



## **Preliminary results for potential climatic signals in dD of wood lignin methoxyl groups from high-elevation alpine larch trees**

Dana F.C. Reichelmann (1,2), Markus Greule (3,4), Jan Esper (1), Frank Keppler (3,4)

(1) Johannes Gutenberg-University Mainz, Department of Geography, Mainz, Germany (d.reichelmann@geo.uni-mainz.de, J.Esper@geo.uni-mainz.de), (2) Johannes Gutenberg-Universität Mainz, Institute for Geosciences, Mainz, Germany, (3) Ruprecht-Karls University Heidelberg, Institute of Earth Sciences, Heidelberg, Germany (markus.greule@geow.uni-heidelberg.de, frank.keppler@geow.uni-heidelberg.de), (4) Max Planck Institute for Chemistry, Department of Atmospheric Chemistry, Mainz, Germany

Tree-rings of high alpine larch trees (*Larix decidua*) were investigated using a recently established method that measures dD values of the wood lignin methoxyl groups (Greule et al. 2008). The resulting dD time series were tested for their potential to preserve climatic signals. 37 larch trees were sampled at the tree line near Simplon Village (Southern Switzerland). They were analysed for their tree-ring width (TRW), and from five individuals dD of the wood lignin methoxyl groups (dDmethoxyl) were measured at annual resolution from 1971-2009 and at pentadal resolution from 1781-2009.

The inter-series correlation of the five annually resolved dDmethoxyl series is 0.53 ( $p < 0.001$ ). For the five pentadally resolved dDmethoxyl series no significant inter-series correlation could be determined. The dDmethoxyl series (annually and pentadally) show a negative correlation with tree-ring width of  $r = -0.53$  ( $p < 0.001$ ) and  $r = -0.32$  ( $p < 0.05$ ), respectively. The climate response of the new dDmethoxyl proxy shows a significant correlation of  $r = 0.60$  for the annually resolved data with June to July precipitation. The pentadally resolved dDmethoxyl series do not show any significant correlation neither with temperature nor precipitation. These results probably indicate dDmethoxyl as a precipitation proxy for high-alpine sites. The missing climate signal in the pentadally resolved series is probably due to absent long term trends in precipitation, which have stronger year to year variability.

### References:

Greule, M., Mosandl, A., Hamilton, J.T.G., Keppler, F., 2008. A rapid and precise method for determination of D/H ratios of plant methoxyl groups. *Rapid Communications in Mass Spectrometry*, 22(24): 3983-3988.