



9th NECLIME Annual Meeting 2008

2nd of September, Bonn, Germany

In the frame of IOPC/IPC the NECLIME annual meeting was held to discuss and integrate possible contributions to a second NECLIME synthesis volume to be published in 2009. Below you find a general introduction to the planned volume and the titles of contributions presented in Bonn.

2nd NECLIME synthesis

The Neogene of Eurasia: spatial gradients and temporal trends

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A: Introduction

In order to obtain a better understanding of long-term palaeoclimate changes during the Neogene in Eurasia the international research network NECLIME – Neogene Climate Evolution in Eurasia – was established in the year 2000. The main objectives of NECLIME are: (1) the quantitative reconstruction of Neogene climate evolution in Eurasia and of its patterns in time and space based on proxy-data and their quantitative climatic interpretation by means of standardised techniques, (2) the reconstruction of Neogene regional and global atmospheric circulation patterns by means of climate modelling, (3) the analysis of the interaction between palaeogeography, vegetation and climate. More details about the concept, structure and members of NECLIME can be found on the NECLIME homepage.

A first synthesis of NECLIME was published in 2007 (Bruch et al.) combining studies on the Miocene of Europe. For this area, a summary of climate and vegetation evolution in time and space was drawn up.

The second synthesis of NECLIME presented in this volume again aims at reconstruction and analysis of changing Neogene patterns with respect to vegetation, biodiversity and climate, but under a



Eurasia-wide perspective, thus allowing for a comprehensive study on a larger scale. Integrating proxies from various sources (palaeobotany, vertebrate palaeontology, geology) and data obtained from numeric modelling the volume focuses on the following topics.

- Precipitation patterns, landscape opening

For some regions of Eurasia it is known, that the Late Neogene Cooling was connected to drying and to the expansion of open landscapes. However, the timing of this process and the mechanisms involved are not yet clearly understood. When quantifying precipitation rates it was shown that plant and animal proxies may contradict each other to some extent. To analyze the response of terrestrial ecosystems to climatic and environmental changes we study palaeo-precipitation patterns in time and space, their polarity and amplitudes of change. As key regions, the Western and Eastern Mediterranean as well as the Eastern Paratethys and Southeast Asia are in the focus. Plant and faunal data are compared in detail and discussed in the context of modelling results. It is shown that faunal data can fill up gaps in the environmental information provided by the palaeobotanical record.

- East Asian Monsoon System

The evolution of the East Asian Monsoon System during the Neogene and its intensity is still a matter of debate. Here, a new, comprehensive record is presented for East Asia comprising palaeoclimate and -vegetation data. This data set allows for studying imprints of the monsoon on the Neogene ecosystems in the context of tectonic activities such as the uplift of the Himalayas.

- Potential of past climates for evaluating future climate change scenarios

According to the 4th Assessment Report of the International Panel on Climate Change (IPCC-4.AR), a significant global warming due to the increase of atmospheric greenhouse gases is predicted by climate models to occur over next 100 years. It is known that the models are well capable to model the well-documented climate change that occurred over the last 150 years but have flaws when boundary conditions significantly differ from today because of a yet insufficient representations of physical processes. The comprehensive data set presented here provides us with climate states for various Cenozoic time slices of Eurasia that are similar or analogous to the predicted future climate. It is shown that the study of past climatic patterns provides important clues when evaluating modelling results for future



scenarios. Prognosticated anomalies partly coincide with palaeo -patterns such as a warming of continental interiors, however, also visible in data sets of past time slices with pre-industrial CO₂. This brings about a discussion about the major driver in global warming.

B: Neogene vegetational patterns of Eurasia

Adele Bertini (Firenze, Italy), Edoardo Martinetto (Torino, Italy) **Studies on Messinian – Pliocene flora and vegetation in Italy - a contribution for stratigraphical and palaeoenvironmental reconstructions**

Dimiter Ivanov (Sofia, Bulgaria), Torsten Utescher (Bonn, Germany), Volker Mosbrugger (Frankfurt, Germany) **Vegetation and climate dynamics in the Miocene of Southeast Europe**

Wang Wei-Ming (Nanjing, China) **Neogene vegetation of China, its spatial and temporal development in connection with ecosystem evolution**

C: Neogene climate patterns of Eurasia

Jan A. van Dam (Amsterdam, The Netherlands), G. J. Reichart (Amsterdam, The Netherlands) **Mammal-based stable isotope, temperature and precipitation trends for the Spanish Neogene**

Lars van den Hoek Ostende (Leiden, The Netherlands), Marc Furió (Barcelona, Spain), Isaac Casanovas (Barcelona, Spain) **A remarkably consistent gradient**

Madelaine Böhme (Munich, Germany), Michael Winklhofer (Munich, Germany), August Ilg (Munich, Germany) **Middle and late Miocene precipitation in Spain and Central Europe: temporal trends and spatial gradients**



Angela A. Bruch (Frankfurt, Germany), NECLIME members (www.neclime.de) **Changes in precipitation patterns in the Miocene of Central Europe as a force for landscape opening**

Mehmet S. Akkiraz (Izmir, Turkey), Funda Akgün (Izmir, Turkey), Torsten Utescher (Bonn, Germany), Angela A. Bruch (Frankfurt, Germany), Volker Mosbrugger (Frankfurt, Germany), Volker Wilde (Frankfurt, Germany) **Miocene precipitation gradients in western and central Turkey as quantified from pollen data**

Yi-Feng Yao (Beijing, China), Angela A. Bruch (Frankfurt, Germany), Volker Mosbrugger (Frankfurt, Germany), Cheng-Sen Li (Beijing, China) **Quantitative reconstruction of Miocene climate patterns and evolution in southern China based on plant fossils**

Torsten Utescher (Bonn, Germany), Angela A. Bruch (Frankfurt, Germany), Arne Micheels (Frankfurt, Germany), Volker Mosbrugger (Frankfurt, Germany) **Cenozoic climate gradients and regional anomalies in Eurasia and their potential for validating future climate change scenarios**

Jussi Eronen (Helsinki, Finland), Torsten Utescher (Bonn, Germany), Kai Puolamäki (Helsinki, Finland), Arne Micheels (Frankfurt, Germany) **Comparison of precipitation calculations from plant and large mammal proxies for the European Neogene**

D: Model results and validation by proxy data

Arne Micheels (Frankfurt, Germany), Angela A. Bruch (Frankfurt, Germany), Jussi Eronen (Helsinki, Finland), Mikael Fortelius (Helsinki, Finland), Mathias Harzhauser (Vienna, Austria), Volker Mosbrugger (Frankfurt, Germany), Torsten Utescher (Bonn, Germany) **An analysis of Miocene**



climate gradients in Europe based on atmospheric circulation patterns of a climate model experiment.

Louis François (Liege, Belgium), Torsten Utescher (Bonn, Germany), Eric Favre (Lyon, France, Jean-Pierre Suc (Lyon, France), Alexandra Henrot (Liege, Belgium), Arne Micheels (Frankfurt, Germany), Volker Mosbrugger (Frankfurt, Germany), Boglarka Erdei (Budapest, Hungary), Rachid Cheddadi (Montpellier, France) **Modelling late Miocene vegetation in Europe: results of the CARAIB model and comparison with palaeovegetation data**