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The history of the Nahariya Submarine Canyon, offshore northern Israel, from sedimentary down core records and foraminiferal analyses

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Submarine canyons are prominent features in continental slopes. They play an important role in sediment transport to the deep sea, as they form conduits for turbidity currents and cause landslides due their steep slopes. Such mass transport events could create geo-hazards, which compromise infrastructures along the continental slope.

Our research focuses on the Nahariya Canyon, which is part of a series of submarine canyons located along the continental slopes of the eastern Mediterranean, offshore northern Israel. This canyon is incised into the slope and does not reach the shelf. Here, we report the results from a study of two piston cores sampled in the canyon at water depths of 650m (NAC650, ~2.5m long) and 915m (NAC915, ~6m long). Chronologies were established based radiocarbon dating using slope foraminiferal shells, in addition to ²¹⁰Pb and OSL dating of bulk sediment. The sediments were characterized by major and trace element concentrations, mineralogy, grain size, and dead foraminiferal assemblages. We further identified the living (Rose-Bengal stained) foraminiferal species at three depths habitats (200m 650m and 915m water depth).

Our results show that both piston cores are comprised of a capping ~40 cm thick interval of fine laminated mud, deposited over the last ~150-200 years, apparently reflecting hemipelagic sedimentation. This capping interval unconformably overlays a consolidated sequence in both cores, which indicates a major sediment removal. The consolidated sequence in NAC650 is mostly homogenous and dates to the previous glacial (>140 ka), and in NAC915 the upper 70 cm of the consolidated sequence consists mud clasts dated to 27-46 ka that overlay an 'S shape' shear zone, which is a result of a down canyon mass wasting (debrite). Below that debrite, the sediment is mostly homogenous and dates to the last glacial (>25 ka). Broken shells of shallow benthic foraminiferal species such as *Ammonia* spp., *Asterigerinata mamilla*, *Miliolids*, *Rosalina* spp. and

Sorites orbiculus are found abundantly throughout both piston-cores, varying between in-core intervals, indicating that allochthonous sediments are prevalent at those cores. Some shallow species are found also in the surface (living) assemblages, mixed with slope deep foraminiferal species. Moreover, the deep living foraminiferal shells are well preserved, in contrast to the shallow living species. Taken together, these indicate that sediment transport processes along the canyon exist to this day.

The cores suggest that the canyon is an erosive environment at least since the last glacial maximum, when the last significant mass wasting deposit is recorded. The Holocene is not represented in the records, probably due to the dominance of erosion processes, except for a thin layer of sediment deposited over the last two centuries that prevails along the entire canyon.