

Dead Sea as an analogue for the deep sea – 2 credits

Course Number: 224.4090

Lecturer: Prof. Nicolas Waldmann

Office Hours: Monday 12:00-14:00, Multipurpose Building – Room 130, tel.
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Course Type: Fieldtrip (3 days of fieldwork)

Course Level: MSc/ PhD

Prerequisites: No

Course Description:

Lakes can serve as analogues to oceans. As such, sediments from the Late Pleistocene Dead Sea (Lisan Formation) hold valuable information on processes occurring in deep sea environments. Moreover, other structures and sedimentary units that developed in the Dead Sea basin (such as the Sedom diapir) provide excellently exposed analogues to processes occurring in deep sea environments, such as the Messinian Salinity Crisis in the Levant Basin.

In the current fieldtrip, we will visit several sites in which excellent preservation of sedimentary structures, associated facies, and other features (such as faults, salt diapir, and different sedimentary units) are preserved in excellent fashion. We will map, log, and describe these units in detail in order to better understand sedimentary processes in deep water environments, while concurrently learning about the evolution of the Dead Sea Basin. Moreover, we will also learn about the important role that the Dead Sea basin plays in shaping the geological history of the Levant region.

Topics:

1. Lakes as analogues of deep sea settings.
2. Interplay between tectonic and climate in shaping sediments in an active tectonic basin.
3. Active hydrocarbon seepage and its interrelationship with the evolution of the pull apart Dead Sea structure.
4. Lake sediments as proxies for climate change and tectonism.
5. The impact of lake level fluctuations in the sedimentary settings.
6. Practical utilization of field techniques in paleolimnology.

Learning Outcomes:

At the end of the course, students will be able to:

1. Understand the different processes occurring in deep water systems and how these are interpreted in the geological record.

2. Carry out sedimentological studies in the field, including measurements and description of stratigraphical columnar sections, sample retrieval, analytical laboratory work and preparation of reports.

Requirements: Report.

Grading: Participation in the excursion and report.

Reading List:

1. Birks, H.J.B., Lotter, A.F., Juggins, S. and Smol, J.P. eds., 2012. Tracking environmental change using lake sediments: data handling and numerical techniques (Vol. 5). Springer Science & Business Media.
2. Kemp, A.E. and Kemp, A.E. eds., 1996. Palaeoclimatology and palaeoceanography from laminated sediments. Geological Society of London.
3. Niemi, B.A.G., 1997. The Dead Sea: the lake and its setting (No. 36). Oxford University Press, USA.