 biophysical series, related to various types of grain (cereal) and vine phenological evidence. The Kőszeg, Szombathely, Retz and Bratislava proxy series and all presented analyses were developed within the framework of the EU project 'Millennium'. The other, Austrian and Moravian series are mainly based on published series, although in some cases they have been modified and extended for this study using newly developed data.
In our presentation, we present methods to transform and composite the data into a homogenous, homoscedastic time-series that can be used for proxy based calibration. The compositing approach normalises individual proxy series to the other "surrounding" proxy records as an evolutive process through time with the final composite series being derived by simply averaging the transformed series together. This approach allows for the retention of low frequency information. Finally, a May-July (MJJ) temperature reconstruction is derived using dendrochronological methods for calibration and verification. The composite series was calibrated to the homogenised series from Vienna and Budapest (HISTALP series: Böhm 2009).
Over the calibration period (1780-1873), the present reconstruction explains 70% of MJJ temperature variations. The developed temperature reconstruction portrays a clear cold phase in the late 16th and early 17th centuries; warm conditions in the mid- and during the late 17th and early 18th centuries, with a period of cooling until another cold period centred around 1815. This cool period was followed by an increase in temperature until the 1860s. Following one last cool phase in the early 20th century, there is a clear warming through the last century, with greatest warming in recent decades.