Comparing water transparency measurements obtained with low-cost citizen science instruments and high-quality oceanographic instruments

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The low cost moored system **KdUINO** allows to measure parameters related to water transparency, specifically the diffuse attenuation coefficient parameter. In this contribution, its measurements are compared with other high precision scientific commercial instrument in order to estimate the sensor measurement error.

What is water transparency and how can we measure it?

Water transparency is a measure of the depth of light penetration into the water. The transparency of natural water is affected by the presence of dissolved organic matter, sediment load and phytoplankton. It is a water quality indicator.

Voluntary Contribution (Citizen Science)

Citizen science projects take advantage of low-cost technologies and citizen collaboration to get big amount of data.

Advanced Oceanographic Instruments

Advanced oceanographic radiometers measure water transparency with high-resolution radiance and irradiance optics, such as the PRR-800, a High Resolution Profiling Reflectance Radiometer that combines both to measure the diffuse attenuation coefficient parameter.

Our design

KdUINO

An open-source and open-hardware moored system based on Arduino and low cost quasi-digital sensors that measure K , the diffuse attenuation coefficient parameter.

KdUINO measurement process

Radiometer measurement process

Comparison between KdUINO and a high-quality oceanographic instrument

Results of K computed from the KdUINO measurements during 1 hour in a "stable" coastal zone. KdUINO is very stable.

Validation comparing K from KdUINO and from an oceanographic instrument: they are highly linearly correlated ($r^2=0,95513$).

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