



Anthropogenic-enhanced erosion following the Neolithic Revolution in the Southern Levant: Records from the Dead Sea deep drilling core

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In addition to tectonics and climatic changes, humans have exerted a significant impact on surface erosion over timescales ranging from years to centuries. However, such kind of impact over millennial timescales remains unsubstantiated. The Dead Sea drainage basin offers a rare combination of well-documented substantial climate change, intense tectonics and abundant archaeological evidence for past human activity in the Southern Levant. It serves as a natural laboratory for understanding how sedimentation rates in a deep basin are related to climate change, tectonics, and anthropogenic impacts on the landscape. Here we show how basin-wide erosion rates are recorded by thicknesses of rhythmic detritus laminae and clastic sediment accumulation rates in a long core retrieved by the Dead Sea Deep Drilling Project in the Dead Sea depocenter. During the last ~ 11.5 kyr the average detrital accumulation rate is ~ 3 -4 times that during the last two glacial cycles (MIS 7c-2), and the average thickness of detritus laminae in the last ~ 11.6 kyr is ~ 4.5 times that between ~ 21.7 and 11.6 ka, implying an increased erosion rate on the surrounding slopes during the Holocene. We estimate that this intensified erosion is incompatible with tectonic and climatic regimes during the corresponding time interval and further propose a close association with the Neolithic Revolution in the Levant (beginning at ~ 11.5 ka). We thus suggest that human impact on the landscape was the primary driver causing the intensified erosion and that the Dead Sea sedimentary record serves as a reliable recorder of this impact since the Neolithic Revolution.