pCO_2 sensor

Air-Sea CO_2 fluxes in ocean: Measurement of CO_2 partial pressure

Sensors

The CO_2 content in the atmosphere is one of the elements responsible for the greenhouse effect. The evolution of its concentration has great consequences on the climate of our planet. It is recognized that the fact that the ocean supplies and drawns in turn CO_2 is one of the major elements of the atmosphere evolution. Considering the variability of dissolved CO_2 in space and time at the surface of the ocean, an experimental approach aiming at making time series measurement from unattended platforms should be contemplated to complete measurements carried out from vessels in movement of from fixed buoys.

pCO_2 sensor can be integrated on CARIOCA and PIRATA buoys with the aim to measure CO_2 partial at the sea surface of ocean and also determine the AIR-SEA CO_2 fluxes in open ocean.

Possible use

- As a sensor (MODBUS protocol)
- Embedded on CARIOCA, PIRATA and other fixed buoys

Advantages

- Compact and robust design
- pCO_2 concentration in seawater
- One year operating autonomy (one measure per hour)
- Compliant with RS485 Serial communication (MODBUS protocol)

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Sensors

pCO_2 sensor

Air-Sea CO_2 fluxes in ocean

DESIGNATION		pCO_2 sensor
CO_2 partial pressure	Range Initial accuracy	250 to 550 µatm ± 3µatm
Temperature (Water circuit)	Range Initial accuracy	-2 to +32 °C ± 0.01 °C
Operational Depth		1 dbar
Dissolved Oxygen (PIRATA version)	Range (0_2-concentration / Air saturation) Initial accuracy	0 to 500 µM / 0 to 150 % < 8 µM / < 5%
Data output		RS485 Serial connection (MODBUS protocol)
Data storage		Yes
Sampling rate		1 measure per hour
Power supply	Range	9 to 18 Vdc (12 Vdc nominal)
Power consumption		29 mW (2.5 mA @ 12 Vdc)
Dimensions		Length × Diameter: 0.85 m x Φ0.24 m
Weight		23 kg in air
Housing Material		Anodized aluminium + anti-fouling paint
Connector		SUBCONN MCDLSF 8-pin

< pCO_2 spectrometer (with dye pocket)

CARIOCA buoy >

< PIRATA buoy (T-Flex)

< Applications:

CARIOCA Buoy: Assessment of the variability of ocean CO_2 partial pressure and Air-Sea CO_2 fluxes in Ocean, integrating a SBE37 probe, a fluorometer (for measuring chlorophyll-a), an Ultrasonic Anemometer (Wind-speed and Atmospheric Pressure), a DO optode and Sea-Temperature.

PIRATA Buoy: Integrated on T-Flex buoys, with an energy and Argos communication module able to measure pCO_2 partial pressure, Dissolved Oxygen, Atmospheric pressure, and seawater temperature.

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