



Sediment budget along cliff dominated coasts in the eastern Mediterranean during single storm to seasonal time scales

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Understanding the evolution of rocky coasts remains a fundamental knowledge gap in coastal research. In this context, the contribution of sea-cliff sediments to the coastal sediment budget and to the evolution of rocky coasts is rarely quantified. Here, we quantified the volumetric changes that occurred during 3 years (2013-2016) along a 190 m section of a rocky coast along Israel's Mediterranean coastline. We used high resolution (~ 1 cm) ground based LiDAR to scan both the beach and the sea-cliff at weekly to seasonal time intervals. Our measurements show the expected seasonal pattern of beach evolution: erosion during fall and winter and accumulation during spring and summer. We found that the beach can temporarily accumulate large volume of sediments during a single winter storm, but this does not change the overall erosional regime during the winter. The sea cliff and taluses erode all year round. The flux of sediments eroded from these features depends on both the talus properties and storms frequency and characteristics. These sediments accumulate on the beach during spring-summer and can explain up to 60% of the total sediments accumulated on the beach during these seasons. On the other hand, during fall-winter the erosional products of the cliff and taluses do not accumulate on the beach. Our findings suggest that the collapse and erosion of sea cliffs have an important role in the evolution of rocky coasts and significant implications to mitigation efforts of sea cliff retreat.