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Late Pleistocene and Holocene Climatic Variability in the Carpathian-Balkan Region

ABSTRACTS VOLUME

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Proxy records of annual/decadal temperature- and hydroclimate variability from the Carpathian-Balkan Region for the past two millennia, a literature review

Alexandra Németh[1], István Gábor Hatvani[1], Margit Horoszné Gulyás[2] and Zoltán Kern[1]

[1] Hungarian Academy of Sciences (MTA); Research Centre for Astronomy and Earth Sciences, Institute for Geological and Geochemical Research (CSFK-FGI), H-1112 Budaörsi út 45. Budapest, Hungary nemethalexandra89@gmail.com, hatvaniig@gmail.com, kern@geochem.hu

[2] Óbuda University, Alba Regia Technical Faculty, Institute of Geoinformatics, H-8000 Pirosalma utca 1-3. Székesfehérvár, Hungary horoszne.margit@amk.uni-obuda.hu

In the present paper a systematic compilation of temperature and moisture sensitive proxy records is presented for the Common Era of the Carpathian- Balkan region with the aim of creating a comprehensive database. It will hopefully facilitate an orientation and an overview among available literature, and hopefully serve as a valuable and solid basis for the climate research community. Authors welcome all contributions in the topic to further broaden the scope of the initiative.

Keywords: Carpathians, Balkans, climate proxy, field correlation analysis, moisture, temperature

The study presents a comprehensive literature collection of temperature- and moisture sensitive proxy records covering a significant part of the past 2000 years published from the Carpathian-Balkan region where the original dataset provides at least semi-centennial time resolution. By gathering the related studies the vision of a new database was formed filling the gap in the climate research of the Carpathian-Balkan Region. Thus, the long-term aim is to launch an initiative to collect all available proxy data in the area.

As an initial step eight temperature and six moisture sensitive proxy reconstruction have been assessed (Table 1., Figure 1). Two obvious conclusions can be drawn immediately from the initial database:

i) tree ring derived reconstructions show an overwhelming dominance in the dataset (9 out of 14) and
ii) that speleothem studies in our region generally lack the direct verification of supposed climate signal against instrumental targets.

The strength and temporal stability/reliability of the climate signal for each archived proxy record is being checked against the Twentieth Century Reanalysis dataset (20CR Project: Compo et al. 2011). It consists of supra-long (1871-2010 AD) reanalysed instrumental climate data on a 2°x2°global grid.

Most of the published proxy-based palaeoclimate studies neglected to scrutinize the expected spatial signature and potential seasonal bias of the studied proxy record. Therefore, the spatial signature of the collected proxies and the strength of their spatial relationship against the 20CR data will be tracked using field correlation analysis.

Table 1 List of the compiled high resolution temperature and hydroclimate reconstructions from the Carpathian-Balkan region (status of September 1st 2014)
MXD stands for maximum latewood density, TRW for tree ring width and N.A. for not available

	Site	Lat-Lon	Proxy	Season	Period	Ref.
Temperature	Tatra region (Poland)	49-19.5	MXD	April-Sep	1709-2004	Büntgen et al. 2007
	Tatra region (N Slovakia)	48.7-19.5	TRW	May-June	1040-2011	Büntgen et al. 2013
	Calimani Mts	47.25-25.5	TRW	June-Aug	1160-2004	Popa & Kern 2009
	Lala Valley, Rodna Mt	47.53-24.92	TRW	June-Aug	1460-2005	Popa & Bouriaud 2014
	Sinaia, Bucegi Mts	45.35-25.53	TRW	Nov-Jan	1774-2001	Popa & Cheval 2007
	Kőszeg	47.3-16.5	documentary phenology	May-July	1644-1944	Kiss et al. 2011
	Kiskőhát	48.07-20.49	speleothem	N.A.	900-1700	Siklósy et al. 2009
	Ceremosnaja Cave, Serbia	44.38-21.65	speleothem	N.A.	-325-1999	Kacanski et al. 2001
Hydroclimate	E Slovenia	46-15	TRW	June	1497-2003	Cufar et al. 2008
	Poprad region	48.55-20.17	TRW	May-Sep	1744-2006	Büntgen et al. 2010
	Bakony-Balaton	46.95-17.65	TRW	Sep-Aug	1746-2003	Kern et al. 2009
	Domogled, Banat	44.87-22.4	TRW	June-Aug	1688-2010	Levanic et al. 2013
	Modric	44.25-15.53	speleothem	N.A.	331-2008	Rudzka et al. 2012
	Kiskőhát	48.07-20.49	speleothem	N.A.	900-1700	Siklósy et al. 2009

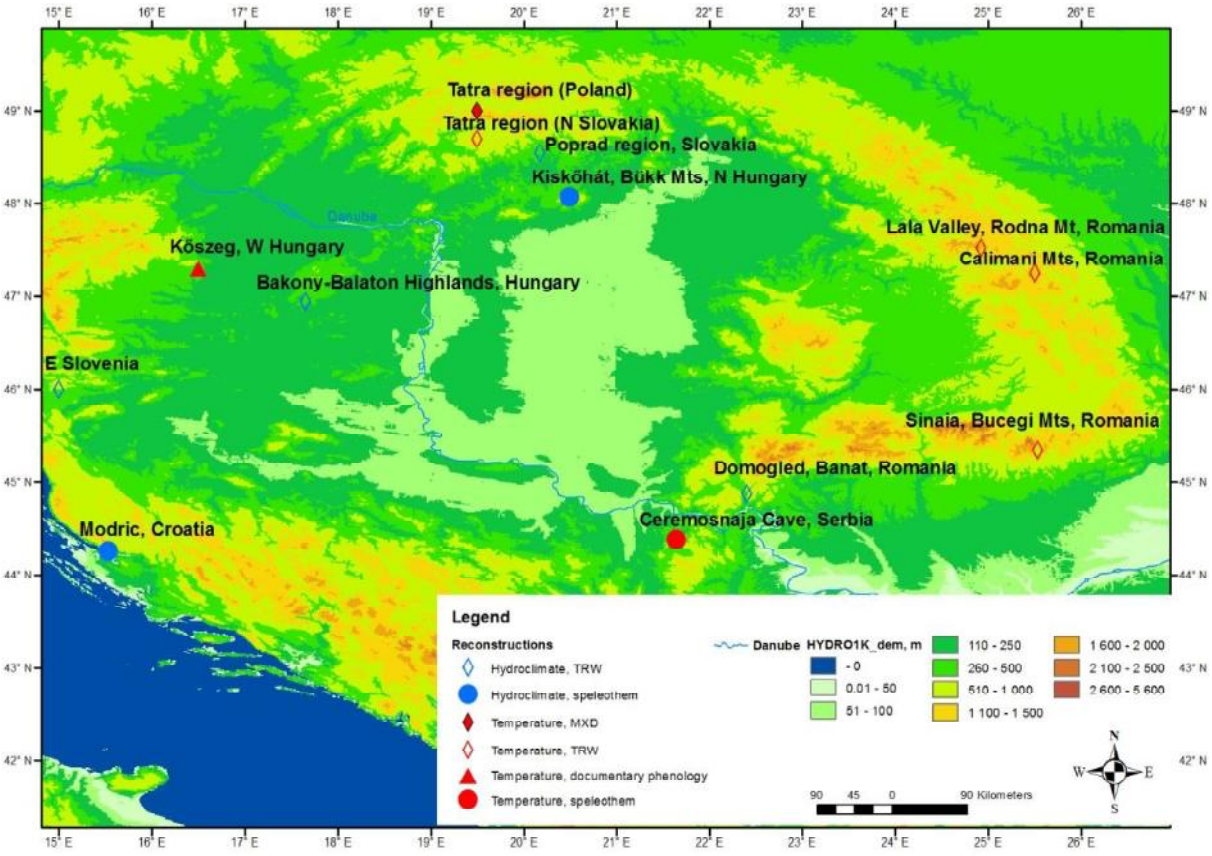

Fig. 1 Spatial distribution of the proxy palaeoclimate records from the Carpathian-Balkan Region with high temporal resolution (annual/decadal) and covering significant part of the past two millennia.

This re-evaluation, to prepare a quality checked and updated dataset is essential for any foreseeable cross-checking exercise with the simulation results of regional climate models. Especially in order to narrow down the uncertainty range of regional future climate predictions. This paper can be considered as a kind of status report of an on-going work and any contribution is welcome to broaden the scope of the project!

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