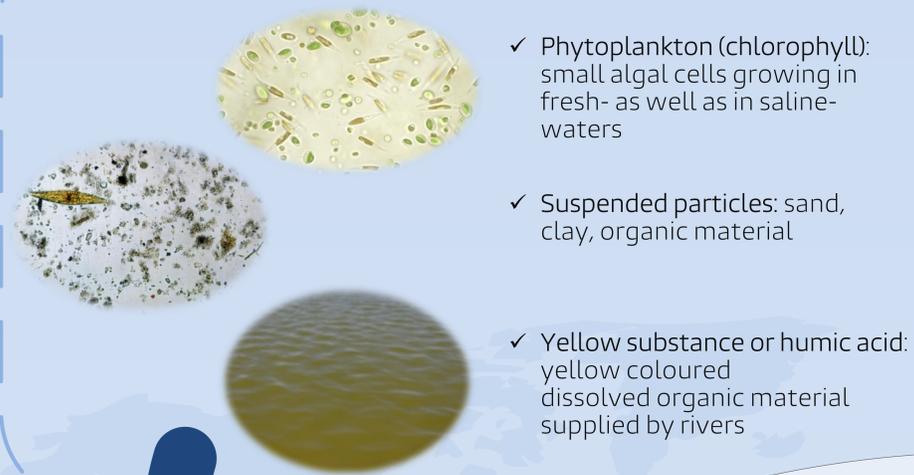


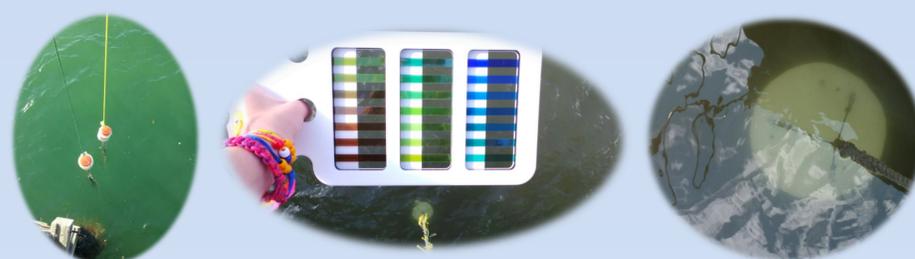
# Extending historic water-quality data sets, using old-fashioned techniques, citizen science and smartphones

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## What gives colour to seas, lakes and rivers?



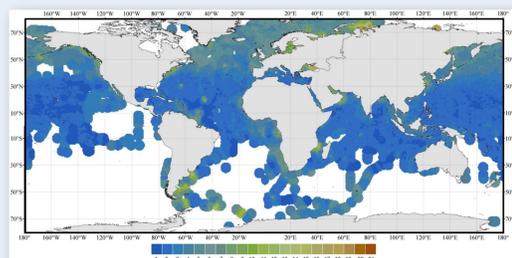
## How are colour and transparency determined?



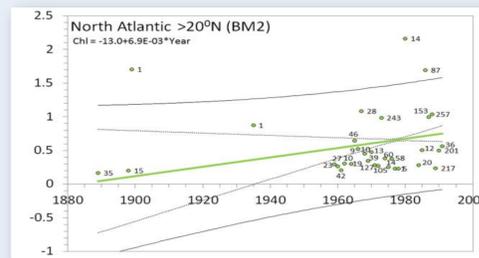
Next to hyper- and multi-spectral radiometers (ground and space borne), they are measured by means of the new KdUINO buoy, the Secchi disk (historical method, 1865) and the Forel-Ule scale (historical method, 1890).

## Science

Besides water temperature and salinity the colour and transparency of water belong to the oldest observed descriptors of lakes, seas and oceans. The colour of water is an essential climate variable defined by the *World Meteorological Organization* (WMO).



Forel-Ule colour composite of all observations between 1890 and 2000



Colour change of the North-Atlantic Ocean since 1890. This ocean is greening (plankton is increasing, so more food is available in the food chain).

## Citclops and the Barcelona World Race 2014-2015



Citclops has established a collaboration with the Barcelona Foundation for Ocean Sailing (FNOB) for the Citclops app and Citclops map-based visualization tools to be used during the Barcelona World Race 2014-2015

## Citizens and science



Citizens can help science by using the smartphone app, developed under the EU-project Citclops. An area of the sea can be selected on-screen and the colour of the water of this area can be compared with an on-screen Forel-Ule colour bar. Pictures and metadata are sent through the Internet to the Citclops database for further analysis. This way historical data can be complemented with new data collected by the citizens.

Citclops app



Currently available

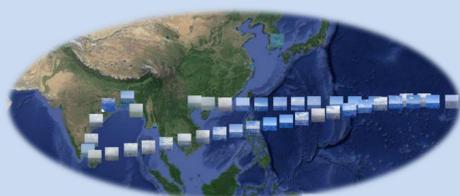


Available soon

## Other collaborations within Citclops



School-boat Far Barcelona collected data during the 2013 Mediterranean Tall Ships Race.



Data collection by a captain of a commercial vessel



Citclops map-based visualization tool for information delivery to citizens and decision makers



The Citclops project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement n° 308469



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