



NECLIME Annual Meeting 2017

Yerevan, Armenia

September 18 to 24, 2017

Report

by Torsten Utescher, Angela Bruch and Ivan Gabrielyan

The 18th Annual Meeting of the NECLIME (Neogene Climate Evolution in Eurasia) Consortium was held in Yerevan, Armenia, at the Botanical Institute of the National Academy of Sciences, from September 18 to 24, 2017. Thanks to the dedication of our hosts, Ivan Gabrielyan and Astghik Papikyan, the perfectly organized meeting was a great success. On a three-day post-conference field trip, the outstanding natural and cultural heritage of Armenia was introduced to the participants.

28 colleagues from 12 countries joined the conference which included two key note lectures (Anush Nersesyan: Vegetation of Armenia; Ivan Gabrielyan: Palaeobotany of Armenia), 15 oral and 10 poster contributions. The contributions were arranged in the following topical sessions: (1) The environmental history of the Caucasus – flora, fauna, vegetation and climate, (2) Plant biodiversity in time and space, (3) Climate data from non-plant proxies: vertebrates, insects and geochemical proxies, (4) Early human environment, and (5) Neogene climate evolution in Eurasia (as a general topic of NECLIME).

In the context of the NECLIME conference, a three-day workshop was organized by ROCEEH (The Role of Culture in Early Expansions of Humans, Heidelberg Academy of Sciences and Humanities) that introduced young scientists from Georgia and Armenia into quantitative techniques of palaeoenvironmental reconstructions developed in NECLIME.

Topics presented on the meeting

The environmental history of the Caucasus – flora, fauna, vegetation and climate

Besides with the two key note lectures on Armenian vegetation and palaeobotany, the complex Neogene and Quaternary environmental history of different parts of the region was addressed on the first day in several oral (Shatilova, Kvavadze, Papikyan, Bruch et al.) and poster (Bozukov & Gabrielyan, Bukhsianidze



et al., Oms et al.) presentations. The topics ranged from geological and stratigraphical questions to biogeography, climate and vegetation changes.

Plant biodiversity in time and space

As the Caucasus represents an important key area exemplifying the evolution of biodiversity and changes in biogeographic patterns and was an important refuge area for “Tertiary” relics throughout the late Neogene and Pleistocene cooling, this issue was discussed in close relation with the abovementioned presentations. Moreover, Huang et al. gave an overview on the Cenozoic plant diversity in Yunnan, China, as an outstanding example of a hotspot of biodiversity and its evolution.

Neogene climate evolution in Eurasia

Several presentations were dealing with this well established NECLIME topic. Presentations on Eastern Eurasia included an outline on vegetation and climate history of the Taiwan Miocene as reconstructed from the palynoflora of interbasaltic soils of the Penghu Islands (Wei-Ming Wang) and a report on vegetation and climate evolution in the Early Pleistocene of central Japan, based on a diverse, multi-level carpological record with independent time control (Momohara et al.). Moreover, a comprehensive outline on the fossil record of Tibet and implications concerning palaeoclimate and palaeo-altitude were presented by Zhe-Kun Zhou. For Western Eurasia, late Pliocene to Early Pleistocene palaeoenvironmental changes in the High Arctic of the European part of Russia were in the focus (Popova et al.). As regards the Eastern Paratethys realm, findings from the Caucasus were complemented by poster presentations on late Pliocene vegetation stages of Ukraine (Sirenko) and faunal turnovers and their climatic background as observed in Miocene sections of southern Ukraine (Stefanska & Stefanskyi). The Central Paratethys was represented by two poster contributions by Kováčová et al. conducting a multiproxy study on Late Miocene sediments from the Danube Basin. The superficial contrast of evaporitic deposits co-existing with humid vegetation was exemplified base on the Messinian macrobotanical record of the northern Italian sites Tossignano and Monte Tondo (Martinetto). Another contribution on Messinian strata and palaeoenvironment was dedicated to the lacustrine Cankiri Basin, Anatolia (Atalar et al.).

Early human environment

Vegetation represents an essential resource for people. People use vegetation in many ways, directly, as in the case of food and firewood, and make use of vegetation indirectly, for example as a habitat for animal life. To reconstruct vegetation and its dynamics in the course of past climatic changes therefore is crucial for understanding its impact on early humans, their migration routes and behavioral or cultural changes since the Early Pleistocene.



Contributions on early human environment and/or resource availability reconstructions for areas and times relevant for Palaeolithic expansions comprised studies in Germany (Stebich et al.), Spain (Altolaguirre et al.), Indonesia (Hertler & Haupt), and the Caucasus (Schulz et al., Bruch et al.).

General NECLIME topics

The analysis on stomatal density variation of Early Pleistocene *Fagus* leaves from Central Japan shed light on methodological problems in identifying past atmospheric CO₂ and altitude (Wang et al.). The application of digital chorological and climatological data sets in the reconstruction of climatic requirements of plants and thus in the application of the Coexistence Approach may considerably extend the potential of the method. In this context, a summary of the achievements of the latest workshop of the NECLIME working group on digital plant distribution, held this year Liège (May 30-31) was presented (Utescher). Kern et al. reported on paleoclimatic variations during glacial-interglacial cycles in semi-arid Northeast Brazil and their connection to the Amazon rainforest, the role of a xerophytic corridor and floristic exchange between biodiversity hotspots in the context of past monsoon intensity and position of the ITCZ

More details can be obtained from the conference program and abstract volume made available for download from our homepage.

Topics addressed in the final discussion

Biodiversity

The evolution of biodiversity is becoming of increased interest in the NECLIME community. Studies dealing with the history of biodiversity hotspots comprise the regions of Yunnan/SW China, Caucasus, and Amazonia. It was stated in the final discussion that comparisons of data from different regions are desirable to examine general characteristics and underlying triggers/forces of biodiversity. Joint efforts of the NECLIME community will be necessary to agree on suitable parameters for the intended comparisons.

Pleistocene records

The increasing number of Pleistocene records, with both climate and vegetation data, is highly appreciated. This provides the prospect for regional to continental scale environmental analyses to better understand the regional responses on global changes. This also shows that the research



questions and approaches of NECLIME are applicable in a much wider scientific frame than anticipated 18 years ago.

Compilation of digital data of plant distribution

We agreed on the establishment of a joint database providing information on the availability of digital maps of plant distribution and on selected digitally derived climate data. This information will be compiled and put online on the NECLIME website by the working group on 'digital data of plant distribution'. These efforts will include the compilation of distribution information from herbarium data of China which will be provided by our colleagues from Kunming and XTGB, Xishuangbanna (Zhe-Khun Zhou et al.). Furthermore, a detailed protocol for data handling throughout the entire process from the data on plant distribution to the extraction and finalization of the climate data is crucial and will be developed by the NECLIME working group on digital data on plant distribution. There is a wish within the NECLIME community to extent these efforts also to mammal distributions. How such data can be incorporated needs to be discussed by the working group and with the colleagues involved.

Another suggestion on providing and sharing information within the NECLIME community and on our website deals with the compilation of scanned pictures of cleared leaves and respective data on measurements. The establishment of a joint database without question is a desirable task. The realization however still needs to be discussed. On a long run, such data may help to establish a software for leaf determination. As a first step in this direction, the NECLIME website will provide a compilation of links to databases with scanned herbarium sheets. If you know of such sites please send the respective information to Andrea Kern (email)

! Special Issue

In the frame of the forthcoming EPPC 2018 (see below) we are planning to organize the next Special Issue of NECLIME on Neogene:

Cenozoic biodiversity and floral patterns

As a possible journal we think about Palaeobiodiversity and Palaeoenvironments (Senckenberg). More details will be appointed at the EPPC Dublin, and the extended NECLIME workshop in Sofia (see below). Contributions from last year's conference in Lucknow are still very welcome.



Forthcoming events 2018

EPPC 2018 in Dublin, Ireland

Two sessions will be organized by NECLIME members at the European Palaeobotany and Palynology Conference (EPPC) in Dublin, Ireland, 12 to 17 August 2018

Cenozoic plant diversity gradients in time and space and its impact on early humans (ROCEEH/NECLIME) / Session 25 / Organizers: A.A. Bruch, A.-J. Henrot, L. Francois, N. Rudaya, T. Utescher

Cenozoic Plant Diversity of Tibet, Himalayas and Hengduan Mountains / Session 14 / Organizers: Zhou Zhe-Kun, Su Tao, Lutz Kunzmann

Extended NECLIME workshop 2018 in Sofia, Bulgaria

In September 2018, an extended NECLIME workshop will be held in Sofia, Bulgaria, at the Institute of Biodiversity and Ecosystem Research, Bulgarian Academy of Sciences. The extended workshop organized together with the 9th meeting of the NECLIME working group on "Taxonomy of Neogene Palynomorphs" also invites contributions on general topics of NECLIME, and contributions intended for our next special issue (see above).

The event, kindly organized by Dimiter Ivanov and his team, will cover topics on

- palaeobotanical records (micro/macro) of the Central and Eastern Paratethys
- *reconstructing vegetation and climate dynamics from pollen records – taxonomical basis and methodological standards*
- *higher resolving time series and their analysis*
- *plant diversity patterns in pollen records*
- *general NECLIME topics*



Forthcoming events 2019

1st American NECLIME meeting in Fullerton, California, USA

Time: mid May 2019

Place: California State University at Fullerton, California, USA

Local Host: Yusheng (Christopher) Liu

Reconstructions of the Neogene Climates in the New World: Challenges and Opportunities

- *Methodology revisit: Quantitative vs Qualitative Reconstructions*
- *New Synthesis: NECLIME Expanding to the New World*
- *Trans-Atlantic Neogene flora and climate comparison*
- *Trans-Pacific Neogene flora and climate comparison*
- *Big Data and Big Picture: Neogene climates in the Northern Hemisphere*
- *Quantitative vegetation reconstruction and climatically induced biodiversity patterns*
- *General NECLIME topics*
-

19th NECLIME annual meeting in St. Petersburg, Russia

Time: August/September 2019

Place: St. Petersburg, Komarov Botanical Institute, Russian Academy of Sciences

Local Host: Svetlana Popova, Dmitri Gromyko

Further details will be announced next year.