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Insights on the evolution of a recent slide complex: A case study of the Goliath Slide, offshore southern Israel

Matan Elad (1), Revital Bookman (1), Ahuva Almogi-Labin (2), Gadol Omri (3), Yizhaq Makovsky (1,3)

(1) The Dr. Moses Strauss Department of Marine Geosciences, Leon H. Charney School of Marine sciences, University of Haifa, Israel., (2) Geological Survey of Israel, 30 Malkhe Israel, Jerusalem, 95501., (3) The hatter Department of Marine Technologies, Leon H. Charney School of Marine sciences, University of Haifa, Mt. Carmel, Haifa 31905, Israel.

Submarine slides play a significant role in shaping the structure of continental margins, via transport of large amounts of sediments from the continental slope towards the deep basin. Yet, important parameters of submarine slides, such as timing and frequency, are often poorly constrained. A multi-proxy approach was applied to sediment cores from the head scar (PHS) and toe (PTL) domains to unravel the structure, stratigraphy and recent evolution of the Goliath Slide Complex, offshore southern Israel. Our integrated analysis divides the sedimentary sequence in the head scar into two different generations of deposits, separated by the slide detachment surface. Two concordant 14C ages were obtained for the sediments immediately overlying this surface, suggesting that the northern head scar was formed during one major event that occurred 7.6±0.1 cal ka BP. The age-model of core PHS-5 reveals a major age-gap of ∼19 kyrs at the slide detachment surface, and also suggests the existence of a hiatus in the upper Holocene sedimentary sequence that covers the time period of ∼6.2 to ∼2.5 ka BP. These age-gaps are also constrained by the planktonic foraminifera assemblage and correspond with significant changes in the sediment density and magnetic susceptibility. Results from the toe domain show a 1.2 m long continuous undisturbed sequence that represents the last ∼14 ka BP and includes the sapropel S1 layer. This sequence overlies three disturbed units interpreted as mass transport deposits (MTD). Various deformation features, sharp contacts and shear surfaces within these units suggest that they underwent significant modification during transport. The 14C age at the base of the undisturbed sequence is 13.99±0.17 cal ka BP, representing the minimum age of the sliding event that transported the MTD units. The age-model of core PTL-3 shows that the ages of the MTD units are substantially older (18.6 to 28.9 cal ka BP) than above it. The age-model also reveals an age-inversion within the MTD sequence, which supports the interpretation of these units as slide-related. The timing of the delineated Goliath sliding events corresponds with a period of rapid sea-level rise following the last deglaciation, accompanied by high sedimentation rates and increased riverine influx from the Nile River. Together these may have promoted slope instability and acted as preconditioning factors to the sliding events. In addition, the Goliath ∼14 ka BP event corresponds with the occurrence of cave seismites in the Soreq Cave, located 40 km to the West of the tectonically active Dead Sea Transform, suggesting that a significant earthquake might have triggered this event. The multi-disciplinary approach has proven to be useful when interpreting complex sedimentary sequences such as slide scars, and provides key insights regarding the development of the Goliath Slide Complex through time.