

Environmental Toxicology and Biological Systems

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Statement of the Problem: The coastal area of the hypersaline terminal lake of the Dead Sea is a unique area of dry land of the lowest elevation on Earth (-420 m a.s.l.). The Dead Sea has been drying up over the last four decades: the water level has dropped at the rate of approximately 1 m year. The Dead Sea drying up is due to climate change in the Eastern Mediterranean, which is expressed by the lack of water inflow from the Jordan river, a decreasing tendency in rainfall over the last 40 years and increasing evaporation. Climate change in the Eastern Mediterranean is accompanied by a positive feedback loop between the shrinking of the Dead Sea and the increasing trend in Dead Sea surface temperature (SST) of 0.6°C per decade. This is caused by increasing evaporation and the continuing disappearance of the Dead Sea.

Methodology & Theoretical Orientation: To estimate the effect of climate change in the Eastern Mediterranean on the Dead Sea, we analyzed yearly data of Dead Sea water levels based on available measurements from 1992 until the present. Several factors could influence the observed Dead Sea water level drop, such as long-term changes in evaporation, in SST, in solar radiation and in near-surface wind. To estimate long-term trends in SST, satellite MODIS data were used.

Conclusion & Significance: We found that there is a positive feedback loop between Dead Sea shrinking and increasing SST. Additional heating of Dead Sea surface water (as a result of Dead Sea shrinking) is leading to an increase in water evaporation, consequently, to some additional decrease in Dead Sea water levels, eventually to subsequent shrinking of the Dead Sea water area. This positive feedback loop leads to acceleration in the Dead Sea water level drop causing a continuing hazard to this hypersaline lake.

Recent Publications

1. Kishcha P, Pinker R, Gertman I, Starobinets B and Alpert P (2018) Observations of positive sea surface temperature trends in the steadily shrinking Dead Sea. *Natural Hazards and Earth System Sciences Discussion* 2018:1–15.
2. Kishcha P, Starobinets B, Gertman I, Ozer T and Alpert P (2017) Observations of unexpected short-term heating in the uppermost layer of the Dead Sea after a sharp decrease in solar radiation. *International Journal of Oceanography* 2017:1–12.
3. Kishcha P, Starobinets B, Savir A, Alpert P and Kaplan M (2017) Foehn-