

Micropaleontology and Stable Isotope Geochemistry of Stratigraphic Boundaries

206-25381 – 3 credits

Dr. Sigal Abramovich

Syllabus

Course Description: This is an interdisciplinary course in which students will use micropaleontology and stable isotope geochemistry of carbonates to interpret stratigraphic boundaries that mark major events in earth's history. The purpose of the course is to learn how microfossils (i.e. foraminifera, calcareous nannofossils) and carbon and oxygen isotopes are applied to the study of stratigraphic boundaries and palaeoecology. The course will include two field trips for practicing fieldwork techniques and collecting samples. Field trips will be followed by lab sessions in which students will practice sample processing techniques, fossil identification and collection, and stable isotope measurements.

Course goals- The aims of this course are to provide students with practical issues of micropalaeontology, develop skills in the acquisition of quantitative scientific data and their subsequent analysis in terms of paleoecological interpretations. Students will learn to obtain and process, quantitative micropalaeontological and geochemical data and apply it to stratigraphical and palaeobiological problems.

Course format: Lectures sessions will be dedicated for both theoretical and practical issues including: application of micropaleontology in stratigraphic and paleoecological studies, foraminifera, and calcareous nannofossils as bio and geo indicators, stable isotope geochemistry of foraminifera, etc.

A research project will be assigned to a group of two or three students following the two field trips. Each research project represents a stratigraphic/and or paleoecological problem that requires collection, processing, and interpretation of quantitative data that will be carried out during the lab sessions.

Bibliography

Fischer, G and Wefer, G., 1999 Use of proxies in paleoceanography, example from the south Atlantic. Springer-Verlag Berlin

McGowran, B., 2005. Biostratigraphy, microfossils and geological time. Cambridge University Press.

Murray, J., Ecology and applications of benthic foraminifera. Cambridge University Press.

Williams, M., Haywood, A. M., Gregory, F.J., Schmidt, D., N. 2007. Deep time perspectives on climate changes. The Micropalaeontological Society, Special publication.

Falkowski, P.G. and Knoll, A.H. 2007. Evolution of Primary Producers in the Sea. Elsevier Academic Press.

Thierstein, H. R. and Young, J. R. 2004. Coccolithophores: From Molecular Processes to Global Impact. Springer-Verlag Berlin Heidelberg.

Perch-Nielsen, K. 1985. Mesozoic calcareous nannofossils. In: Bolli, H.M. Saunders J. B. and Perch - Nielsen K. eds. Plankton stratigraphy. Cambridge University press, Cambridge. pp. 329 - 426.

Course Requirements

1 hr lecture

3 hr tutorial

2 day excursion

Grading

40% presentation

60% final report of the research project