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# SPATIAL AND TEMPORAL VARIABILITY OF THE ECOLOGICAL SYSTEM OF A SEASONAL SOLAR SALTWORKS (KALLONI IN LESVOS ISLAND): IMPLICATIONS FOR SALT PRODUCTION

**F. CHRISTOFORIDOU[1], F. VLATSIOTOU[1], G. TSIRTSIS[1], M. KARYDIS[1], and N. KOROVESIS[2]**

[1]Dept of Marine Sciences, University of the Aegean, University Hill, 811 00 Mytilini, Greece, [2]Hellenic Saltworks S.A., 1, Asklipiou str., 106 79 Athens, Greece
E-mail: gtsir@aegean.gr

## EXTENDED ABSTRACT

The spatial and temporal variability of the ecological system of a seasonal solar saltworks is studied in the present work. The fieldwork was carried out in the saltworks of Kalloni, island of Lesvos, Greece, covering an area of 2.5 $Km^2$, with an annual production of 30000 to 40000 tons of sodium chloride. Physical (temperature and density), chemical (phosphate, silicate and ammonia in the water column) and biological parameters (chlorophyll α concentration in the water column and the sediment) were measured during summer at the seawater intake of the saltworks, four concentrating ponds of low, intermediate and high density and two crystallizers.

Considerable spatial variability was observed among the ponds, reflecting the different phases that the ecological system passes from the seawater intake, to the concentrating ponds and the crystallizers. The density gradient was maintained constant throughout the summer period, ranging from 4 Baume in the seawater intake to around 30 Baume in the crystallizers. A trend of increasing values was also recorded for temperature from the ponds of low density (around 26$^oC$) to the crystallizers (28-30$^oC$). Temporal variations were observed for most of the chemical and biological parameters in the intake and concentrating ponds, whereas the ecosystem of the crystallizers showed rather low variability. Phosphate and ammonia have shown a trend of increasing values along the density gradient. Phosphate concentration increased from below 2 μg-at P/l in the ponds of low salinity to about 10 μg-at P/l in the crystallizers. Ammonia concentration was relatively low, ranging from 0.5 μg-at N/l in the seawater intake to around 1.0 μg-at N/l in the crystallizers. The maximum values of silicate and chlorophyll α in the water were measured at the concentrating ponds of low and intermediate salinities, being 113.5 μg-at Si/l and 31.9 μgr/l, respectively.

The functioning of the brine biological system is very important in the seasonal solar saltworks, helping or harming salt production. The present work is a first approach towards the development of a quantitative methodology aiming at the understanding of the ecological processes in the brine ecosystem, in order to support management practices for high quality salt production.

**Key words:** seasonal solar saltworks, brine ecosystem functioning, phytoplankton, nutrients