



International School on Foraminifera

14th Course

Urbino

5th – 24th June, 2023

First Circular

Course Description

The 14th Course on Foraminifera is designed to provide an overview of the Taxonomy, Ecology, Biodiversity, and Geological History of Benthic and Planktonic Foraminifera. This intensive course is intended for students interested in Micropalaeontology, Palaeoceanography, Palaeoecology, Climate History, Biology, and Environmental applications. The aim is to provide a primer on the study of foraminifera and examples of how foraminifera can be used as (paleo)environmental and (paleo)oceanographical proxies. We review the current classification schemes of the foraminifera, discuss their ecology and life history, review their usefulness for biostratigraphical applications, and use case studies to investigate the geological history of the group with lab and practical sessions. The entire course consists of approximately 60 hours of lectures and 60 hours of practical work.

Course Structure

Four distinct courses are planned: Foraminiferal Introduction (6-10 June), Larger Benthic Foraminiferal Course (11-14 June), Smaller Benthic Foraminiferal Course (16-19 June) and Planktonic Foraminiferal Course (21-24 June).

Teaching Format

The course consists of lectures and practical classes covering the taxonomy, distribution, ecology, and paleoecology of foraminifera. Microscope lab sessions provide the opportunity for participants to learn the foraminiferal genera and species, and view Cretaceous to Neogene foraminiferal assemblages from Petroleum Exploration areas and ODP sites as well as Quaternary and modern assemblages. At the end of each lecture session, different tasks will be assigned to participants to reinforce the knowledge learned. Course materials include the pdf lectures and numerous pdf reprints of classic papers.

Courses Outline

5 June Icebreaker Party

Foraminiferal Introduction

Day 1 (6 June) Kaminski & Frontalini

Welcoming speech and course presentation

Famous Names and Milestones in the Study of Foraminifera
Introduction to Foraminifera & Review of Foraminiferal Suborders
Sample Preparation Techniques
Lab Task 1: Identification of foraminiferal wall composition, coiling, chamber arrangement, and apertures of benthic foraminifera
Lab Task 2: Dividing forms by wall structure, coiling and chamber arrangement
Material: Nova Scotia Agglutinated Foraminifera & Mediterranean Sea

Day 2 (7 June) Kaminski, Cetaan & Frontalini

Morphology and Classification of Benthic Foraminifera
Miliolids, Buliminids and small Rotaliids
Collecting modern foraminifera
Lab Task 1: Identification of benthic foraminiferal genera: wall composition, coiling, chamber arrangement and shape, and apertures
Material: Arabian Gulf and Adriatic Sea

Day 3 (8 June) Kaminski & Cetaan

Introduction to Planktonic Foraminifera and their Classification
Morphology and Classification of Planktonic Foraminifera
Lab task 1: Identification of wall structures, coiling and chamber morphology
Material: Sargasso Sea and South Atlantic

Day 4 (9 June) Hohenegger & Gooday

Biology of Foraminifera
Ecology and taphonomy of foraminifera
Lab 1: Statistical analyses for ecological and paleoecological studies
Lab Task 1: Using statistical program packages

Day 5 (10 June) Pawlowski & Gooday

Introduction to molecular genetics of Foraminifera
Taxonomy, distribution and ecology of monothalamous foraminifera including deep-sea, freshwater and terrestrial species
Lab 1: Observations of living foraminifera
Lab 2: Samples preparation for DNA extraction
Lab 3: Sampling methods for living foraminifera

Larger Benthic Foraminifera

Day 6 (11 June) Hohenegger, Papazzoni & Briguglio

Biology, bauplan and functional morphology, carbonate production (recent)
Most important groups of LBF in the Phanerozoic
LBF morphology using loose specimens, thin sections, microCT
Upper Palaeozoic shallow water Fauna: the Fusulinina Suborder
Shallow water K/T boundary and Palaeocene LBF associations
Lab: MicroCT; Fusulinina in thin sections; Paleocene LBF

Day 7 (12 June) Papazzoni & Briguglio

The Eocene biodiversity (I): Nummulitids
The Eocene biodiversity (II): Orthophragminids
The Eocene biodiversity (III): Alveolinids
Lab: Nummulitids, Orthophragminids, Alveolinids

Day 8 (13 June) Hohenegger, Papazzoni & Briguglio

LBF biostratigraphy, Opperzones and applications
Oligo-Miocene LBF associations
Modern LBF: ecology, distribution (now and future), applications
Lab 1: Lepidocyclinids and Miogypsinids
Lab 2: Paleodepths estimation by means of LBF
Evening Session: "Foraminiferal Party". Slide presentations by ISF participants - five minutes each: five photos, five PowerPoint slides

Day 9 (14 June) Hughes

- Early Carboniferous foraminifera and their use for paleoenvironmental interpretation
Lab and Task 1: Asbian foraminiferal identification using thin sections (paleoenvironment study)
- Late Permian foraminifera of the Middle East and their biosteering application
- Triassic micropalaeontology of the Middle East: age application
Lab and Task 2: Triassic foraminiferal identification using photomicrographs (age determination)
- Jurassic foraminifera of the Middle East: age, paleoenvironment and implications for cycle definition
Lab & Task 3: Jurassic foraminiferal identification using thin sections (age determination)
- Jurassic foraminifera of the Middle East (Oxfordian): age and paleoenvironment
Lab & Task 4: Jurassic (Oxfordian) foraminiferal identification using photomicrographs: paleoenvironment exercise
- Late Jurassic hypersalinity events: foraminiferal & associated microfaunal/floral responses
Lab & Task 5: Jurassic hypersaline foraminiferal identification using photomicrographs: paleoenvironment study
- Cretaceous foraminifera of the Middle East: age, paleoenvironment and implications for cycle definition
Lab & Task 6: Cretaceous (Aptian) foraminiferal identification using photomicrographs: age and paleoenvironment exercise
- Neogene foraminiferal applications in the Red Sea hypersaline-associated succession

Day 10 (15 June) Day off

Smaller Benthic Foraminifera

Day 11 (16 June) Kaminski

- Morphogroups and functional morphology of smaller benthic foraminifera
- Ecology and distribution of benthic Foraminifera
- Lab: Databases, Taxonomy of benthic foraminiferal suborders
- Task 1: Water depth estimation based on SBF
- Task 2: Identification of SBF morphogroups

Day 12 (17 June) Kaminski & Frontalini

- Community Structure, Life History, and Reproduction
- Oceanographic proxies, benthic foraminiferal microhabitats, and productivity/oxygenation
- Benthic foraminifera and water mass properties
- Atlantic and Mediterranean shallow water benthic Foraminifera
- Lab: Modern smaller benthic foraminifera: Foraminiferal genera and assemblages
- Task 1: Productivity/oxygen estimation based on SBF
- Task 2: Environmental Interpretation
- Keynote lecture by Laia Alegret: Deep-sea drilling and the JOIDES Resolution

Day 13 (18 June) Cetaan & Alegret

- Biostratigraphy and Paleoecology of benthic foraminifera
- The ODP record, Cretaceous/Paleogene boundary, Paleocene-Eocene Thermal Maximum, Eocene hyperthermals and late Eocene
- Lab: A review of late Cretaceous to Paleogene faunas and index taxa
- Task 1: Paleodepth estimation based on upper depth limits of SBF
- Task 2: Paleoproductivity/paleoxygen estimation based on SBF

Day 14 (19 June) Kaminski & Foy

- Cenozoic Paleoceanographic events and SBF
- Neogene of West Africa, and Gulf of Mexico: The ACEX Arctic Drilling Expedition
- Lab: The Paleogene record; North Sea, Trinidad, Angola, Carpathians, Gubbio
- A review of Jurassic to late Cretaceous faunas, Bering Sea Pleistocene faunas
- Task 1: Flysch type fauna identification – index taxa
- Task 2: Oxygen minimum zone fauna

Rigs and Stuff
Wellsite Micropaleontology

Day 15 (20 June) Kaminski & Frontalini

Morning field excursion to the Gubbio area
Cretaceous-Paleogene sequence at Contessa Highway and Contessa Road
Paleocene-Eocene Thermal Maximum and other hyperthermals at Contessa Road
Oceanic Anoxic Event 2 “Bonarelli” at Contessa Quarry
K/Pg boundary at Bottaccione
Oceanic Anoxic Event 1a “Selli” at Gorgo a Cerbara
Afternoon tourist visit to Gubbio
Social Dinner

Planktonic Foraminifera

Day 16 (21 June) Julie Meilland

Modern Planktonic Foraminifera
Taxonomy of modern planktonic foraminifera
Structure of cytoplasm, Feeding, Symbionts, Ontogeny
Reproductive and seasonal cycles, Depth habitats
Origin of Planktonic Foraminifera
Biogeography of Planktonic Foraminifera
Faunal Provinces, Climatic Zones and Water Masses
Lab 1: Recent assemblages - wall texture - shell morphology
Task 1: Identification of latitudinal zones based on PF

Day 17 (22 June) Kaminski

Neogene Planktonic Foraminifera
Miocene and Pliocene Planktonic Foraminifera
Pleistocene Planktonic Foraminifera
Biochronology and Zonal schemes
Lab 1: Miocene index species - Pliocene-Pleistocene index species
Task 1: Identification of biozones
Task 2: Identification of glacial and interglacial assemblages

Day 18 (23 June) Petrizzo

Paleogene Planktonic Foraminifera
Biostratigraphy
Notes on Paleooceanography
Lab 1: Paleogene index species
Task 1: Morphology of Paleogene PF
Task 2: Identification of biozones
Aperitif, Graduation ceremony

Day 19 (24 June) Petrizzo

Mesozoic Planktonic Foraminifera
Biostratigraphy
Notes on Paleooceanography
Lab 1: Upper Jurassic to Maastrichtian index species
Task 1: Morphology of Cretaceous PF
Task 2: Identification of biozones

Min number of participants: 20

Final deadline May 1st, 2023

Registration fees

Early registration (registration and payment before February 28th, 2023)

PhD/MSc Students:

One module	Euro 410
Two modules	Euro 640
Three modules	Euro 800
Full course	Euro 910
Academic/Industrial staff:	
One module	Euro 590
Two modules	Euro 900
Three modules	Euro 1100
Full course	Euro 1250

Late registration (registration and payment after February 28th, 2023)

PhD/MSc Students:

One module	Euro 470
Two modules	Euro 770
Three modules	Euro 970
Full course	Euro 1050
Academic/Industrial staff:	
One module	Euro 660
Two modules	Euro 1060
Three modules	Euro 1250
Full courses	Euro 1350

The fee includes:

- lectures 4-day course
- lecture notes, handouts, PowerPoint, pdf of reprints
- icebreaker party
- refreshments
- aperitifs
- excursion
- social dinner

How to register

Registration must be done by submitting the registration form that can be download from <http://isf.tmsoc.org> website, or by sending an email to isf@tmsoc.org

The course fee must be paid to the following bank account:

Registration is upon receipt of payment in Euro (€) by direct bank transfer to:

Account name: Institute for Climate Change Solutions

Bank name: Intesa Sanpaolo S.p.A.

BIC: BCITITMMXXX

IBAN: IT85D0306967684510783725482

Currency of account: Euro (€). (Please contact us for further instructions if you wish to pay in Pounds Sterling, in US Dollars, or by Credit Card).

Reason for payment: participant's name and 14th I.S.F. (e.g. *John Smith – 14th I.S.F.*)

As soon as you have a copy of the bank transfer, please send it by e-mail to isf@tmsoc.org

Correspondence and Information:

isf@tmsoc.org

Lectures

Prof. Michael A. Kaminski, King Fahd University of Petroleum & Minerals (Saudi Arabia)

Prof. Fabrizio Frontalini, Urbino University (Italy)

Prof. Laia Alegret, University of Zaragoza (Spain)

Prof. Antonino Briguglio, University of Genova (Italy)

Dr. Claudia Cetean, Robertson Ltd (UK)

Prof. Andrew Gooday, National Oceanography Centre (UK)

Prof. Johann Hohenegger, University of Vienna (Austria)

Prof. Geraint Wyn Hughes, King Fahd University of Petroleum & Minerals (Saudi Arabia)

Dr. Julie Meilland, MARUM, University of Bremen (Germany)

Prof. Cesare Andrea Papazzoni, University of Modena e Reggio Emilia (Italy)
Prof. Jan Pawlowski, University of Geneva (Switzerland)
Prof. Maria Rose Petrizzo, Milano University (Italy)

Scientific Directors & Coordinators

Prof. Michael A. Kaminski, King Fahd University of Petroleum & Minerals (Saudi Arabia)
Prof. Fabrizio Frontalini, Urbino University (Italy)

Requirements

The course is primarily intended for young researchers at the PhD or MSc stages of their careers and industrial staff working with Foraminifera, Meiofauna, Micropaleontology, Paleocyanography, Paleocology, Climate History. Applicants will primarily be selected on the basis of the relevance of the course for their current work. Because the course is oversubscribed, places on the course are reserved in the order of payments received. Please register early in order to reserve your place.

Location

The course will be held in Urbino at the “Collegio Internazionale”. The “Collegio Internazionale” is in the historic center of Urbino, two blocks from the main square please visit, <http://www.collegiointernazionaleurbino.it/en/1/galleria-immagini.html>.

Accommodation and meals

It is possible for participants to book accommodation at the “Collegio Internazionale” University Hall). Most of the rooms are double-occupancy and have en-suite bathrooms, only a few single rooms are available and will be assigned in enrollment order upon request. The rooms are furnished, air-conditioned, clean and comfortable. The cost of the accommodation is € 18 in double and € 25 in single per night (breakfast not included) for students and is € 28 in double and € 35 in single per night (breakfast not included) for academic and industrial staff. The accommodation cost is paid upon your arrival by debit/credit card at the reception desk of Collegio Internazionale. Cafeteria meals may be obtained by a rechargeable debit card (each participant will receive a meal card at reception) at the nearby university residential block in the "Mensa del Duca" (1-minute walk from the Collegio Internazionale). The cost is € 9 for a complete meal (first course, main course, side dish, bread, fruit and water), € 6 (main course, side dish, bread, fruit and water) or € 5 (first course, side dish, bread, fruit and water). Urbino City Tax € 7.50 for the entire stay.

Insurance

The registration fees do not include insurance of any kind. Participants are advised to take out appropriate insurance, including cover for travel, accommodation, medical assistance and personal possessions.

The second circular with detailed information about the course is scheduled to be distributed in early March 2023 and will be sent to people who replied to the first circular.

We look forward to seeing you in Urbino!

For more information, please visit our new website at www.isf.tmsoc.org/

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