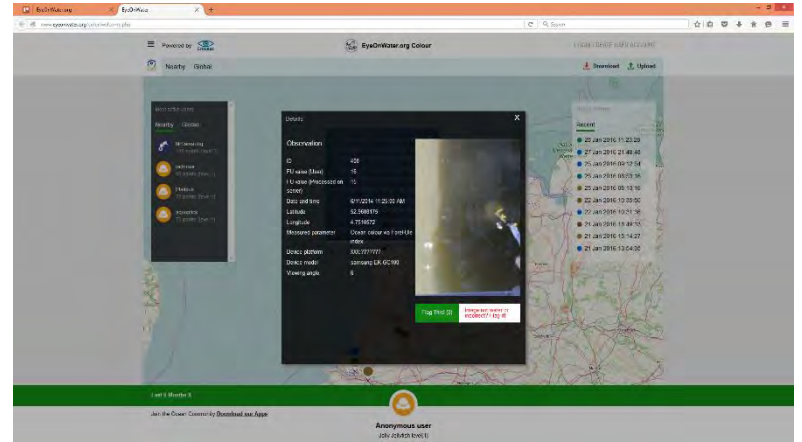




EyeOnWater – Concept for monitoring by citizens



Peter Thijssse (MARIS), Marcel Wernand (NIOZ)

13 October 2016



Koninklijk Nederlands Instituut voor Onderzoek der Zee



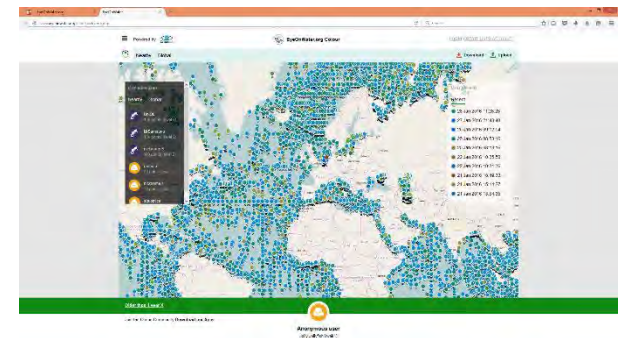


Background EyeOnWater

- Normal scientific monitoring of water / sea areas via costly remote sensing or local observation station.
- Data used by scientists (oceanographers, limnologists) and water authorities for statistical and long-term analysis.
- Now this normal monitoring can be supplemented by smartphone data
- In a.o. the EU FP7 project Citclops several methods have been investigated for certain parameters. The EyeOnWater was born as extendible concept.
- Advantage: Bridging the gap between science, government and citizen.



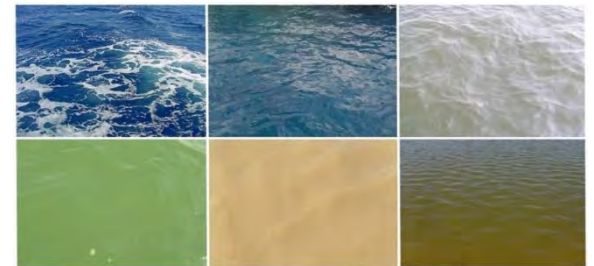
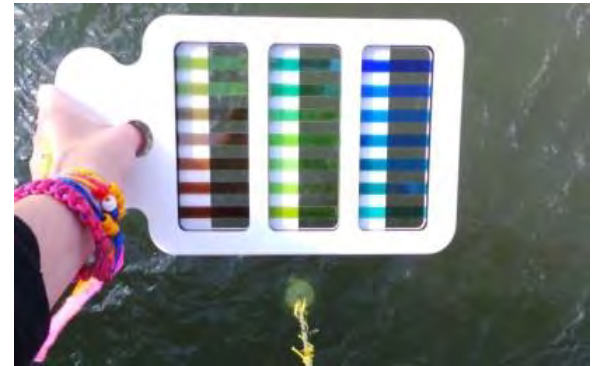
www.Citclops.eu





Concept EyeOnWater-Color

- Water quality of natural waters can be estimated via their colour and transparency.
- Measuring water color since 1889 from vessels via the Forel-Ule-scale with 21 colors. (nowadays also via remote sensing).
- Long term analysis of Forel-Ule data: Some seas and oceans get more blue (less phytoplankton), some get greener (more phytoplankton), with different pattern over time.
- Via the EOW app we collect as much color data of natural waters together with the public to increase insight in (local and global) trends.





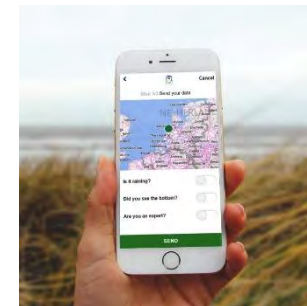
EyeOnWater: Collect, store, *validate*, publish

How does it work?



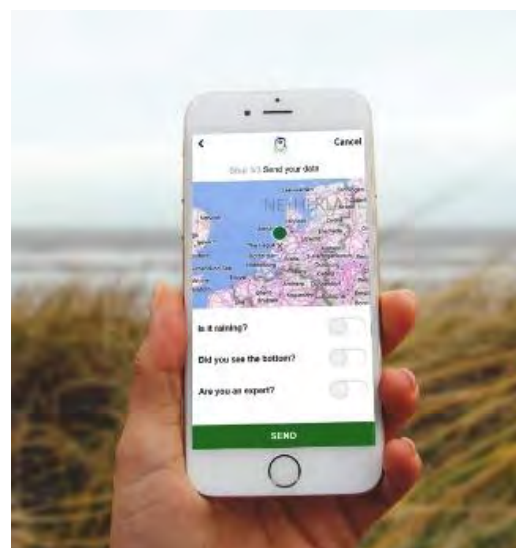
EyeOnWater app

- The EyeOnWater-color App uses the 21 colors in the Forel-Ule scale.
- Observation process:
 - Measure: follow the guidance to take an image of the water
 - Compare: Compare the color in the image with the FU scale – and select
 - Add info: Clouds, bottom view?
 - Send: Data is sent to the server including metadata provided by the smartphone like date/time, GPS-location, angle, device type, etc.
 - Validate: Go to www.eyeonwater.org and compare your measurements to others.





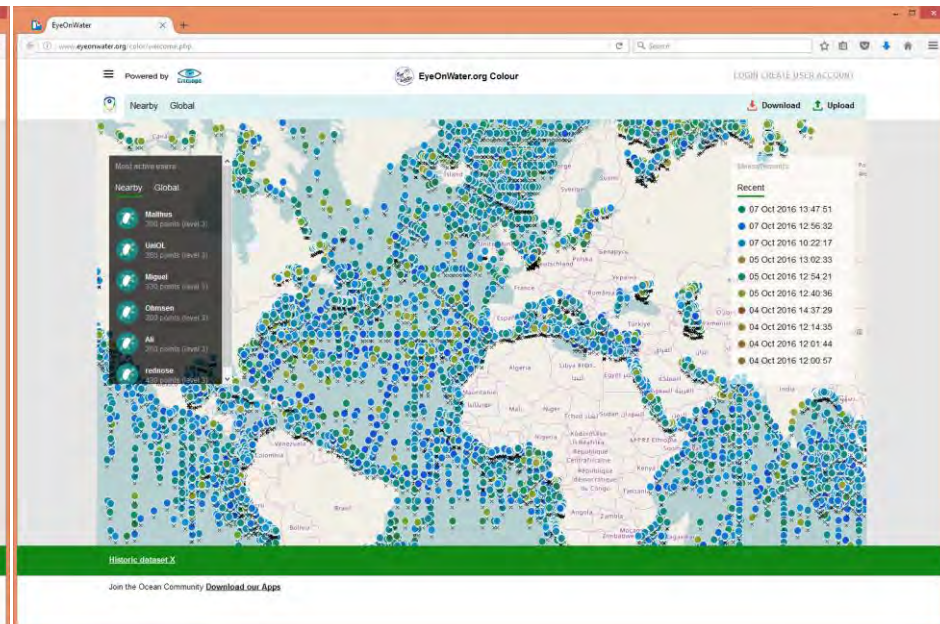
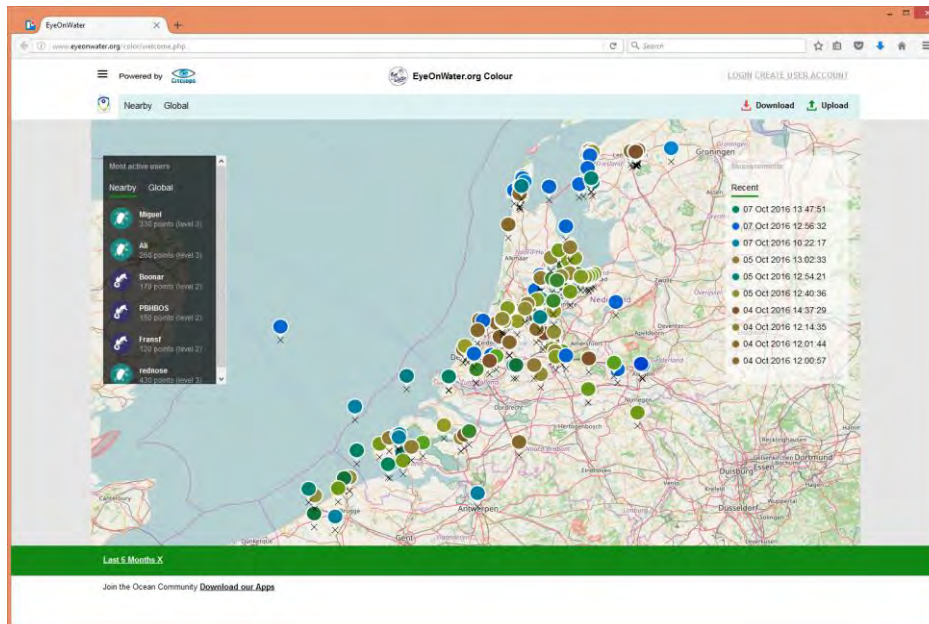
EyeOnWater app





EyeOnWater website

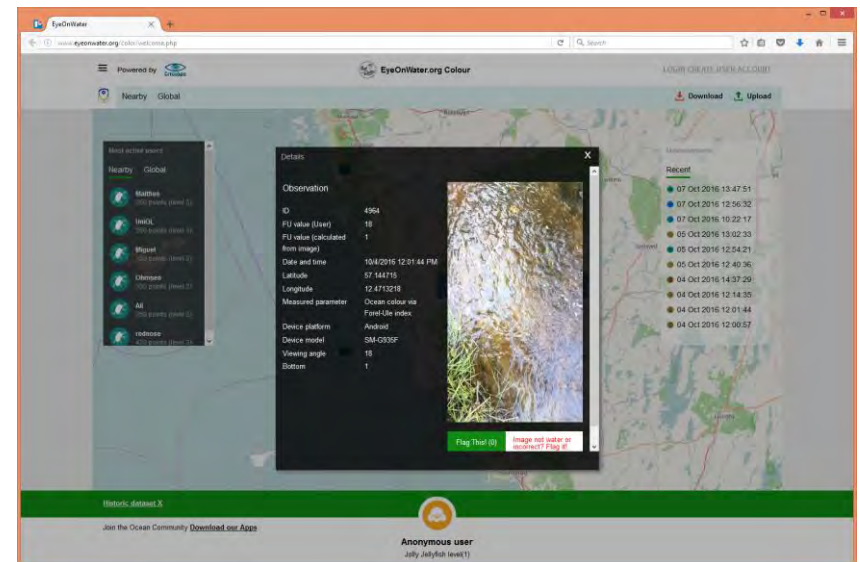
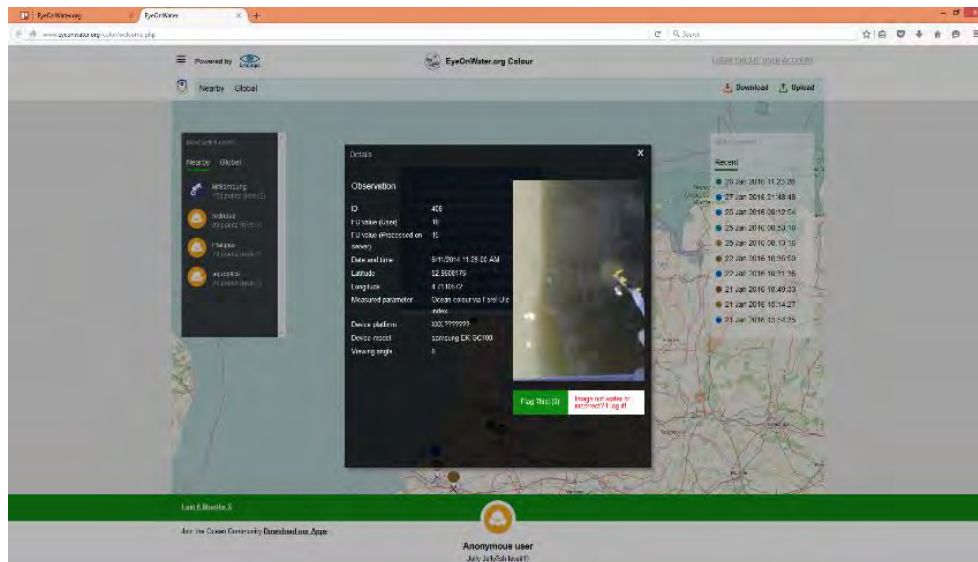
- www.eyeonwater.org is the central portal where all data is stored and published.
- Overview of all measurements (nearby/global) and selections in time (recent = app / historic)





Display of details

- Display details per measurement for inspection by (other) user.
- Metadata of when/where/who, plus image





Personalisation

- By connecting your app to an online account you get a personal experience (see all your data, view your ranking)

The screenshot shows the EyeOnWater.org Colour website interface. The main content is a map of the Netherlands with various colored markers representing user locations. A sidebar on the left lists 'Most active users' with their names, point counts, and levels. A 'Current user' panel on the right shows a list of recent observations with timestamps. The footer includes a 'Historic dataset X' link, a 'Join the Ocean Community' button, and user statistics for 'Miguel' (51 photos, 330 points, Tallspin Turtle level 3).

EyeOnWater.org Colour

Powered by Mapbox

LOGIN CREATE USER ACCOUNT

Download Upload

Current User Nearby Global

Most active users

Name	Points	Level
Matthias	350	level 3
UniOL	350	level 3
Miguel	330	level 3
Ohmsen	300	level 3
All	260	level 3
rednose	150	level 3

Current user

Timestamp
16 Sep 2016 16:29:32
16 Sep 2016 16:26:27
16 Sep 2016 16:27:51
16 Sep 2016 14:54:48
16 Sep 2016 13:13:29
16 Sep 2016 13:12:34
16 Sep 2016 13:11:38
16 Sep 2016 13:10:36
16 Sep 2016 11:02:34
16 Sep 2016 11:00:56

Historic dataset X

Join the Ocean Community [Download our Apps](#)

Photos (51) 51 330 points

Miguel
Tallspin Turtle level(3)



Validations

Two validations:

- Validation upon storage on server (RGB analysis of the image – WACODI algorithm)
- Validation by users via “flagging” of suspicious or bad measurements (email sent to expert – one click to remove)

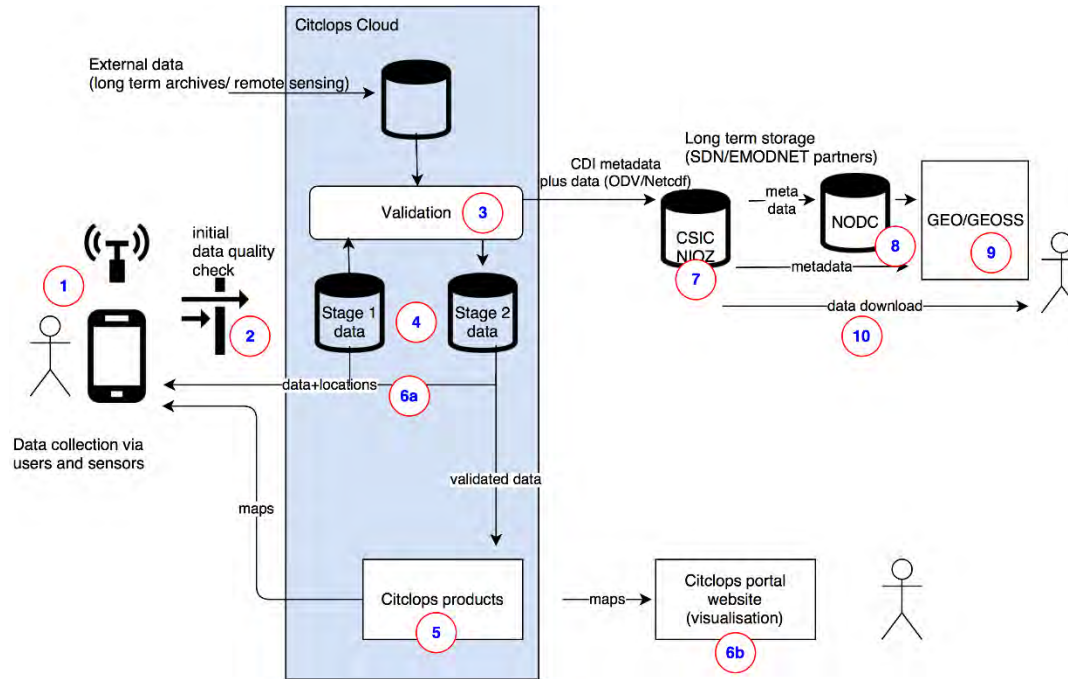
The screenshot displays the EyeOnWater web application interface. The browser address bar shows www.eyewater.org/colour/welcome.php. The page header includes the EyeOnWater logo, the text "Powered by Citicasts", and the site name "EyeOnWater.org Colour". There are navigation links for "Current User", "Nearby", and "Global", along with "Download" and "Upload" buttons. A sidebar on the left lists "Most active users" with names and point counts: Malthus (350 points), UniOL (300 points), Miguel (330 points), Ohmsen (300 points), Ali (260 points), and rmlnase (420 points). The main content area features a map with several observation points. A "Details" modal window is open, displaying the following information:

Observation	
ID	4634
FU value (User)	10
FU value (calculated from image)	11
Secchi Depth	140
Date and time	9/16/2016 10:58:10 AM
Latitude	52.485776720617
Longitude	5.1177708059597
Measured parameter	Ocean colour via Forêt-Ule index
Device platform	iOS
Device model	iPhone6,2
Viewing angle	6

Below the details, there is a thumbnail image of green water. At the bottom of the modal, there is a "Flag This (0)" button and a text prompt: "Image not water or incorrect? Flag it!". The footer of the application includes a "Historic dataset" link, a call to action "Join the Ocean Community Download our Apps", and user statistics for "Miguel": "Photos 51" and "330 points".



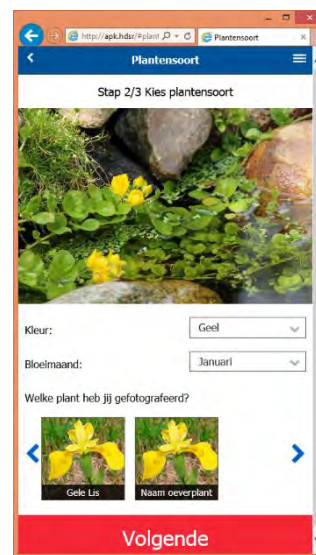
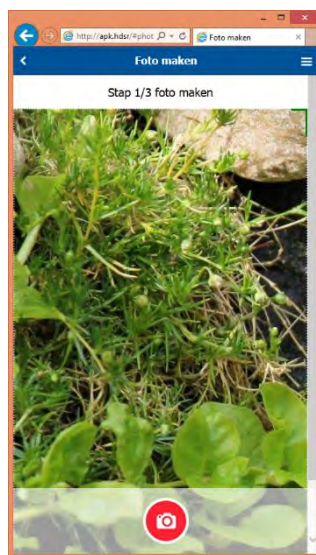
Also taken into account



- Metadata is standardized and makes use of minimum minimum CDI required fields, and vocabularies.
- Some vocabularies adjusted/expanded for new type of data (L05/P01)
- Aimed at later uptake of data by datacenters and eventually SDN/EMODNet and GEOSS

Possible concept extensions (1)

- Collect “phenomena” data (direct use):
 - Type and location of plants
 - Type and location of waterplants
 - Location of large plastics
 - ...





Possible concept extensions (2)

- Measuring water quality parameters
 - Phosphate, nitrate concentrations
 - PH
 - Salinity
 - ..

Needs research for usefulness and value compared to lab methods



Source:
<http://www.myperfectpool.com.au>

But.. An endless potential of users and uses!



www.eyeonwater.org





EyeOnWater



The EyeOnWater website and adjacent free Apps help you to assess the Colour and Clarity of natural waters



EyeOnWater - A visualisation of scientific data shared by the community

People have always been interested in observing their surroundings. Whereas observation satellites and in-situ measuring stations are set up to monitor vast areas of ocean coastlines, this can now be complemented by EOW Colour, Clarity and Sea Lettuce (Ulva) observations carried out by citizens. Data will be used by scientists (oceanographers, limnologists) and water authorities for statistical and long-term analysis in conjunction with climate research.

Join the community, download the apps:



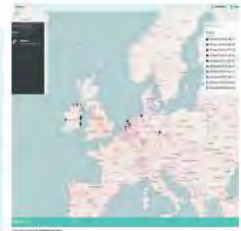
Colour

The EyeOnWater colour app helps us to classify rivers, lakes, coastal waters, seas and oceans on its colour (it can be used over both fresh and saline natural waters). The observations via the app are an extension of a long term (over 100 years) set of water colour observations made by scientists in the past. You can view them all together in this map application. If you have contributed yourself, do not forget to login for a more personal experience.

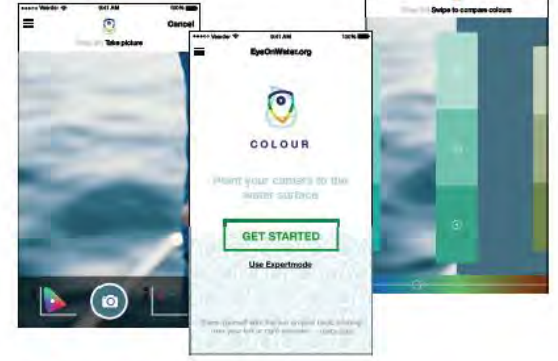


Clarity

Clarity observations are usually done by Secchi Disk, lowering a white disk in the water and measuring to what depth it is still visible. EyeOnWater has collected a large dataset of observations from the past, and this set has been extended by citizens and volunteer measurements contributed via the EyeOnWater app.



Our app



Developed by:



www.eyeonwater.org

A visualisation of scientific data collected and shared by the community