SEASONAL VELOCITY VARIATIONS IN THE CONTINENTAL SIDE OF THE CATALAN GYRE

Jordi Font & Antoni Ballester
Institut d'Investigacions Pesqueres de Barcelona
P. Nacional s/n 08003 Barcelona,Spain.

SUMMARY: Velocity measurements in a coastal currentmeter mooring station near Ebre river delta are analyzed for the period October 1982 - September 1983. Tables of seasonal predominant velocities and power spectra are presented for -8, -50 and -100 m levels.

RESUMÉ : Nous presentons des mesures de courants prises d' octobre 1982 à septembre 1983 près de l'embouchure de l'Ebre à trois niveaux (-8, -50 et -100 m) sur un fond de 165 m. Les tables montrent pour chaque niveau et chaque saison : 1) La direction prédominante, sa vitesse moyenne et le pourcentage de persistance dans cette direction D et dans D ± 30°. 2) l'énergie des principales bandes spectrales (longue période, durée des tempêtes, brises diurnes et inertie).

We present the first complete annual cycle of currentmeter data collected off the Catalan coast (NW Mediterranean) : Casablanca station (40° 43'34"N, 1°21'35"E) October 1982 - September 1983. This mooring is situated over a bottom depth of 165 m near the continental slope off Ebre river delta, and it consists of three currentmeters at -8, -50 and -100 m.

Table I summarizes the dominant velocity for each season and level: most occurrent direction, mean velocity in this direction, percentage in this sector of total measured time and percentage of total virtual displacement corresponding to this direction $\pm$ 30°.

	autumn			winter			spring			summer		
	8	50	100	8	50	100	8	50	100	8	50	100
dir	SSW	SSW	S	SSW	SSE	S	SSW	SSW	S	SW	SSW	S
cm/s	28	28	17	14	10	6	23	7	5	22	11	9
% hrs	24	29	42	15	16	26	8	17	22	17	27	38
% $\pm 30^{o}$	52	59	74	46	37	61	22	41	55	50	65	76

Table I : Seasonal persistences of velocity

To evaluate the relative influence of the different meteorological phenomena on the marine circulation, we computed spectral analysis of currents and calculated the accumulated power in several frequency bands. Table II presents accumulated power values for the bands corresponding to periods of more than 25 days ("permanent" current), 3-4 days (typical storm duration), 24 h (related to breezes, more than to the irrelevant tides) and 18.4 h (inertial period f).

	autumn			winter			spring			summer		
	8	50	100	8	50	100	8	50	100	8	50	100
Longshore current												
>25 d	275	265	183	38	35	24	9	17	13	106	39	35
3-4 d	77	29	14	12	11	7	8	4	2	24	4	6
24 h	12	2	3	4	0	0	27	0	0	11	1	1
f	16	4	5	3	2	0	335	9	5	52	3	3
Cross-shore current												
>25 d	89	115	20	7	7	1	2	3	1	119	12	1
3-4 d	89	44	15	22	15	4	4	7	1	18	8	2
24 h	9	5	2	6	3	1	49	1	0	14	1	0
f	12	6	3	4	2	1	438	11	4	76	5	3

Table II : Accumulated power (relative units) in four bands

This study has been done in the frame of the Spanish-USA Joint Committee project n. CA 83/047.