Wetland dynamics of Lake Neusiedl and soda pans measured by using high-resolution probes

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Abstract

A network system of online-measurement of water quality for the water bodies Lake Neusiedl and soda pans has been installed in 2017, recording raw data at a three-minute time interval. Peak values and the range between maximum-minimum values on a daily basis on the one hand and the annual development of daily means with seasons on the other hand are used to identify abiotic stress by natural environment most relevant for the inhabiting biota. In this poster presentation we provide just a few examples on tracking habitat change, which are relevant for the wetland district Seewinkel due to recent impact of global warming.

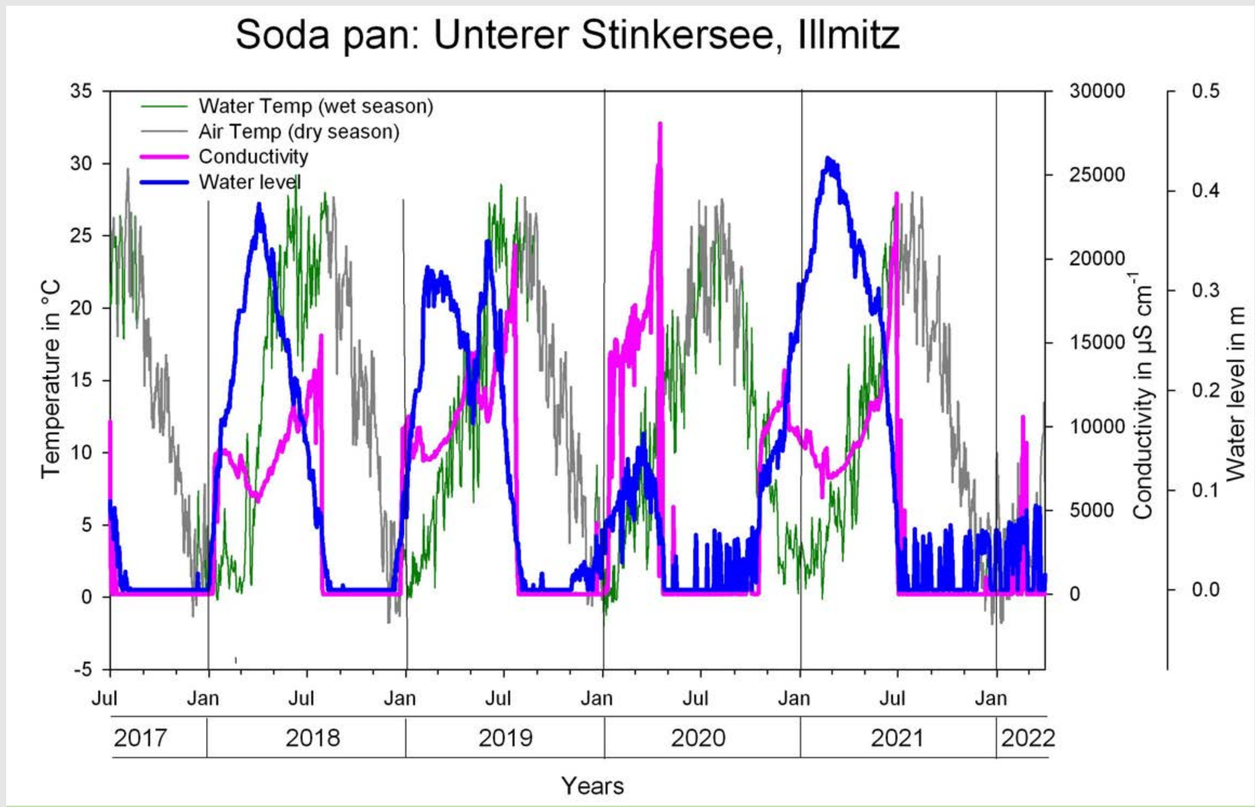

Figure 3: Time series of water level, temperature and conductivity for the soda pan Unterer Stinkersee, 2017 to 2022, PLS_C probe, daily means.

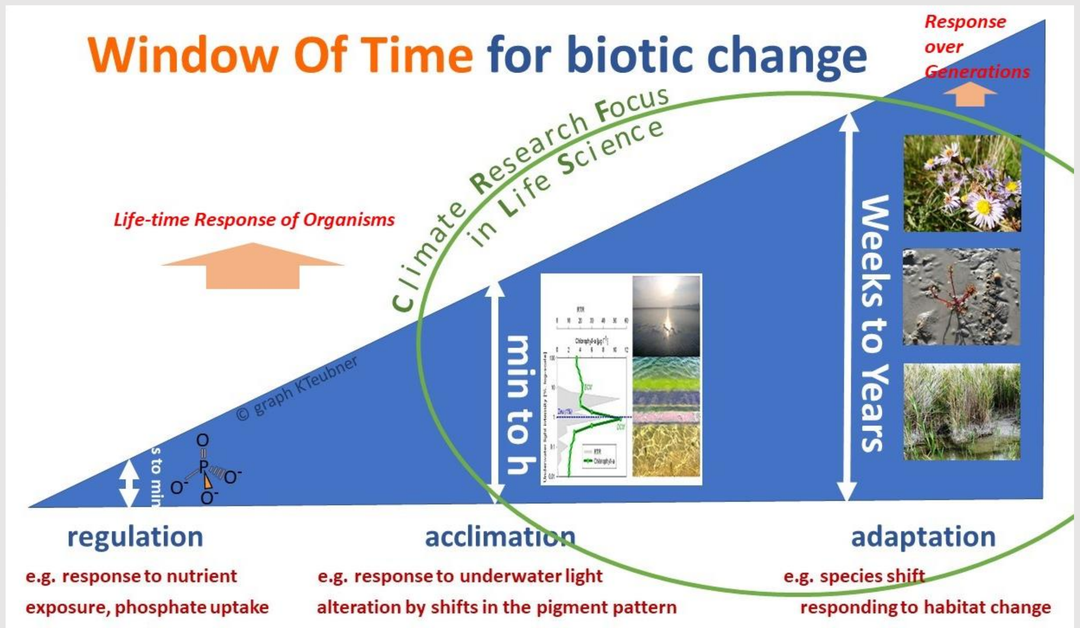

Figure 1: Biotic response at different time-scales of environmental change: regulation, adjustment and adaptation

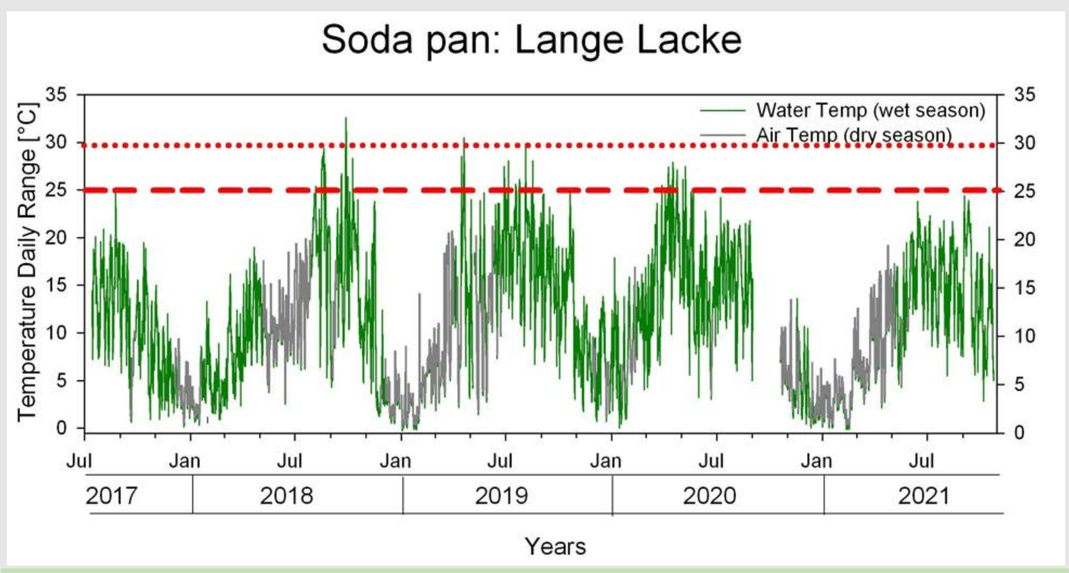

Figure 2: Day-Night temperature range for soda pan Lange Lacke, based on PLS_C-data with time resolution of three minutes.

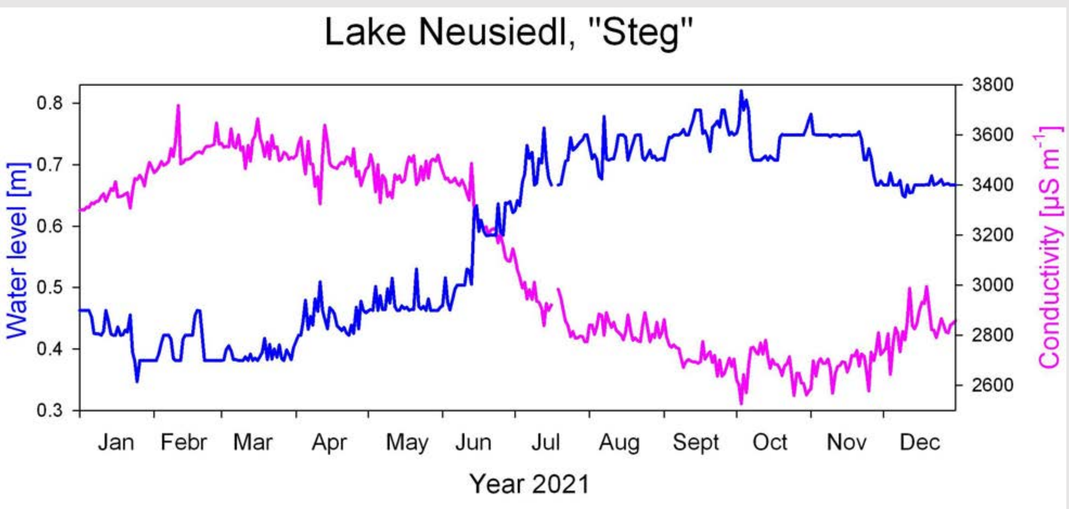

Figure 4: Inverse development of water level and conductivity with seasons in Lake Neusiedl. PLS_C and Hydrolab-Data, daily means.

Time-scales of habitat change relevant for biota

The biotic response to environmental change relates to different time scales (**Figure 1**). The biotic response of short-term action within seconds and minutes is defined as **regulation**, and concerns e.g., the ability of algal organisms to utilize ephemeral nutrient pulse concentrations. The biotic response accomplished by pigment **acclimation**, which means that e.g. photosynthetic organisms can modify their pigment pattern according to the availability of ambient light sources, can be observed within minutes to hours – and thus concerns, among others, the dial cycle of environmental change. These both, the biotic regulation and adjustment, are vital elements of life-time response of organisms. The shift among species within biotic assemblages, however, is a shift over generations, named **adaptation**, lasting much longer, even for years, and among others it depends on the life-span of organisms living in the habitat. Such time window can be linked even to the evolution of biota, and is of interest when following the biotic response to global change.

Our network system of online-measurement of water quality (PLS_C and Hydrolab measuring probes) for the water bodies Lake Neusiedl and soda pans is aimed at tracking habitat change on various times scales most relevant for the biotic response of wetland organisms. The high resolution data are used to identify environmental stress throughout the dial cycle as exemplified for the day-night time range of temperature on surface water of the soda pan in **Figure 2**. The seasonal changes tracked by daily means illustrate the high intra-annual dynamic of the soda pan environment Unterer Stinkersee controlled by the water level as shown in **Figure 3**. Finally, **Figure 4** identifies an annual cycle of inverse development of water level and conductivity in Lake Neusiedl and thus underpins the vulnerability of this soda lake against global warming.

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