



International and interdisciplinary Symposium

Climate Change and Human-Environment Interaction in the Caucasus: Geo-bio-archeological and literary perspectives

Friday, 1.12.2023, 12h30-18h30

Saturday, 2.12.2023, 9h30-18h30

45 rue d'Ulm 75005 Paris, salle des Actes and online



Conveners: **Anca DAN** (ENS-CNRS Paris, anca-cristina.dan@ens.psl.eu),

Mikheil ELASHVILI (Iliia State University, Tbilisi and fellow at ENS Paris, mikheil_elashvili@iliauni.edu.ge)

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e quo liquatae solis ardore excidunt / guttae, quae saxa assidue instillant Caucasi
("flowing drops that the burning Sun wrings out of my body /
continuously moisten the rocks of the Caucasus")
Cicero, *Tusculan Disputations* II 10

Climatology, Geoarchaeology and Humanities

We live in a constantly changing environment, affected by a variety of factors, such as global warming, natural catastrophes and anthropogenic stress on the environment (IPCC 2022, Loveluck et al. 2018, 2020, Stewart & Stringer 2012, Müller et al. 2011, González-Sampériz et al. 2009, Rohling et al. 2009, 2019, Mayewski et al. 2004, Ruddiman et al. 2003, Vitousek et al. 1997). The effects on the human communities have always been noticed and sometimes noted down in texts and maps, although the antiquity of their languages and their various cultural contexts make them difficult to understand (Dan 2023). During the past decades, however, the environmental catastrophes got into the daily news. In order to understand their causes, chronology and future developments, scholars from various disciplines, ranging from geo- to social sciences, arts and humanities started to work together and to publish reconstructions of paleoenvironments as well as scenarios to come.

The Caucasus and its catastrophic changes

Due to the political, military and economic problems of the countries occupying the modern Caucasus, this region did not receive the attention it deserves, when considering its strategic importance for both the European and Asiatic countries. Yet, the Caucasus, with its old volcanoes (among which the highest peak in Europe, Elbrus, 5,642 m) and with their Eurasiatic watershed is not only one of the richest lands in natural resources (metals, minerals, wood) but also a huge natural observatory of the health of our ecosystems. Caucasus' glaciers (above 2300 m) are particularly sensitive to the actual warming: they lose up to 0.7-1% of their whole mass every year (Toropov et al. 2019, Tielidze et al. 2020, 2022). Their melting and that of the permafrost is relevant for the whole degradation of the environment, causing immediate as well as distant catastrophes: in the last decades, mudflows and ice-rock avalanches destroyed settlements and essential infrastructures, and changed the river debits (Evans et al. 2009, Tielidze et al. 2019), contributing to the rise of the levels of the Black and Caspian seas. Their total melting (estimated around 2050) will have fundamental consequences since the high Caucasus with its glaciers has been the water tower for the adjacent plains and valleys (Gregory and Oerlemans 1998, Leroy et al. 2022b, Tielidze et al. 2022): desertification of the mountainous and steppe regions will increase, glacial lakes may burst, the drainage basins will change their shape and extent, in turn heavily affecting biodiversity. The reduced ecosystems services will have catastrophic consequences on the human economy and quality of life. With these natural changes, all human societies will be affected and some traditional habitats will be abandoned (Von Suchodoletz et al. 2022, Leroy et al. 2022a). Natural archives (like glaciers) that we use now in order to reconstruct the history of climate and environment (Mayewsky et al. 2004, Lovelock et al. 2018, 2020) will be soon lost and the whole heritage we can transmit to the future generations will be diminished.

Aims

Joining forces between scientists of different disciplines and countries in order to register the various data about the human interaction with the environment in moments of crisis throughout history, should help us to prepare solutions for this near future. For a proper estimation of the whole chain of (probably catastrophic) events which could affect a country like Georgia, land of the

Golden Fleece, we need to consider the whole circuit of the peak water, from the melting glaciers to the high mountain lakes, the river basins, their deltas and the sea (Holzhauser 2016, Laermanns 2017a-b, 2019, Von Suchodoletz 2015). The climatic, geomorphologic, ecologic modellings must be related with ideas from arts and humanities as well as social sciences, in the *longue durée*, in order to anticipate the societal changes of the next generation (Goldberg & MacPhail 2006, Rapp & Hill 2006). Based on our previous research on the geohistory and geobio-archaeology of the Black Sea (Fouache et al. 2012), the Colchis lowlands (Gamkrelidze 1992, Laermanns 2017a, 2019), on rivers (Von Suchodoletz et al. 2015) – including the mythical Phasis (Lordkipanidze 2000, Dan 2016) – and lakes (Messenger et al. 2013, 2021), this meeting is intended as a kick-off for future international and interdisciplinary collaborations.

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PROGRAM

Friday, 1.12.2023

12.30 Reception of the participants

2 PM Introduction

Panel 1. Ice

2.15 PM Paul Andrew Mayewski

The Ice Chronicles - A Step in the Quest to Understand Climate Change and Human Interactions

Climate Change Institute, University of Maine, Orono, ME, USA

3 PM Andrei V. Kurbatov¹, Pascal Bohleber², Lela Gadrani¹, Geoffrey Hargreaves*³, Michael Handley⁴, Douglas S. Introne⁴, Curtis Labombard³, Elena V. Korotkikh⁵, Christopher Loveluck⁵, Paul A. Mayewski⁴

Adapting New Technologies for State-of-the-Art Ice Core Science

1. *Climate Change Institute and School of Earth & Climate Sciences, University of Maine, Orono, ME, USA*

2. *Environmental Sciences, Informatics and Statistics, Ca' Foscari University of Venice, Italy*

3. *National Science Foundation Ice Core Facility, U.S. Geological Survey, Denver, Colorado, USA*

4. *Climate Change Institute, University of Maine, Orono, ME, USA*

5. *Archaeology, University Park, School of Humanities, University of Nottingham, UK*

*Retired in 2022

3.45 PM M. Elashvili¹, L. Gardani², Levan Tielidze¹

Glacial Extends and Fluctuations in Greater Caucasus from LGM

1. *Cultural Heritage and Environment Research Center, Ilia State University, Tbilisi, Georgia*

2. *Climate Change Institute, University of Maine, Orono, ME, USA*

Coffee break

Panel 2. People and Places

4.30 PM Marianne Cohen¹ & Josep Vila-Subirós²

Resilient Landscapes in a Context of Climate and Socioenvironmental Change in the Caucasus. Key concepts and general considerations

1. *Geography and Spatial Planning, Lab. Médiations, Sorbonne University, Paris, France*
2. *Geography, Socioenvironmental Research Group, University of Girona, Catalonia, Spain*

5 PM Bérengère Perello

Human-Environment Interaction in Early Bronze Age Armenia. Aims and Perspectives of the HOMELAND Project

Archéorient, CNRS (UMR 5133), Lyon, France

5.30 PM N. Sulava¹, R. Chagelishvili¹, N. Rezesidze¹, B. Gilmour², E. Kvavadze, T. Beridze³

The Archaeometallurgy of Copper in the Mountain Regions of Colchis (Georgia, Lechkhumi)

1. *Georgian National Museum - Archaeology, Tbilisi, Georgia*
2. *School of Archaeology, University of Oxford, Great Britain*
3. *Al. Janelidze Institute of Geology, Tbilisi, Georgia*

Theater. 6-6.30 PM

Aeschylus' *Prometheus Bound*: performance in Ancient Greek by Philippe Brunet

Classics, University of Rouen Normandy, France

Saturday, 2.12.2023

Panel 3. Trees & Flowers

9.30 AM Ingo Heinrich¹, Gerhard Helle², Svend Hansen¹, Sabine Reinhold¹, Daniel Balanzategui¹, Alexander Müller¹

Tree Rings from the Caucasus Region and Their Potential for Multi-Parameter Environmental Reconstructions

1. *German Archaeological Institute (DAI), Berlin, Germany*
2. *Helmholtz Centre Potsdam, German Research Centre for Geosciences (GFZ), Germany*

10 AM Alexia Decaix

Reconstructing Human-Environment Interactions in the Southern Caucasus: an archaeobotanical macroremains perspective

GeoArchEon & National Museum of Natural History, France (UMR 7209 AASPE)

10.30 AM Kristina Sahakyan¹, Sebastien Joannin², Torsten Haberzettl³, Marie-Luise Adolph³, Lilit Sahakyan¹

5,000 Years of Vegetation Dynamics: Pollen Analysis of Gravity Sediment Cores in Small Sevan Lake, Armenia

1. *Institute of Geological Sciences, National Academy of Sciences of Armenia*
2. *CNRS, Institute of Evolutionary Science of Montpellier, France*
3. *Geography and Geology, University of Greifswald, Germany*

Coffee break

Panel 4. Lake & River

11.30 AM Hannes Laermanns¹, Daniel Gademan¹, Nino Ustiashvili², Levan Navrozashvili², Tiiu Koff³, Mikheil Elashvili², Helmut Brückner¹

The Lake Paravani Archive - a contribution to the Late Quaternary landscape evolution of the Lesser Caucasus (Georgia)

1. *Institute of Geography, University of Cologne, Germany*

2. *Cultural Heritage and Environment Research Center, Ilia State University, Tbilisi, Georgia*

3. *Tallinn University, Institute of Ecology, Tallinn, Estonia*

12 AM Hans von Suchodoletz

Prehistoric Societies and Water Supply in the Southeastern Caucasus: a geomorphological and geoarchaeological approach

Geoinformatics and Remote Sensing Group, Leipzig University, Germany

Lunch break

Panel 5. Ice & Dust

2 PM Lela Gadrani

Kazbegi Glacier Paleo Ice Core Project - Update

Climate Change Institute, University of Maine, Orono, ME, USA

2.30 PM Lyudmila Shumilovskikh

Palynological Studies from Kazbegi Region: Results and perspectives

Palynology and Climate Dynamics, University of Göttingen, Germany

3 PM Vera Batalova

First palynological Studies of Ice Cores from Elbrus: A new word in atmospheric monitoring in the Caucasus region

Palynology and Climate Dynamics, University of Göttingen, Germany

Coffee break

Panel 6. River & Sea

4 PM Alfred Vespremeanu-Stroe¹, Hannes Laermanns², Levan Navrozashvili³, Mikheil Elashvili³, Laurențiu Țuțuianu¹, Mihaela Dobre¹, Diana Hanganu¹, Luminița Preoteasa¹, Helmuth Bruckner²

New Data from the Rioni Suggest an Early (Neolithic) Delta Formation and Human Presence

1. *Geography, University of Bucharest, Romania*

2. *Institute of Geography, University of Cologne, Germany*

3. *Cultural Heritage and Environment Research Center, Ilia State University, Tbilisi, Georgia*

4.30 PM Florin Zăinescu, Alfred Vespremeanu-Stroe

Understanding the Effects of Rising Sea Levels on the Big River Deltas of the Black Sea - findings from the Danube river

Geography, University of Bucharest, Romania

5 PM Anca Dan¹, Udo Schlotzhauer²

Environmental Changes in the Caucasian deltas of the Black Sea, according to Classical Texts & Archaeology

1. AOROC – Classics, École Normale Supérieure – CNRS, Paris

2. Eurasia, German Archaeological Institute (DAI), Berlin

Posters

Akaki Nadaraia

Glacial Geomorphology and Landscape Changes in Enguri Valey (South Caucasus) during the Holocene

Cultural Heritage and Environment Research Center, Ilia State University, Tbilisi, Georgia

Guram Imnadze¹, Akaki Nadaraia²

Activated Periglacial Hazards in an Alpine Environment: An example of recent glacial debris flows in Shovi and Devdoraki Valleys (Georgian Caucasus)

1. Institute of Geography, Tbilisi State University, Georgia

2. Cultural Heritage and Environment Research Center, Ilia State University, Georgia

Nino Ustiashvili, Mari Murtskhvaladze

NGS Insights into Microbiome Composition in Ice Cores: Shifts in microbial communities as early indicators of environmental changes

Ilia State University, Tbilisi, Georgia

Levan Navrozashvili, Mikheil Elashvili, Levan Losaberidze, Mate Akhalaia, Giorgi Kirkitadze

Paleoenvironmental Reconstruction and Spatio-Temporal Analyses of the Late Bronze Age Culture in the Shiraki Valley (South Caucasus)

Ilia State University, Tbilisi, Georgia

Mikheil Lobjanidze, Tea Munchava

Landscape and Geomorphologic Changes in the Historic Tana Valley (Georgia), Influenced by Climatic and Anthropic Factors

Cultural Heritage and Environment Research Center, Ilia State University, Georgia

Daniela Pascal, Alfred Vespremeanu-Stroe, Régis Braucher, Răzvan Popescu, Mihaela

Enăchescu, Alexandru Berbecariu, ASTER Team

Glacial Geochronology and Extent in Făgăraș Massif (Southern Carpathians) - Parallels for the vanished glaciers of Lesser Caucasus

Geography, University of Bucharest, Romania