

## **DEVELOPMENT OF A LOW-COST SENSOR FOR ESTIMATING THE DIFFUSE ATTENUATION COEFFICIENT IN COASTAL WATERS**

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Light availability is an essential factor in the water column, as it plays a vital role in the regulation of physical and biogeochemical processes in the upper layer of the ocean. It is important to comprehend the behavior of light underwater if scientists and citizens desire to evaluate water quality conditions in coastal and inland waters. An important optical property used to assess the penetration of light in the water column is the diffuse attenuation coefficient ( $K_d$ ). Recent studies have reported the development of economic sensors to measure the diffuse attenuation coefficient in natural waters. However, their availability remains relatively low, and expensive sensors are still used as the standard instrumentation. The main goal of this study is to describe a DIY low-cost sensor system using Hobo's loggers (Onset Computer Corp.) as a low-cost alternative for collecting optical data and calculating  $K_d$  over more high-end sensors, such as the Solar Light Quantum Photosynthetically Available Radiation (PAR) sensor. Both sensors were placed side-by-side on a frame and deployed in clear, oligotrophic oceanic waters (low  $K_d$  values) to coastal areas (intermediate  $K_d$ ) and lakes and river mouths where the  $K_d$  was highest. Throughout all areas, both sensors showed comparable  $K_d$  values with slight errors attributed to external environmental factors. Access to low-cost light sensors systems, such as the one described here, can provide reliable measurements of  $K_d$  and increase the number of water quality observations by citizen scientists worldwide.