

Fluorescence Characteristics and
Optical Properties of the NE Mediterranean

A. YILMAZ, İ. SALİHOĞLU and D. EDİGER

Middle East Technical University, Institute of Marine Sciences
P.O.Box 28, 33731 Erdemli-İçel (TURKEY)

In situ fluorescence and light penetration data together with the hydrological data collected during the July 1988 and March 1989 (LBDS 01) R/V BİLİM expeditions to Northeastern Mediterranean are presented and discussed. Continuous *in situ* profiles of fluorescence could be particularly valuable for estimating biomass and productivity in coastal waters where particulate matter and Gelbstoff limit the use of satellite imagery (Mackey, et al., 1989).

Calibration of fluorescence against chlorophyll determined on discrete samples collected from depths was performed and extracted chlorophyll concentrations were well-correlated to chlorophyll fluorescence (Figure 1) by a linear equation of $Chl1 = 4.85 (Fluo) + 0.32$ ($n=390$).

Subsurface chlorophyll maxima observed in the NE Mediterranean (Yilmaz et al., 1988; Salihoğlu et al., 1989) was clearly and statistically confirmed by *in situ* fluorescence data. As summarized in Table 1, max fluorescence due to chlorophyll and its breakdown products was measured as deep as 120 m and the max depth of zero fluorescence determined as 135 m. The depth of max fluorescence is more deeper in summer than the depth measured in early spring because of light inhibition. On the other hand the quantitative fluorescence values are relatively higher in spring since the bloom time is determined as February-March in the NE Mediterranean. The deepest 1 % light transmission was measured as 120 m (average being 105 m) in the region so the euphotic zone is thick and the photosynthetic activity is observed in the deeper parts of euphotic layer.

Some specific examples of deep chlorophyll-a maxima which were obtained by continuous fluorescence measurements in the water column and the vertical profiles of light penetration are illustrated in Figure 2. As is seen from the figure there is no match with pycnocline and the max fluorescence (summer examples). Euphotic layer is hydrologically homogeneous due to the presence of convective mixed layer caused winter cooling in March examples but still the deep fluorescence peaks were clearly observed.

REFERENCES:

- SALİHOĞLU, İ., C. SAYDAM, Ö. BAŞTÜRK, K. YILMAZ, D. EDİGER, E. HATİPOĞLU, A. YILMAZ, 1990, "Transport and distribution of nutrients and chlorophyll-a by meso-scale eddies in the Northeastern Mediterranean", *Marine Chemistry (in press)*
- YILMAZ, A., D. GÖÇMEN, Ö. BAŞTÜRK, A. C. SAYDAM and İ. SALİHOĞLU, 1988, "Deep chlorophyll-a maximum in the Northeastern Mediterranean", Presented at XXXIst Congrès-Assemblée de la C.I.E.S.M., Athens, 17-22 October 1988. In: *Rapp. Comm. int. Mer Médit.*, 32(2), 1988: pp. 44, (Abstract only).
- MACKEY, D. J., E. C. V. BUTLER, P. D. NICHOLS and H. W. HIGGINS, 1989, "Continuous Shipboard and *in situ* Measurements of pH and Fluorescence in Seawater", *Marine Chemistry*, 28, pp. 41-60.

Table 1. Relative Surface Fluorescence(SF), Maximum Fluorescence Intensity (MFI), Depth of Maximum Fluorescence (DMF) and Depth of Zero Fluorescence (DZF) in the Northeastern Mediterranean

	July, 1988			March, 1989		
	Min.	Max.	Ave.	Min.	Max.	Ave
F(X10 ⁻² , arbitrary unit)	0	5	2 (n=63)	0	14	5 (n=40)
MFI(")	3	10	5 (n=61)	7	34	14 (n=40)
DMF (m)	57	120	88 (n=59)	10	88	52 (n=40)
DZF (m)	57	135	113 (n=57)	70	130	104 (n=41)

Figure 1. Calibration curve of *in situ* fluorescence and extracted chlorophyll-a (Some data from The Sea of Marmara and The Black Sea are included for support)

Figure 2. Continuous *in situ* profiles of relative fluorescence and light penetration at selected stations in the Northeastern Mediterranean

Table 1. Relative Surface Fluorescence(SF), Maximum Fluorescence Intensity (MFI), Depth of Maximum Fluorescence (DMF) and Depth of Zero Fluorescence (DZF) in the Northeastern Mediterranean

36.3

	July, 1988			March, 1989		
	Min.	Max.	Ave.	Min.	Max.	Ave
F($\times 10^{-2}$, arbitrary unit)	0	5	2 (n=63)	0	14	5 (n=40)
MFI (")	3	10	5 (n=61)	7	34	14 (n=40)
DMF (m)	57	120	88 (n=59)	10	88	52 (n=40)
DZF (m)	57	135	113 (n=57)	70	130	104 (n=41)

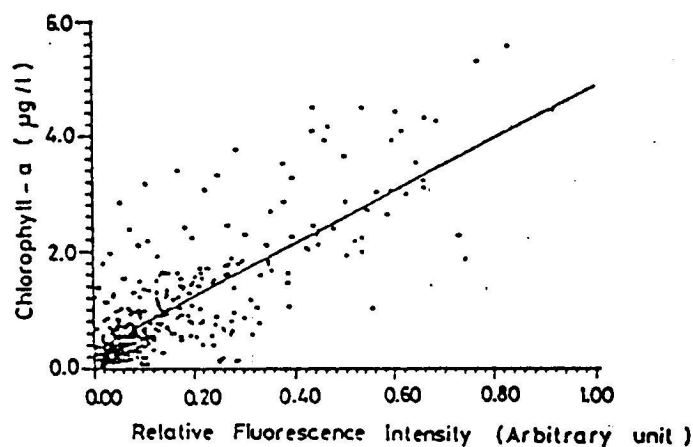


Figure 1. Calibration curve of *in situ* fluorescence and extracted chlorophyll-a (The data from The Sea of Marmara and The Black Sea were influenced for extra support)

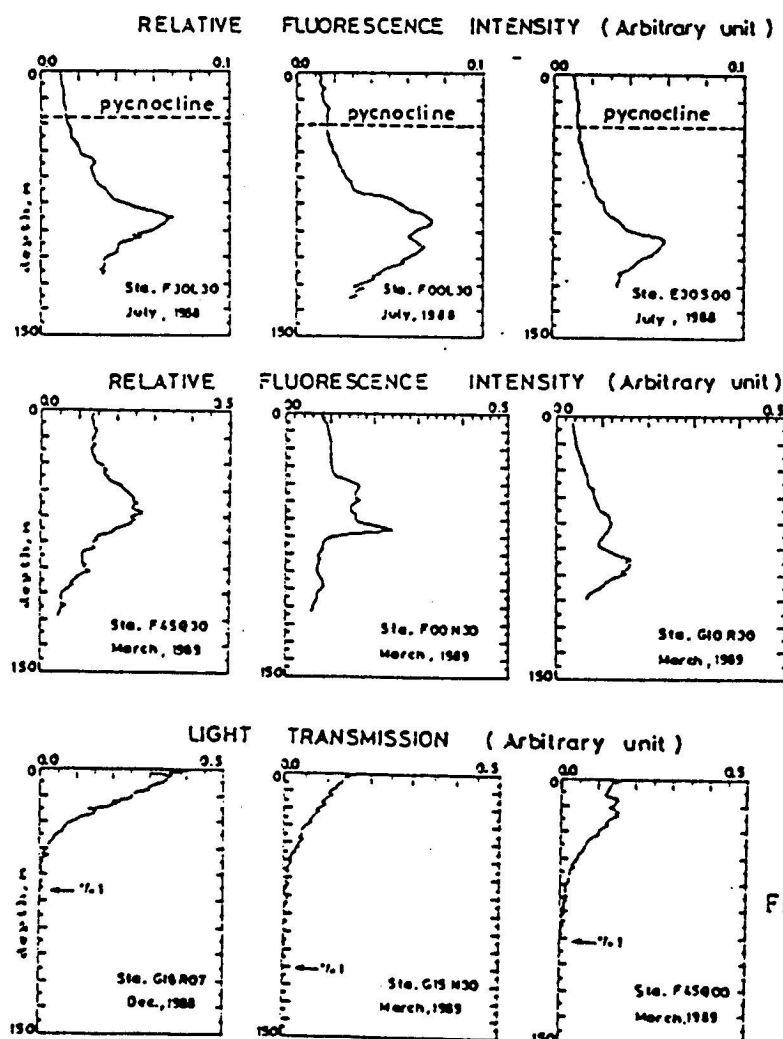


Figure 2. Continuous *in situ* profiles of relative fluorescence and light penetration at selected stations in the Northeastern Mediterranean

30651
767
1990
c.2



FOURTH POEM SCIENTIFIC WORKSHOP

Istituto Studio Dynamica Grandi Masse-CNR
and
Istituto Veneto di Scienze, Lettere ed Arti
Venice, Italy

27 August — 1 September 1990

ODTÖ-DBE KÖTÜPHANE
METU-İMS LIBRARY

