

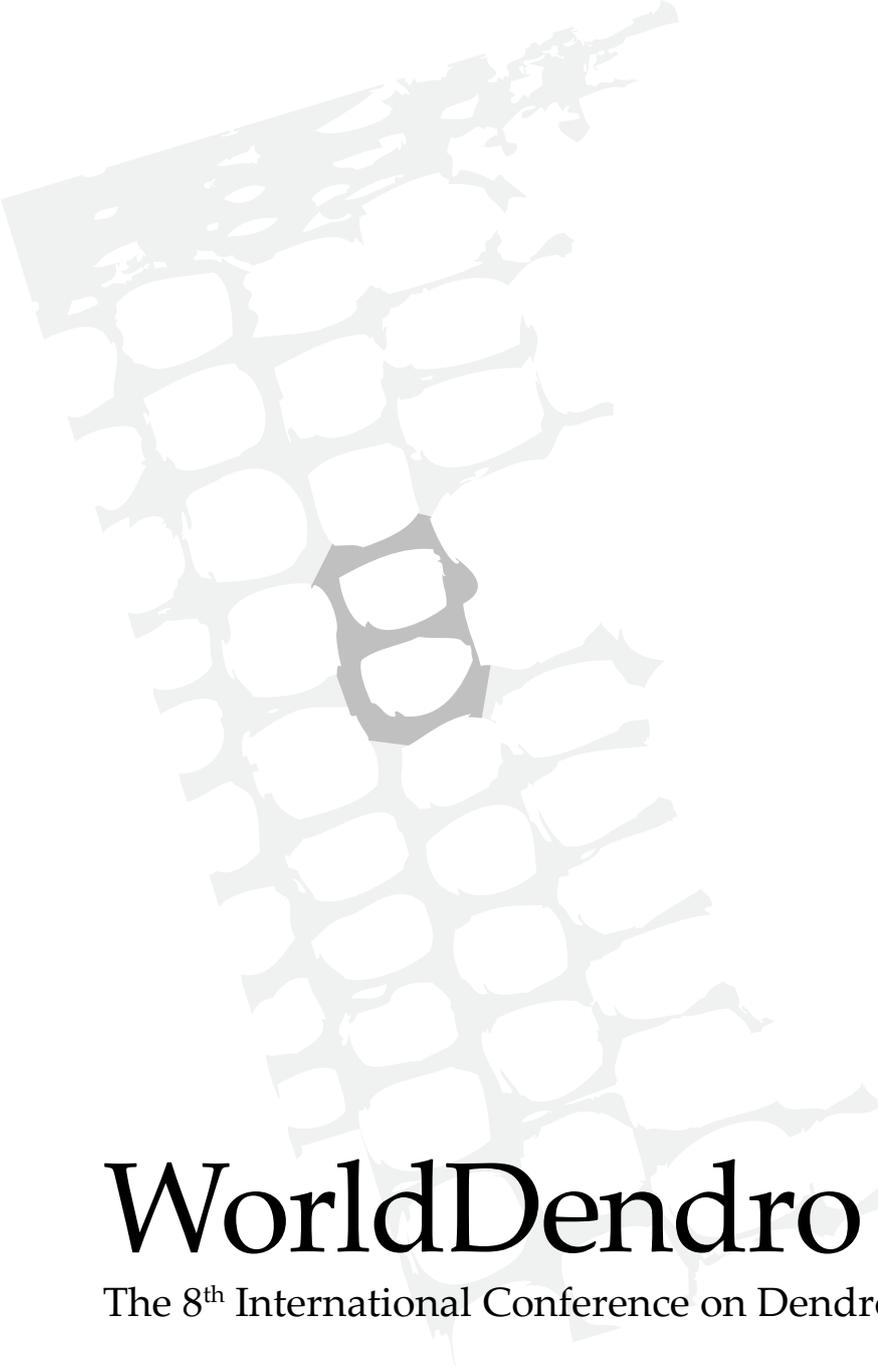
WorldDendro 2010

The 8th International Conference on Dendrochronology

ABSTRACTS

EDITORS: Kari Mielikäinen, Harri Mäkinen and Mauri Timonen

June 13 – 18, 2010, Rovaniemi, Finland



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DIRECT: A new approach to dendroclimatic reconstructions

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Here we introduce a new method of the past climate reconstruction from raw tree ring measurements and (possibly) other proxy data. DIRECT (which stands for Direct Reconstruction Technique) takes advantage of both response surfaces and Regional Curve Standardization (RCS) concepts to make climatic reconstructions on the basis of available instrumental records and different proxy data, while it was constructed mostly for tree ring proxies. The main feature of this method is direct (i.e. without standardization) transformation of raw measurements into values of climatic parameter being reconstructed. This approach eliminates some common standardization problems like loss of low-frequency variability or potential bias on the ends of chronology

For all the years we have instrumental data that we want to extend in the past we put our raw tree ring measurements against three parameters (climatic parameter value, cambial age and the mean measurement for the first 100–150 years of the sample) in 4D response space, one point for each measurement that falls within instrumental period. Smoothing (approximating) hypersurface for these points can be either plotted for visual analysis or used for transforming raw measurements into climatic parameter values. For each year of reconstruction period these values can be averaged with each other and other proxies (with different weights) to get final reconstruction. As a particular case this method supports nonlinear response models with ambiguous solutions.

In this study we apply DIRECT to tree ring data collected in Central Caucasus Mountains in order to reconstruct mean summer temperature back to 1797.