

**SUBCOMMISSION ON NEOGENE STRATIGRAPHY
ANNUAL REPORT 2012**

1. TITLE OF CONSTITUENT BODY and NAME OF REPORTER

Subcommission on Neogene Stratigraphy (SNS)

Chair: Isabella Raffi, Università "G.d'Annunzio" di Chieti-Pescara, Chieti, Italy

2. OVERALL OBJECTIVES, AND FIT WITHIN IUGS SCIENCE POLICY

The SNS is the primary body responsible for providing optimum clarity and stability in the Neogene Chronostratigraphic Scale by selecting and defining Global Stratotype Sections and Points (GSSPs) for Series and Stages.

3. ORGANIZATION

The SNS is a subcommission of the ICS, founded in 1971. Reference is made to the annual report of 1995 for a brief historical resume of the SNS. The subcommission has four regional committees (Mediterranean, Pacific, Atlantic and Nordic) and keeps close contacts with the Russian Neogene Commission chaired by Prof. Yuri B. Gladenkov. Apart from the executive bureau, the SNS has 21 voting members and 35 corresponding members (*see Appendix for full list of officers and voting members*). The SNS has presently one active working group for defining the GSSP remaining for the Langhian and Burdigalian chaired by Isabella Raffi. The change of the chair of this working group is upcoming, and will be promptly conveyed. The SNS web site (www.geo.uu.nl/SNS) is used for news release and contains the following sections: Home, News, Board, Members, Newsletters, GSSP's, and Links.

Officers for 2012-2016 (from August 1):

Chair: Isabella Raffi, Università "G.d'Annunzio" di Chieti-Pescara, Chieti, Italy

Vice-Chair: Kenneth Miller, Rutgers University, Piscataway, USA

Secretary: Elena Turco, University of Parma, Parma, Italy

4. INTERFACES WITH OTHER INTERNATIONAL PROJECTS

There is a close link with (I)ODP because of its important role in the development of integrated time scales for the Neogene, in testing the global correlation potential of bio-events, and in a better understanding of climate and ocean history during this time span.

5. CHIEF ACCOMPLISHMENTS AND PRODUCTS IN 2012

Election of new bureau

In 2012, elections were held for a new bureau as officers served their full term. Prof. Isabella Raffi was elected in the first round as new chair with a majority vote of 60%. Prof. Kenneth Miller was elected as vice-chair in the second round. Dr. Elena Turco will remain in function as SNS secretary. The new bureau is in the process of making some modifications to the voting member list and corresponding member list, due to the unavailability of some members to actively participate and contribute.

ATNTS2012

In 2012, the new standard geological time scale GTS2012 was published in two volumes by Elsevier (Gradstein et al., 2012). The Neogene chapter, termed ATNTS2012 (Astronomically tuned Neogene Time Scale), was authored by Frits Hilgen, Lucas Lourens and Jan van Dam with contributions of Allen Beu, Andrew Boyles, Roger Cooper, Wout Krijgsman, Jim Ogg, Werner Piller and Douglas Wilson (Hilgen et al., 2012). ATNTS2012 is not very much different from its predecessor, ATNTS2004, as can be expected from an astronomical time scale once the tuning is correct. However, a final tuning still has to be presented for the Early Miocene, but ongoing work on (I)ODP Leg 208 and 320/321 sites is anticipated to solve this problem the coming years. Pliocene deep marine land-based sections of Punta di Maiata and Eraclea Minoa decorate the front covers of the two volumes of GTS2012, signifying the breakthrough made in the Neogene using a combination of integrated high-resolution stratigraphy and astronomical tuning.

Towards defining the Langhian GSSP

The base of the Langhian and thus the Lower-Middle Miocene boundary is widely accepted to be approximated by the *Praeorbulina* datum and a position close to Chron C5Cn, in agreement with common and consolidated practise. However, the historical stratotype at Cessolo with terrigenous and turbiditic sediments in its lower part is less suitable for defining the GSSP. For that reason, two potentially suitable sections for defining the Langhian GSSP were selected in the Mediterranean, namely the downward extension of the La Vedova beach section in northern Italy and St. Peter's Pool on Malta. These sections were studied as part of the Italian research project (PRIN 2006 - prot. 2006047534 - "In

search of the Global Stratotype Sections and Points of the Burdigalian and Langhian Stages and paleoceanographic implications”), directed at defining the remaining GSSPs (Langhian and Burdigalian) in the Neogene. Research papers directed at selecting the most suitable section and guiding criterion for defining the Langhian GSSP were published in a special volume of Stratigraphy in 2011. These papers dealt with the integrated magnetobiostratigraphy (Iaccarino et al., 2011; Turco et al., 2011). In 2012, both sections were extended further into the Burdigalian, while ongoing studies focus on the stable isotope stratigraphy, and cyclostratigraphy and astronomical tuning of these sections. These are considered important criteria for defining GSSPs in the Neogene. The younger La Vedova beach section has been studied in detail and an astronomical tuning established (Hüsing *et al.*, 2010). Also the downward extension covering the interval for defining the GSSP looks promising from an orbital tuning perspective (Iaccarino *et al.*, 2009). A preliminary astronomical tuning and astrobiochronology have been established for the alternative St. Peter’s Pool section on Malta (Lirer *et al.*, 2009). Following these studies a decision can be made in 2013-2014 which section and criterion are most suitable for defining the Langhian GSSP. Evidently, both sections have their strong and weak points and are complementary to each other, with La Vedova having a higher quality magnetostratigraphy and St. Peter’s Pool a better preservation of the calcareous plankton. The latter is important for biostratigraphy and stable isotopes.

6. CHIEF PROBLEMS ENCOUNTERED IN 2012

A problem that remains is the possible lack of suitable sections in the Mediterranean for defining the Burdigalian GSSP. This is certainly the case if we prefer to have the Burdigalian GSSP defined in an astronomically tuned deep marine section in the Mediterranean that directly underlies the geologic time scale. The alternative option to have this boundary defined in (IODP) cores is being seriously considered by the Working Group on the Langhian and Burdigalian GSSPs, and a decision about this issue will probably be made the coming year.

7. SUMMARY OF EXPENDITURES IN 2012:

Credit on Nov 2011	Euro	3968,35
Credit on Nov 2012	Euro	3968,35

8. WORK PLAN, CRITICAL MILESTONES, ANTICIPATED RESULTS AND COMMUNICATIONS TO BE ACHIEVED NEXT YEAR (2013):

The study of the two potential boundary stratotype sections of La Vedova and St. Peter’s Pool for defining the Langhian GSSP will be continued and focus on the astronomical tuning of the sections and the construction of a stable isotope record for St. Peter’s Pool. It is anticipated that a workshop will be held in the second half of next year about the definition of the Langhian and Burdigalian GSSPs. The search for suitable sections and/or cores for defining the Burdigalian GSSP will continue. In absence of suitable Mediterranean sections for defining the Burdigalian GSSP, the option to formally designate this boundary in an ODP core will be seriously considered.

9. BUDGET AND ICS COMPONENT FOR 2013

Organization workshop on Langhian and Burdigalian GSSPs, Italy	Euro 2500
Optional: Fieldtrip to the La Vedova section (base-Langhian)	Euro 1500
Website updating	Euro 3000

10. SUMMARY OF MAIN ACCOMPLISHMENTS OVER PAST FIVE YEARS (2008-2012)

2008

Integrated stratigraphic studies of La Vedova section and its downward extension, the latter section being candidate for defining the Langhian GSSP. Revision and update of SNS website. Preparation of several papers on the definition and status of the Quaternary and Neogene. Preparation of a “Neogene” proposal for the formal ICS voting procedure on the Quaternary-Neogene issue.

2009

Publication of papers by members of SNS on the Quaternary issue (Aubry et al., 2009; McGowran et al., 2009; Van Couvering et al., 2009). Publication in Episodes about the formal definition of the Serravallian GSSP (Hilgen et al., 2009). Ongoing research on La Vedova and St. Peter’s sections.

2010

Preparation of several papers on the two candidate sections for defining the Langhian GSSP for publication in a special volume of Stratigraphy, on the historical stratotype of the Langhian, and on the taxonomic concept of *Praeorbulina*.

2011

Publication of papers about potential Langhian GSSP sections in a special volume of Stratigraphy. Preparation of the Neogene chapter (ATNTS2012) of the GTS2012 (Hilgen et al., 2012, in press).

2012

Publication of the Neogene chapter ATNTS2012 in GTS2012 (Hilgen et al., 2012).

11. OBJECTIVES AND WORK PLAN FOR NEXT 2 YEARS (2013-2014)

- Reorganization and updating of the SNS website.
- Organization of a workshop on the selection of boundary criteria and sections for defining the 2 remaining stage boundaries in the Miocene, namely the base-Langhian and the base-Burdigalian. Potentially suitable sections in the Mediterranean region that may serve as Langhian GSSP have been identified (La Vedova; St. Peter's Pool). Crucial questions to be addressed during the workshop are: 1) which section is most suitable to be proposed as Langhian GSSP, 2) which prime guiding criterion should be selected, and 3) should we abandon the ambition of having the Burdigalian GSSP directly tied within an astrochronologic framework in order to have the GSSP defined in a Mediterranean land-based section, or should we define this GSSP in drilled ODP sequences at Ceara Rise or any other tuned sequence drilled by (I)ODP.

Selection of most suitable section/ODP core and guiding criteria for defining the Langhian and Burdigalian GSSPs before 2014. Writing of proposals for the Langhian and Burdigalian GSSPs in 2013-2015.

APPENDIX [Names and Full Addresses of Current Officers and Voting Members]***New subcommission officers (from August 1, 2012)***

Chairman: Isabella Raffi, [Dipartimento di Ingegneria e Geologia](#), Università degli Studi "G. d'Annunzio" di Chieti-Pescara, Campus Universitario, Via dei Vestini 31, 66013 Chieti Scalo, Italy. E-mail: raffi@unich.it

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Secretary: Elena Turco, Dipartimento di Fisica e Scienze della Terra "Macedonio Melloni", Università degli Studi di Parma, Parco Area delle Scienze 157A, 43124, Parma, Italia. Email: elena.turco@unipr.it

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