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The dramatic drop of the Dead Sea at 0.44 km^3/a and its recently (1932-2007) formed terraces

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The Dead Sea has experienced a continuous drop in level since the beginning of the twentieth century, mainly due to human activities. This drop formed a unique landscape of shore-line terraces that present an excellent model to study the changes in the Dead Sea level and to evaluate the related hydrological conditions. Three cross sections of these terraces were surveyed using DGPS. The levels of the terraces were correlated to the recorded levels of the Dead Sea in order to determine their ages. Moreover, the changes in the water volume and surface area of the Dead Sea were calculated from SRTM data using Arc GIS. The surveyed cross-sections show that the Dead Sea has declined from -389 m in 1932 to -399 m in 1979 with an average of 0.2 m/a. In this relatively long period, only seven terraces, with large dimensions, can be recognized. This could be due to a relatively slow drop and prolonged times of still stands of the water level that allowed the waves to erode such wide terraces. However, the intensive consumption of the Dead Sea water in the last 27 years caused an accelerated drop from -400 m in 1980 to -419 m in 2007 with an average of 0.7 m/a. In this relatively short period, 25 terraces were formed but with smaller dimensions. This is interpreted as a result of the fast recession and of the short period of constant water level that have not allowed the waves to form wide terraces. The model of the water volume and area shows that the Dead Sea has lost 9 km^3 of its volume between 1932 and 1979 with annual average of 0.18 km^3/a and 465 km^2 from its area with an average of 9.5 km^2/a. In the period (1980 – 2007) the water volume of the Dead Sea decreased dramatically from $\sim$ 157 km^3 at a level of -400 m to $\sim$ 145 km^{3}at a level of -417 m with an average of 0.44 km^3/a. Such modeling provides excellent predictive possibilities that can be used in the hydrological, environmental and economic

planning of the Dead Sea basin and the projected Red Sea- Dead Sea channel.