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Energy Balance, Evapo-transpiration and Dew deposition in the Dead Sea Valley

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The Dead Sea is a unique place on earth. It is a terminal hypersaline lake, located at the lowest point on earth with a lake level of currently -429 m above mean sea level (amsl). It is located in a transition zone of semiarid to arid climate conditions, which makes it highly sensible to climate change (Alpert1997, Smiatek2011).

The Virtual Institute DEad SEa Research Venue (DESERVE) is an international project funded by the German Helmholtz Association and was established to study coupled atmospheric hydrological, and lithospheric processes in the changing environment of the Dead Sea. At the moment the most prominent environmental change is the lake level decline of approximately 1 m / year due to anthropogenic interferences (Gertman, 2002). This leads to noticeable changes in the fractions of the existing terrestrial surfaces – water, bare soil and vegetated areas - in the valley. Thus, the partitioning of the net radiation in the valley changes as well. To thoroughly study the atmospheric and hydrological processes in the Dead Sea valley, which are driven by the energy balance components, sound data of the energy fluxes of the different surfaces are necessary. Before DESERVE no long-term monitoring network simultaneously measuring the energy balance components of the different surfaces in the Dead Sea valley was available. Therefore, three energy balance stations were installed at three characteristic sites at the coast-line, over bare soil, and within vegetation, measuring all energy balance components by using the eddy covariance method.

The results show, that the partitioning of the energy into sensible and latent heat flux on a diurnal scale is totally different at the three sites. This results in gradients between the sites, which are e.g. responsible for the typical diurnal wind systems at the Dead Sea. Furthermore, driving forces of evapo-transpiration at the sites were identified and a detailed analysis of the daily evaporation and dew deposition rates for a whole annual cycle will be presented.

Alpert, P., Shafir, H., & Issahary, D. (1997). Recent changes in the climate at the Dead Sea–a preliminary study. Climatic Change, 37(3), 513-537.

Gertman, I., & Hecht, A. (2002). The Dead Sea hydrography from 1992 to 2000. Journal of marine systems, 35(3), 169-181.

Smiatek, G., Kunstmann, H., & Heckl, A. (2011). High-resolution climate change simulations for the Jordan River area. Journal of Geophysical Research: Atmospheres (1984–2012), 116(D16).