WASI Training IV:
Review of campaign 2018

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Project MONEO-WET
Sierpe, Costa Rica, 12-22 March 2019
Field data set 2018
Field data set 2018

GPS

Global positioning system

• 2 systems (CENAT, Peter's smartphone)
• track
• sampling points
Field data set 2018
Videos from DJI drone

**DJI drone**
- DJI ...
- Camera: DJI FC300X
- operated by CENAT

**Used for documentation**
- Survey of test area
- Videos for Public Relations
Field data set 2018
Photos from OMD

**Camera**
- Olympus OMD EM-5 Mark 2 (private)
- Fisheye 7.5 mm for water and sky
- Zoom 14-100 mm else
- *The photos were later geo-tagged*

**Used for documentation**
- Measurement procedures
- Sky conditions
- Water conditions
  - surface (waves, floating material)
  - colour
Field data set
Photos from GoSI

**GoSI**

*GoPro Sky Imager*

- GoPro Hero 5 with 270° lens
- Mounted on roof of ship
- Every 10 sec a picture
- *Date and time were later corrected*

**Used for documentation**

- Change of illumination during day
- Sky conditions during measurement
Field data set 2018
Photos from Hero 3

Hero 3

GoPro Hero 3

- Mounted on OOSS
- Manually operated
- Date and time were later corrected
- The photos were later geo-tagged

Used for documentation

- Target during spectral measurement
  - reference panel
  - water surface (reflections, colour)
  - floating material
Field data set 2018
Water clarity and depth

Secchi disk

• Water transparency
• Water depth
Field data set 2018
Water constituents

**Laboratory analysis**

- Chlorophyll-a concentration
- TSM (total suspended matter) concentration
- TSM extinction coefficient (350 – 900 nm)
- CDOM (colored dissolved organic matter) absorption coefficient (200 – 900 nm)
Field data set 2018
Spectra from OOSS

OOSS
Ocean Optics Sensor System
• gimble for horizontal alignment ①
• step motor to adjust viewing angle ②
• 2 shutters for dark current ③
• Hero 3 camera for documentation ④

Used for spectral measurements
• Ed sensor for downwelling irradiance ⑤
• Lu sensor for upwelling radiance ⑥
  – reference panel
  – water surface
Field data set 2018
Structure of data archive

Directory structure

Directory „2018_CostaRica“

- Subdirectory for each day
  - Subdirectory for each instrument
- Subdirectory for common infos
- Subdirectory for data analysis
Procedures
Correct date and time of photos
Set file date to date from EXIF

Problem
File date may be changed during copy process (e.g. using USB cable for data transfer from camera to PC)

Total Commander
• Plugin „Exif“
• Dateien – Dateiattribute ändern – Pluginattribute ändern - ExifDateTime
Geotag OMD photos
Add geo-information to EXIF

GPicSync (alternative: GeoSetter)

- Set UTC Offset = -6
Results
Results

Variety of water colour
Results

Variety of reflectance

Sierpe campaign 2018

Reflectance [sr⁻¹]

Wavelength [nm]
Results
NIR signature

Missing range 820–900 nm would allow better separation of $C_X$ and $g_{dd}$

Fit parameters:
$C[4] = 1.1 \text{ mg/l}$, $C_X = 33 \text{ mg/l}$, $C_Y = 1.4 \text{ m}^{-1}$, $S = 0.0056 \text{ nm}^{-1}$, $g_{dd} = 0.40$
Results
NIR signature

$C_X$ affects scaling
$g_{dd}$ adds offset

Fit parameters:
$C[4] = 6 \mu g/l$, $C_X = 11.5 \text{mg/l}$, $C_Y = 0.46 \text{m}^{-3}$, $S = 0.004 \text{nm}^{-1}$, $g_{dd} = 0.078$
Results
NIR signature

Very good fit of range > 700 nm

Fit parameters:
\[ C[4] = 5 \mu g/l, C_X = 19 \text{ mg/l}, C_Y = 1.67 \text{ m}^{-1}, S = 0.0078 \text{ nm}^{-1}, g_{dd} = 0.024 \]