LIFeLiDAR

Laser-Induced Fluorescence environmental

Products: Exploring the sea upper layer

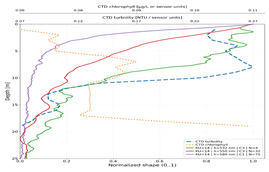
Mobile surveys, continuous monitoring and satellite products validation

LIFL.11 - LIF-Elastic-Raman compact LiDAR

Water quality mapping & Vertical high-res profiling

Measures	Pigments, CDOM, SPM, petroleum and organic-pollution markers
Acquisition	48-band spectra; 250-800 nm
Excitation	355 + 532 nm or 266 + 532 nm; 10 Hz
Deployment	High-speed boats of any size; Drones

Water-column profiles, res. 0.5 m

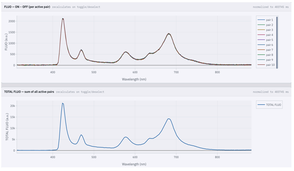


mFL.12 - micro Fluorescence LiDAR

Hyperspectral Fluorescence acquisition, 12 nm res.

Measures	Chl-a, PE, PC, CDOM, SPM, Oil-in-water
Optics	405 nm excitation; 400-880 nm reception
Monitoring	Unattended, day-and-night water monitoring
Deployment	Above-water stations; Buoys; Vessels; Drones; Sensor networks

Fluorescence spectra

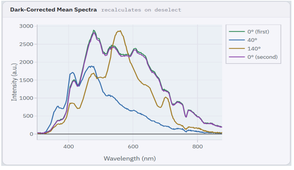


mHR.2 - micro Hyperspectral Radiometer

Remote sensing reflectance acquisition

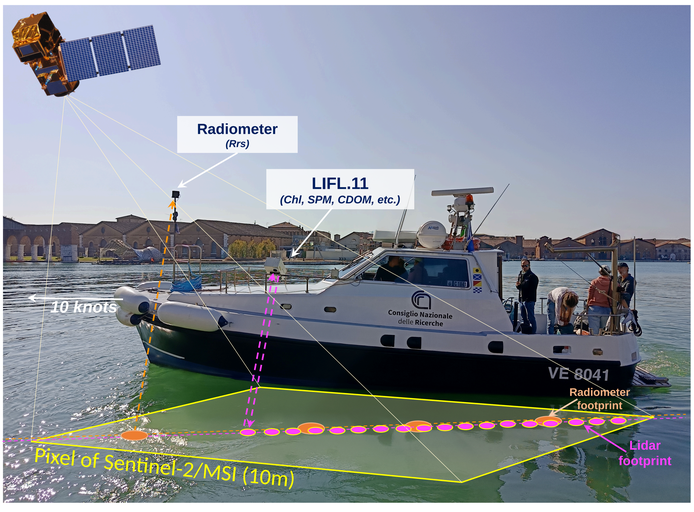
Measures	Irradiance, water-leaving and sky radiance
Optics	320-880 nm; Automated measurement cycle; 12 nm res.
Meta Data	GPS, IMU, Camera frames for each measurement
Deployment	Standalone; Sensor networks; Paired with active sensors

Measured intensity spectra



From water measurements to satellite validation

Active LiDAR and passive radiometry connect water constituent concentrations with satellite-observed water colour



~20 measurements along a 10 m pixel at 10 Hz and ~10 knots.

1 Satellite-coincident measurement

Recording ground-truth data (water quality parameters) by LiDAR and Rrs from the same water patch during satellite overpass. Water samples provide concentration calibration.

2 Match the overpass

Align time-stamped, georeferenced observations with satellite pixels. Averaging LiDAR Data within each pixel. Compare in-situ Rrs with atmospherically corrected satellite Rrs.

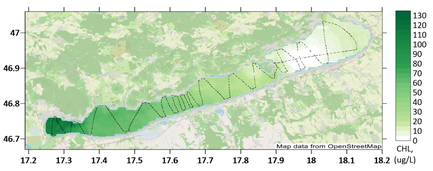
3 Build and validate

Evaluation and selection of the optimal algorithm of atmospheric correction. Develop regional water-quality retrievals. Test their performance against independent field measurements.

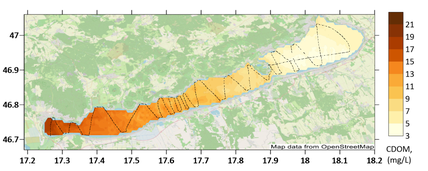
Lake Balaton: examples of water-quality mapping

14/08/2026

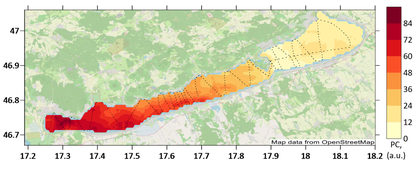
Chlorophyll-a



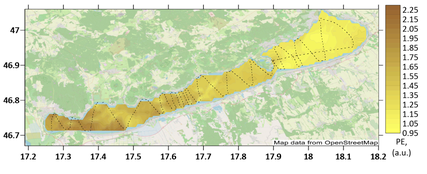
CDOM



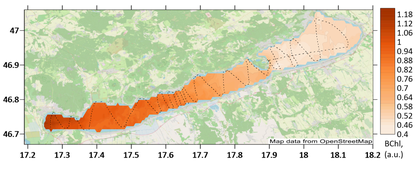
Phycocyanin



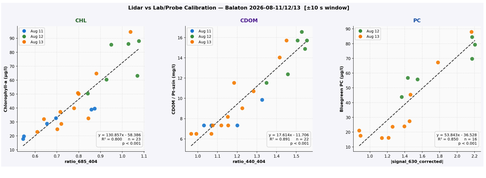
Phycoerythrin



BChl



Calibration: LiDAR vs Water Sampling



Environmental surveys & Instruments for water quality monitoring

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