



Citizens' Observatory for Coast and Ocean Optical Monitoring

A spatio-temporal analysis with KdUINO data, a citizen science instrument

Abstract

The low cost moored system KdUINO allows to measure the diffuse attenuation coefficient parameter (K_d), related to the water transparency. The KdUINO has been designed as a DIY (Do-It-Yourself) instrument: it is very easy to build and can be made at home. Its total cost is less than 200 Euros.

Due to its low cost, researchers can use a lot of them for the price of one conventional oceanographic instrument. KdUINO is a perfect device to make spatio-temporal studies in coastal zones.

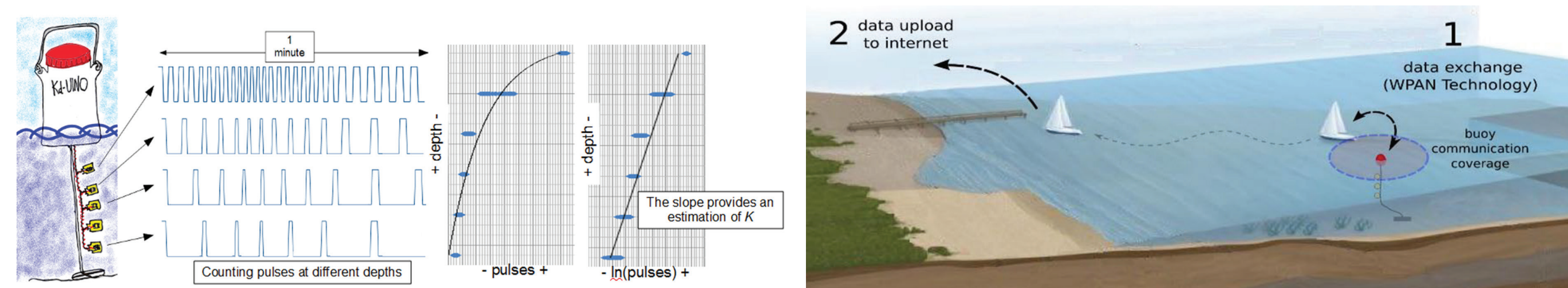
Citclops: a citizen science project

The CITCLOPS project aims to develop systems to retrieve and use data on seawater color, transparency and fluorescence, using low-cost sensors combined with people acting as data carriers, contextual information (e.g. georeferencing) and a community-based Internet platform, taking into account existing experiences (e.g. Secchi Dip-In, Coastwatch Europe and Oil Reporter).

In order to measure water transparency, we designed the KdUINO, a moored system with low-cost sensors, based on the open hardware platform Arduino and quasi-digital sensors that measure the diffuse attenuation coefficient parameter (K_d).



KdUINO: how it works?

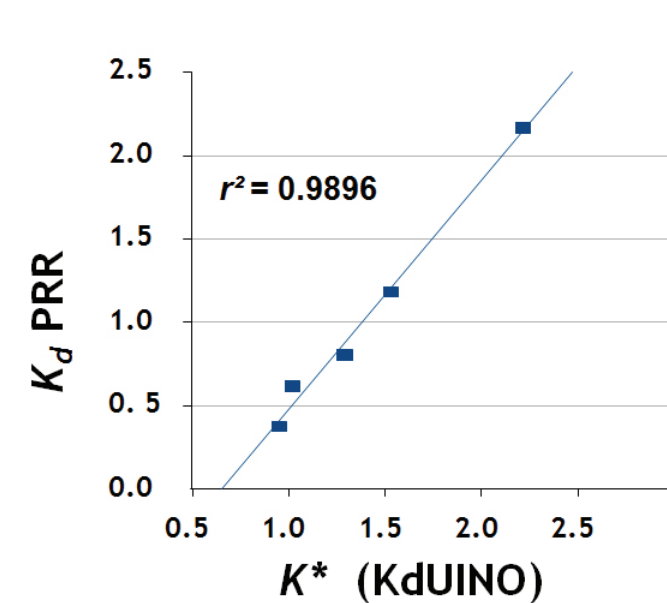
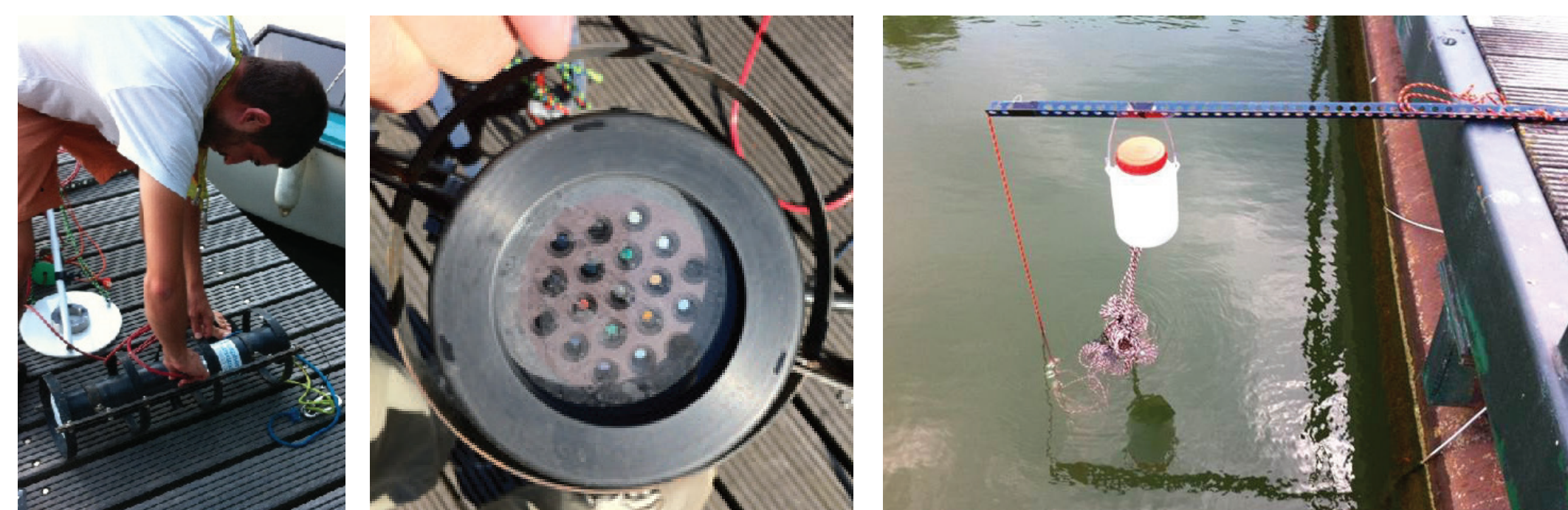


The sensors transform the irradiance measurements into frequency. The Arduino counts the number of cycles over large periods of time to obtain a time integrated measurement of irradiance.

Whenever you are close enough to the KdUINO, within the communication connectivity-range (1), data will be transmitted to their mobile devices. The mobile devices will automatically retransmit the data once they have the possibility to connect to a data center(2).

KdUINO: comparison of measurements with a high-quality oceanographic instruments

A CITCLOPS field campaign was conducted at the Dutch coast. The objective was to compare the values of K_d obtained with the KdUINO and of K_d obtained with the radiometer. Both instruments measured at 6 different points, where water transparency and color seemed to be different.



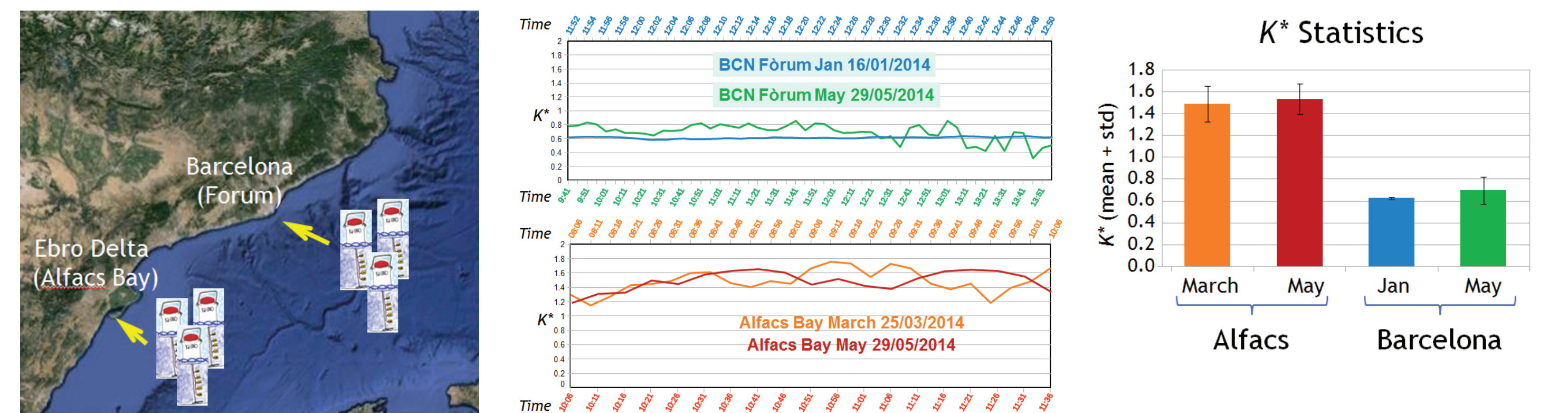
Starting a diy KdUINO community

We are doing workshops to increase the KdUINO community. Actually, more than 75 volunteers from 5 school are making their own KdUINOs.



Example: KdUINO measurements in the catalan coast, Spain

Measuring in different locations and time intervals



Conclusions

Preliminary results comparing the KdUINO measures with oceanographic radiometer values show that KdUINO is a reliable instrument to estimate K_d .

KdUINO is a citizen science instrument that allows to measure K_d in a semi-permanent way with a spatio-temporal coverage, unreachable with conventional instruments because of their costs and/or their lack of possibility to record data in a long term.

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