

Plankton biostratigraphy - An EARTHTIME-EU initiative of critical evaluation of biohorizons and biozonations of the last 100 Ma

Varna, Bulgaria. October 5-th to 7-th, 2011

An EARTHTIME-EU Science Meeting

Final Scientific Report

Contents:

	Page
1. Summary	2
2. Description of Scientific content and discussion of the event	3
3. Assessment of the results and impact on the future direction of the field	4
4. Final Meeting Programme	5

1. Summary

The first Workshop of two biostratigraphy groups within the EARTHTIME-EU project was held in Varna, Bulgaria, from 4 to 8 October 2011. The aim of the meeting was to bring together strategic individuals of the European biostratigraphic community and selected guests in working towards a critical revision of plankton biohorizons, their reliability and correlation, taxonomic and biostratigraphic equivalency, and calibration against other scales. In addition, 3 outstanding experts from the other subdisciplines of EARTHTIME-EU project - astrochronology, magnetostratigraphy and isotope geochronology were invited to join the meeting in order to keep them linked to the advance of biostratigraphy community and for calibration issues. During the meeting, scientists discussed on a large spectrum of problems, including: biostratigraphic concepts and naming conventions, documentation of the calibration of the primary biohorizons, poor calibration of datums reported in published GTS and the difficulties involved in tracking these to published sources; poor inter-calibration of widely-used plankton zonations; integration between calcareous nannofossils and planktonic foraminifera and other (bio)stratigraphic schemes (e.g. dinoflagellate and radiolaria); generic problems of taxonomic equivalency.

The Workshop consisted of two full-day scientific sessions (Wednesday-Thursday) and an optional post-meeting field trip (Friday), bringing together a total of 22 participants from 8 different EU countries and 18 research institutes and universities.

The biostratigraphy community has identified a number of priority issues that need to be addressed in the near future, such as: taxonomy clarity, reliability of used biohorizons, diachrony of bioevents, unification of calibration data protocols.

2. Description of Scientific content and discussion of the event

The meeting was organized in two plenum sessions and several outbreak sessions, including key notes, discussions and general discussions on the following topics:

1. Late Cretaceous Biostratigraphy
2. Palaeocene – Middle Eocene Biostratigraphy
3. Late Eocene – Oligocene Biostratigraphy
4. Neogene – Quaternary Biostratigraphy

Each scientific session included a number of key-notes, where the state of the art and the scientific forefront of each stratigraphic interval was presented. Presentations were followed by discussion on the future actions related to the progress of each field (outbreak sessions). Moreover, the final plenum session and general discussion focused also, among the others, on magnetostratigraphic correlation procedure, astrochronological calibration and carbon isotope geochemistry of the last 100 Ma.

Taxonomy is fundamental issue, the real backbone of biostratigraphic research. In the future activities, much effort must be spend to distinguish between true diachronous bioevents and taxonomy problems. Correlation of nannofossils vs. planktonic forams after taxonomy cleared and new/emended zonations for each group established is of key importance. After this, correlations to e.g. dinoflagellate and radiolaria can be established, and Tethyan-Boreal Tethyan-Paratethyan correlations can be worked on.

Database: open databases by Chronos for planktonic forams, Nannotax for nannofossils were discussed; long-term maintainence (ERC) problem; possibility for funding of visiting young scientists to work into and with database.

Correlation/calibration to carbon isotope data: high resolution carbon isotope data is needed to calibrate biohorizons.

3. Assessment of the results and impact on the future direction of the field

It is clear that a fundamental biostratigraphic work is crucial for the achievements of the EARTHTIME network. Aiming at improving biostratigraphy, a working document prepared by Pearson and Wade (September 2011: *Biostratigraphic naming conventions used in Berggren and Pearson, 2005 and Wade et al. 2011*) was thoroughly discussed and overall agreement on the basic conventions was worked out.

From the fruitful discussions of the meeting, it was clear that full documentation of data, and traceability of scientific results are of crucial importance for plankton biostratigraphy. To progress into this, overall agreement was reached on the convenience of a number of follow-up meetings focussed on the following topics:

- Taxonomic work - ESF Earthtime-EU workshop on Cretaceous planktonic forams taxonomy suggested by Maria Rose Petrizzo for 2012, maybe together with nannofossil taxonomy (possible venue and date: September 2012 INA Meeting at Cluj/Napoca, Romania). The aim is to solve taxonomic problems, calibration issues, first integration discussion nanno-forams.
- For nannofossils, taxonomy and emended /improved UC zonation will be discussed at the 2012 Houston Nanno meeting for Nannotax by J. Lees and P. Bown (short visit grants from Earthtime-EU are possible for other interested nanno workers).
- Biostratigraphy - Group meetings in Houston (2010) and London (2011) in industry/NERC sponsored Nannotax will result in improved zonation based on Burnett (1998) UC-zonation, discussion on markers and diachroneity, and improved correlations to stages.
- Following this, for 2013 a session (and workshop) for nannofossil – foram zonation integration at the Cretaceous Symposium, Ankara, Turkey, Sept. 2013, is envisaged as well.

An open call for proposals for science meetings is already formally announced, and applications will be evaluated at steering committee meeting of spring 2012.

4. Final Meeting Programme

Tuesday 4 October 2011

Arrival in Varna

20:00-23:00 Ice-breaker at Azalia hotel, VIP hall "Cinnamon"

Wednesday 5 October 2011, big conference hall of Azalia hotel

- 9:10 Welcome
- 9:15-9:40 Heiko Palike
Introduction to Earthtime-EU RNP (20 min + 5 min questions)
- 9:40-9:55 David Lazarus
Current state of paleontological data management: IODP, Neptune database.
- 9:55-12:55 Plenum Session – key notes
- 9:55-10:45 *(1) Late Cretaceous Biostratigraphy*
Outbreak session chair: Michael Wagreich
Key notes:
- 9:55-10:15 Maria Rose Petrizzo, Brian Huber
Late Cretaceous planktonic foraminiferal biozonation and correlation
- 10:15-10:35 Jackie Lees, Paul Bown
Upper Cretaceous calcareous nannofossil biostratigraphic datum and calibration with PFs & the GTS
- 10:35-10:45 Questions
- 10:45-11:15 *Health Break and Coffee*
- 11:15 – 12:05 *(2) Paleocene – Middle Eocene Biostratigraphy*
Outbreak session chair: Domenico Rio
Key notes:
- 11:15-11:35 Paul Pearson
Paleocene-Middle Eocene planktonic foraminiferal zonation
- 11:35-11:55 Eliana Forniaciari
Paleocene-Middle Eocene calcareous nannofossil zonation
- 11:55-12:05 Questions
- 12:05-12:55 *(3) Late Eocene – Oligocene Biostratigraphy*
Outbreak session chair: Bridget Wade
Key notes:
- 12:05-12:25 Bridget Wade
Late Eocene – Oligocene planktonic foraminiferal zonation

- 12:25-12:45 Tom Dunkley-Jones
Late Eocene-Oligocene calcareous nannofossil zonation
- 12:45-12:55 Questions
- 13:00-14:00 *Lunch*
- 14:00-14:40 *(4) Neogene – Quaternary Biostratigraphy*
Outbreak session chair: Isabella Raffi
Key notes:
- 14:00-14:20 Isabella Raffi
Neogene – Quaternary calcareous nannofossil zonation
- 14:20-14:40 Mariana Filipova
Palynostratigraphy of Quaternary sediments from the Bulgarian Black Sea area
- 14:40-14:50 Questions
- 15:00-18:00 Outbreak sessions - splitting in 2 groups (2 different halls)
- 16:30-17:00 *Health Break and Tea*
- 19:30-21:30 Dinner

Thursday 6 October 2011

- 9:00-13:00 Outbreak sessions
- 10:30-11:00 *Health Break and Coffee*
- 13:00-14:30 *Lunch*
Session Chairs put together report presentations
- 14:30-16:00 Plenum Session
15-20 min presentations each by session chairs with discussions
- 16:00-16:30 *Health Break and Tea*
- 16:30-18:00 General Discussion, big conference hall of Azalia hotel
Chair: Heiko Palike

- Key notes:
- 16:30-16:50 Silke Viogt, Andy Gale
Calibration of Upper Campanian – Maastrichtian nannofossil and foraminiferal events to carbon isotope stratigraphy and the GPTS
- 16:50-17:10 Miguel Garces
Can I trust this magnetostratigraphic correlation?
- 17:10-17:30 Heiko Palike
Progress in Astrochronology and correlation
- 17:30-18:00 General discussion: Integration and calibration of biostratigraphy data to independent chronologies (magneto-, chemo-, and astrochronology); generic problems of taxonomic equivalency, methodological equivalency, biogeography.
- 18:00 End of Workshop
- 19:30 Dinner at Bulgarian folk Restaurant "Kopitoto", St. St. Constantine & Helena resort.

Friday 7 October 2011

- 8:30 h Field trip
Eastern Paratethyan Neogene along the Black sea coast
guided by K. Stoykova
- 19:30 Returning to Hotel Azalia
- 20:00 Dinner

Saturday 8 October 2011

- 10:00-11:00 Visit Archeological Museum - Varna, exhibition of the oldest gold in the world
- 12:00 Departure of all participants

Full List of the participants:

No.	European Biostratigraphers	Country	Location	e-mail
1	Grunert, Patrick	Austria	Institute of Earth Science, University of Graz	patric.grunert@uni-graz.at
2	Wagreich, Michael	Austria	University of Vienna	michael.wagreich@univie.ac.at
3	Filipova, Mariana	Bulgaria	Natural History Museum, Varna	marianafilipova@yahoo.com
4	Stoykova, Kristalina	Bulgaria	Geological Institute, BAS	stoykova@geology.bas.bg
5	Lazarus, David	Germany	Museum für Naturkunde, Berlin	david.lazarus@mfn-berlin.de
6	Mutterlose, Jörg	Germany	Ruhr-Universität Bochum	joerg.mutterlose@rub.de
7	Petrizzo, Maria Rose	Italy	University of Milan	mrose.petrizzo@unimi.it
8	Raffi, Isabella	Italy	Università "G. d'Annunzio", Chieti	raffi@unich.it
9	Rio, Domenico	Italy	University of Padova	domenico.rio@unipd.it
10	Fornaciari, Eliana	Italy	University of Padova	eliana.fornaciari@unipd.it
11	Backman, Jan	Sweden	Stockholm University	backman@geo.su.se
12	Bown, Paul	UK	University College London	p.bown@ucl.ac.uk
13	Dunkley-Jones, Tom	UK	Imperial College	t.dunkley-jones@imperial.ac.uk
14	Gale, Andy	UK	University of Portsmouth	andy.gale@port.ac.uk
15	Lees, Jackie	UK	University College London	j.lees@ucl.ac.uk
16	Pearson, Paul	UK	Cardiff University	PearsonP@cardiff.ac.uk
17	Wade, Bridget	UK	University of Leeds	B.Wade@leeds.ac.uk
	Non-Biostratigraphers			
18	Voigt, Silke	Germany	University of Frankfurt	s.voigt@em.uni-frankfurt.de
19	Garces, Miguel	Spain	University of Barcelona	mgarces@ub.edu
20	Pälike, Heiko	UK	University of Southampton	heiko@noc.soton.ac.uk
	Ph D students, logistic support			
21	Grunchovski, Georgi	Bulgaria	Geological Institute BAS	georgi2801@geology.bas.bg
22	Vergiev, Stoyan	Bulgaria	Natural History Museum, Varna	stvergiev@abv.bg