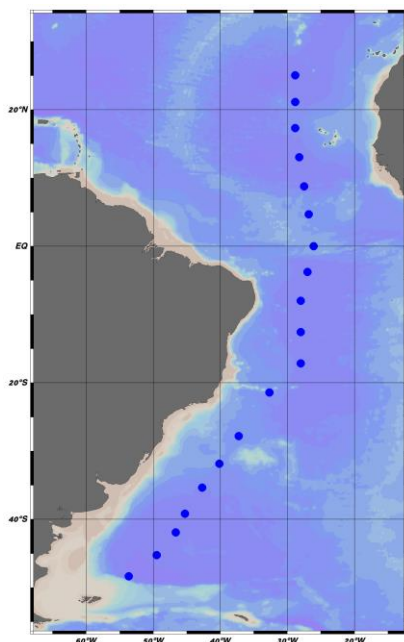


CRUISE REPORT: FICARAM IV

Submitted: January 2009 Updated: May 2024



Highlights

Cruise Summary Information

Section Designation	A17		
Expedition Designation (ExpoCode)	29HE20020304		
Alias	HE081		
Chief Scientist	Fiz F. Pérez / IIM-CSIC		
Dates	4 March – 9 April 2002		
Ship	R/V <i>Hespérides</i>		
Ports of Call	N/A		
Geographic Boundaries	53° 67''W	25° 04''N	26° 07''W
		48° 35''S	
Stations	19		
Floats and Drifters Deployed	0		
Moorings Deployed and Recovered	0		

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Report assembled by Savannah Lewis

Links to Selected Topics

Shaded sections are not relevant to this cruise or were not available when this report was compiled.

Cruise Summary Information	Hydrographic Measurements	
Description of Scientific Program	CTD Data:	
Geographic Boundaries	Acquisition	
Cruise Track (Figure): PI CCHDO	Processing	
Description of Stations	Calibration	
Description of Parameters Sampled	Temperature	Pressure
Bottle Depth Distribution (figure)	Conductivity	Oxygen
Deployments	Bottle Data	
Moorings Deployed or Recovered	Salinity	
	Oxygen	
Programs and Principal Investigators	Nutrients	
Scientific Personnel	Total Carbon	
	CFCs and SF6	
Problems and Goals Not Achieved	Total Alkalinity	
	pH	
Underway Data Information	Lowered Acoustic Doppler Current Profiler	
Navigation Bathymetry		
Acoustic Doppler Current Profiler		
Thermosalinograph		
XBT and/or XCTD		
pCO ₂	References	
Atmospheric Chemistry Data		
Meteorological Observations		

CRUISE FICARAM IV

PI: Aida F. Ríos and Fiz F. Pérez

R/V Hespérides

Cruise: He081

Dates: 4 March to 9 April 2002

Chief scientist: Fiz F. Pérez (IIM-CSIC)

Nutrients analysis responsible: Carmen G. Castro (IIM-CSIC)

During the cruise FICARAM II, 19 stations were performed. Alkalinity and pH were measured on board. The variables of carbon system, pH and alkalinity, in surface waters together with the $f\text{CO}_2$ measured, were used to study the internal consistency of the measurements.

pH was measured spectrophotometrically following Clayton and Byrne (1993).

Total Alkalinity (TA) was measured using potentiometric titrations with hydrochloric acid to a final pH of 4.40 (Pérez and Fraga, 1987). The electrodes were standardised using a buffer of pH 4.42 made in CO_2 free seawater (Pérez et al., 2002).

Dissolved oxygen was determined by Winkler potentiometric titration. The estimated analytical error was $\pm 1 \mu\text{mol}\cdot\text{kg}^{-1}$. Oxygen saturation was calculated following Benson and Krause equation (UNESCO, 1986).

Nutrient samples were frozen before the analysis. Nutrient concentrations were determined by segmented flow analysis with Alpkem system, following Hansen and Grasshoff (1983) with some improvements (Mouriño and Fraga, 1985; Álvarez-Salgado *et al.*, 1992). The analytical error was $\pm 0.05 \mu\text{mol}\cdot\text{kg}^{-1}$ for nitrate, $\pm 0.05 \mu\text{mol}\cdot\text{kg}^{-1}$ for silicic acid and $\pm 0.01 \mu\text{mol}\cdot\text{kg}^{-1}$ for phosphate.

CT was calculated from $\text{pH}_{\text{T}25}$ and total alkalinity with the Mehrbach et al (1973) constants refitted by Dickson and Millero (1987).

To check the accuracy of the pH and TA measurements, samples of CO_2 reference material (CRM, batch 54 distributed by A.G. Dickson from the Scripps Institution of Oceanography) were analysed during the cruises. The uncertainties of pH and alkalinity were ± 0.002 and $\pm 0.7 \mu\text{mol kg}^{-1}$, respectively. The corresponding theoretical $\text{pH}_{\text{T}25}$ value (7.918) for this batch was calculated using the dissociation constants from Lueker et al. (2000), which was in agreement with the theoretical value (± 0.0002).

Figure 1 compares the CO_2 fugacity ($f\text{CO}_2$) values measured at every station sampled during FICARAM IV cruise and those calculated from $\text{pH}_{\text{T}25}$ and total alkalinity with the Lueker et al. (2000) dissociation constants. The agreement between both $f\text{CO}_2$ is excellent ($r^2 = 0.99$), confirming the good internal consistency of our measurements. The average and standard deviation of the differences between both calculated and measured CO_2 was $0.3 \pm 3 \mu\text{atm}$.

FIGARAM IV

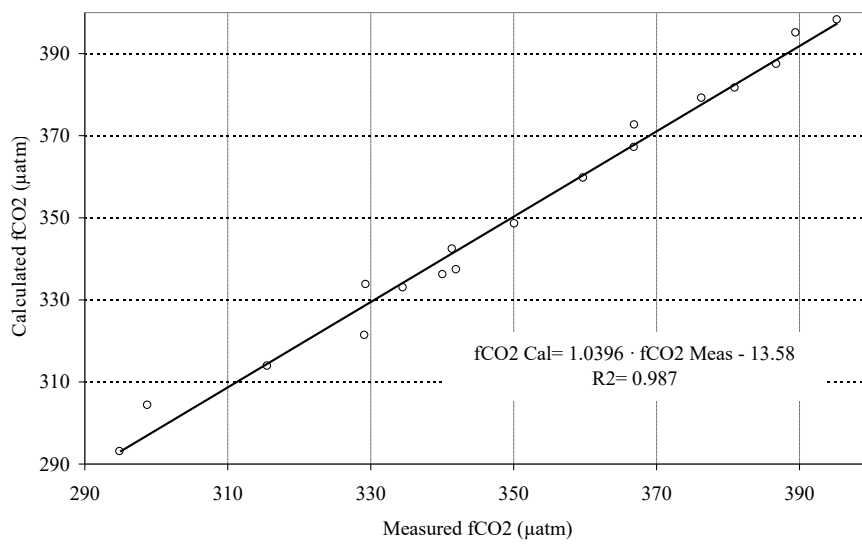


FIGURE 1- Relationship between measured CO₂ fugacity and that calculated as a function of TA and pH measured at the surface of the FIGARAM IV stations.

References

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