

Pump-and-Probe fluorometer data series for cruise Pelagia PE125

Principal Investigators and Data Originator

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Content of data series

Parameter	Unit	Parameter code	Number of stations	Comments
Depth	m	DEPHPR01	13	none
Constant <i>in vivo</i> Fluorescence (Fo)	rel. units	COFLPP01	13	none
Maximum <i>in vivo</i> Fluorescence (Fm)	rel. units	CMFLPP01	13	none

Instrumentation and data processing by originator

Instrument: PumpProbe fluorometer, manufactured by EcoMonitor, Moscow, Russia.

The PumpProbe Fluorometer is a submersible double-flash pulse fluorometer for continuous measurement of chlorophyll fluorescence parameters *in situ* and for determination of chlorophyll concentration and fundamental photosynthetic properties of phytoplankton in the sea.

The double flash fluorometer contains two excitation channels and one emission channel. One of the excitation channels provides a weak, probe flash used for measuring the fluorescence yield of Photosystem II (PSII). The other excitation channel provides a pump flash which is used for closing the reaction centres of PSII. Both excitation signals are provided by xenon flash-lamps. The light from the flash-lamps is collected by condensers and by a set of bluegreen excitation filters. The emission signal is collected by the emission condenser and filtered by a red filter before striking the photodetector.

The instrument is typically programmed to generate a sequence of probe-pump-probe flashes where flash intensity and timing can be varied as required by the experimental protocol. The fluorescence signal recorded during the first probe flash is a measure of the constant part of the fluorescence yield. The fluorescence signal measured during the second probe flash is a measure of PSII fluorescence yield that results from closing the traps by the pump flash. If the pump flash has a saturating intensity, and the second probe flash is applied 50-70 microseconds following the pump flash, then the fluorescence signal measured during the second probe flash is a measure of PSII fluorescence yield with all the traps closed. Depending on the experimental protocol, the different photosynthetic parameters can be measured.

Technical data:

Chlorophyll a concentration (based on fluorescence)	0.03 - 50 $\mu\text{g l}^{-1}$
Underwater irradiance (PAR range)	0.03 - 300 W m^{-2}
Depth	0 - 200 m
Fluorometer:	
Excitation wavelength range	400 - 550 nm
Registration wavelength range	> 680 nm
Energy of "probe flash"	0.01 J
Energy of "pump flash"	0.01 - 1 J
Duration of "probe flash"	0.01 ms
Duration of "pump flash"	0.01 ms
Interval between "pump and probe" flashes	0.05 - 1 ms
Submerge unit size sphere,	d = 250 mm
Submerge unit weight	10 kg
Voltage	220 V or 12 V
Required power	25 W

BODC Data Documentation
PROVESS Project MAS3-CT97-015

BODC processing

The data were loaded into a database under the ORACLE Relational Database Management System without modification.

Comments on data quality

None to report.