

224.5001 – From the Tethys to the Mediterranean

Second semester

Time:

Instructor: Prof. Nicolas Waldmann

Office Hours: Monday from 12:00 until 12:00, Room 130, 04-8280736

Teaching Assistants & Office Hours: No teaching assistance was requested

Course Type: Two lectures followed by 2 days fieldtrip

Course Level: MSc/PhD

Pre-Requisites: Introduction to geology

Students that have official letters stating the needed academic adjustments are welcome to contact me during office hours or by email as early in the semester as possible.

Course Overview:

The boundary between Eurasia and Gondwana (currently the suture between Eurasian and the African plates) has been the site of violent tectonic deformation and changing geography since the Triassic. The Mesozoic seas of this zone and their extension into the Himalayan region are known as the Tethys Sea, while the Tertiary seas are usually called the Mediterranean.

In the present course we aim to trace the history of the region, from the breakup of Pangea at the end of the Triassic through the present times. The course includes preliminary frontal lectures on the general geology of the region, which will provide the necessary background information to be learned prior to a 3 days

fieldtrip. The students will learn about the different processes occurring through time, from the evolution of the carbonate platform to its demise and replacement by a siliciclastic environment. Furthermore, emphasis will be made to understanding deep-water marine processes as identified in the geological record, such as mass transport deposits (e.g. Eocene outcrops), sedimentary facies in reef settings (e.g. Carmel Mountain) and deep-water diagenetic processes (e.g. Upper Galilee). Apart of understanding the evolution of the region from the Jurassic onwards, the students will learn about the interplay between the geology, landscape evolution and a pinch of human occupation, which have left important impacts in the region's history.

The course includes:

1. two introductory sessions to provide the background (**TBA**)
 - i. The birth of the Mediterranean Sea – NW 7.3.21
 - ii. Geology and geomorphology of Israel – NS 11.3.21
2. one session after our return from campus (**date and time to be communicated latter**)
3. three field trip days (**May 28-29, 2024**)

Topics:

1. Geological history of the Levant region from the Jurassic until the present.

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

4. Understand and learn about the general geological framework of the Levantine region since the Jurassic until present day.
5. Correlate the information gathered from the outcrop with the geological setting of the deep Levant Basin in the East Mediterranean.

6. Learn about the evolution of the landscape in light of changing climate and tectonic conditions.

Requirements: Report and synthesis of a specific subject in a frontal class presentation.

Grading: Final assignment - 100%.

*The final assignment is composed of **the field trip summary** including all the explanations given during the field trip by both supervisors + 1 enlarged chapter (of your choice from a list of subjects to be distributed, up to 1000 words).*

Reading List:

1. Avni, S., Joseph-Hai, N., Haviv, I., Matmon, A., Benedetti, L. and Team, A.S.T.E.R., 2019. Patterns and rates of 103-105 yr denudation in carbonate terrains under subhumid to subalpine climatic gradient, Mount Hermon, Israel. *Bulletin*, 131(5-6), pp.899-912 .
2. Bachmann, M. and Hirsch, F., 2006. Lower Cretaceous carbonate platform of the eastern Levant (Galilee and the Golan Heights): stratigraphy and second-order sea-level change. *Cretaceous Research*, 27(4), pp.487-512.
3. Frumkin, A., Barzilai, O., HersHKovitz, I., Ullman, M. and Marder, O., 2019. Karst terrain in the western upper Galilee, Israel: Speleogenesis, hydrogeology and human preference of Manot Cave. *Journal of human evolution*, p.102618.
4. Homberg, C. and Bachmann, M. eds., 2010. Evolution of the Levant margin and western Arabia platform since the Mesozoic. *Geological Society of London*.
5. Gardosh, M., Druckman, Y., Buchbinder, B. and Rybakov, M., 2008. The Levant Basin offshore Israel: stratigraphy, structure, tectonic evolution and implications for hydrocarbon exploration (p. 118). *Geophysical Institute of Israel*.