Tuyen Tap Nghien Cöu Bien, 2001, XI: 57-68

ÑAC ÑIEM ÑONG LÖC CUA DONG CHAY TONG HÔP Ô MOT SO VUNG BIEN THEM LUC ÑÒA VIET NAM QUA SO LIEU ÑO ÑAC DAI NGAY TAI CAC TRAM PHAO

Nguyen Ba Xuan
Vien Hai Döông Hoc (Nha Trang)

TOM TAT Cac ket qua nghien cöu ve ñac ñiem ñong löc cua dong chay tong hôp ô mot so vung bien them luc ñòa Viet Nam qua viec phan tích so lieu ño ñac dai ngay tai cac tram phao trong 6/2000 cho thay: ô vung bien phía nam ñao Cu Lao Cham (Quang Nam), sö bien ñoi cua dong chay tong hôp theo ño sau co xu the yeu dan va bò phan tan theo nhieu höông khac nhau, trong ño höông nam, ñong nam la öu the va ngöôc chieu vôi höông bac, tay bac ô tang mat; ô vung bien Le Thuy (Quang Bình), tö tang mat ñen tang ñay xu the cua dong chay luon luon co höông ñong nam; con ô vung bien phía tay ñao Bach Long Vó (Hai Phong), dong chay co xu the höông bac, ñong bac va nam, tay nam, gan trung vôi höông chay manh cua cac dong nhat trieu K1 va O1. Ô vung bien phía tay Bach Long Vó, dong trieu co toc ño rat lôn so vôi dong trung bình. Xu the chung cua che ño dong trieu ô ca ba vung la do sö chi phoi chu yeu cua cac dong nhat trieu (K1, O1) so vôi cac dong ban nhat trieu (M2, S2).

THE DYNAMIC CHARACTERISTICS OF CURRENTS IN THE COASTAL ZONES OF VIET NAM ON BASIS OF ANALYZING THE DATA MEASURED AT THE MOORING BUOY STATIONS

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SUMMARY Some results of analyzing the currents on basis of using the data measured at the mooring buoy stations of the coastal zones in the period of June 2000 are presented: in the southern regions of Cu Lao Cham island, the changes of currents in the depths are characterized by domination of currents with the northern and north-western in the surface layers and in the bottom layers with the southern and south-eastern directions. In the sea coastal zone of Le Thuy, domination of currents with the south- eastern directions is observed at all the depths. In the western region of Bach Long Vi island, the currents are observed by domination of the north, north-eastern and south, south–western directions. In the western region of Bach Long Vi island the velocity of average current is smaller, but the velocity of tidal current is bigger than in the other regions. In the studied regions the tidal currents are characterized by domination of the tidal diurnal waves O1 and K1.

I. MÔ ÑAU

Bai bao trình bay cac ket qua nghien cöu ve ñac ñiem ñong löc cua dong chay tong hôp ô mot so vung bien them luc ñòa Viet Nam qua viec phan tích cac so lieu ño ñac dai ngay tai cac tram phao trong "ñôt khao sat ñònh ky Bien Ñong", thang 6/2000. Nhö chung ta ña biet, dö an "Khao sat ñònh ky Bien Ñong" ñöôc to chöc ñònh ky hang nam, vôi nhiem vu chính la khao sat va nghien cöu cô ban cac ñieu kien tö nhien va moi tröông cua Bien Ñong. Ñay la mot phan cac ket qua nghien cöu do tac gia lam chu trì, ñöôc trích ra tö cac ket qua nghien cöu tong hôp cua dö an.

II. TAI LIEU VA PHÖÔNG PHAP

Trong bai bao ña sö dung cac day so lieu ño dong dai ngay tai cac tram phao ô vung bien phía nam ñao Cu Lao Cham (ky hieu Tr. LT14), vung bien Le Thuy (ky hieu Tr. LT8) va vung bien phía tay ñao Bach Long Vó (ky hieu Tr. LT1). Tai cac tram phao dong chay ñöôc ño bang may tö ghi DNC-2M tai 3 tang: mat, giöa va ñay, vôi khoang thôi gian ñat ghi tö ñong cua may la 15 phut/1 so lieu. Tong thôi gian tien hanh ño ñac tai cac tram la: 74 giô ñoi vôi tram Tr. LT14; 168 giô ñoi vôi tram Tr. LT8 va 48 giô ñoi vôi tram Tr. LT1. Ño sau trung bình tai cac tram la: 52m (tram Tr. LT14); 31m (tram Tr. LT8) va 33m (tram Tr. LT1). Thôi gian tien hanh ñôt khao sat bat ñau tö ngay 4/6/2000 ñen 21/6/2000. Ví trí cua cac tram phao co toa ño nhö sau:

- φ: 15°43.686'N, λ: 108°43.537'E (tram Tr. LT14).
- φ: 17°14.432'N, λ: 107°00.535'E (tram Tr. LT8).
- φ: 20°08.182'N, λ = 107°40.503'E (tram Tr. LT1).

Qua thöc te ño ñac dai ngay tren bien chung toi nhan thay rang, cac tram phao vôi cac thong so ky thuat thiet ke ña hoat ñong rat on ñònh trong ñieu kien thôi tiet kha khac nghiet vôi toc ño gio co the ñat tôi cap 7. Mat khac nhö chung ta ña biet, viec öng dung tram phao ñe ño ñac dong chay ô bien la mot trong nhöng phöông phap ño ñac ñöôc sö dung pho bien nhat trong hai döông hoc hien nay bôi vì cac so lieu ño ñac tren cô sô sö dung phöông phap nay co ño chính xac va ño tin cay rat cao.

III. KET QUA NGHIEN CÖU

1. Ñac ñiem thong ke cua dong chay tong hôp

Ket qua tính toan thong ke tan suat cua dong chay tong hôp theo 8 höông va theo cac khoang toc ño ô vung bien phía nam Cu Lao Cham, vung bien Le Thuy va vung bien phía tay Bach Long Vó, cho thay rang:

- Ô vung bien phía nam Cu Lao Cham, tai tang 5m, dong chay tong hôp co höông bac va tay bac vôi tan suat öu the theo moi höông la 33%. Dong chay theo cac höông nam, ñong, ñong nam va tay nam ton tai vôi tan suat rat nho, döôi 6%. Dong chay theo cac höông ñong bac va tay chæ chiem khoang 12% theo moi höông (Hình 2). Toc ño trung bình cua dong chay tong hôp la 25,5cm/s va cöc ñai la 57,0 cm/s (Bang 1). Tai tang 20m, dong chay tong hôp vôi cac höông chiem öu the ña bien ñoi ñang ke. Dong chay öu the tai tang nay chæ ton tai theo höông tay bac vôi tan suat xap xæ 34%. Them nöa, neu tai tang 5m dong chay theo cac höông nam va ñong nam hau nhö khong ton tai, thì tai tang nay chung ña xuat hien vôi tan suat kha cao (nam: 21% va ñong nam: 8%). Toc ño

dong chay cöc ñai la 53,0 cm/s chu yeu theo höông tay bac, toc ño trung bình la 18,6 cm/s (Bang 1). Neu tai tang 5m va 20m dong chay theo höông ñong nam khong ton tai hoac ton tai vôi tan suat nho, thì khi xuong ñen tang gan ñay (tang 40m) no ña chiem öu the vöôt tren tat ca cac höông khac (29%). Tan suat cua dong chay theo höông tay bac tai tang nay cung co gia trò töông ñöông vôi höông ñong nam (27%). Dong chay theo höông nam cung co tan suat xap xæ 15%, gan bang mot nöa höông ñong nam. Toc ño cöc ñai cua dong chay tong hôp tai tang 40m la 33,0 cm/s va trung bình la 17,7 cm/s.

Nhö vay, tö cac ket qua phan tích chi tiet ô tren co the rut ra nhan xet ve xu the bien ñoi theo ño sau cua dong chay tong hôp ô vung bien phía nam Cu Lao Cham, ño la: ô cac tang gan mat, dong chay tong hôp co xu the la höông tay bac, bac va nguyen nhan chu yeu la do sö chi phoi cua dong chay gio gay ra. Tuy nhien khi cang xuong sau dong chay cang yeu dan va bò phan tan theo nhieu höông khac nhau, trong ño höông nam va ñong nam la chu yeu. Tai tang gan ñay dong chay tong hôp hau nhö khong con chòu anh höông cua dong gio ma chu yeu do dong trieu chi phoi. Tai tang nay tan suat phan bo cua dong chay chu yeu tap trung ô hai höông chính la ñong nam va tay bac - la höông chay manh cua dong trieu tai vung nay.

- Ô vung bien Le Thuy, mot mat do anh höông cuc bo cua he thong gio mua tay nam kha on ñònh theo höông tay trong suot thôi ky khao sat, mat khac do sö chi phoi cua hoan löu xoay thuan hình thanh ô vònh Bac Bo trong thôi ky mua he, nen dong chay tong hôp co xu the kha on ñònh theo höông ñong nam tö tang mat ñen tang ñay (höông chay doc bô ve phía nam) vôi tan suat öu the lôn hôn 60% (Hình 3). Toc ño dong chay tong hôp co the ñat gia trò cöc ñai la 74,0cm/s ô tang 5m, 62,0cm/s ô tang 15m va 32,0cm/s ô tang 25m (Bang 1). Nhöng ket qua nghien cöu ve xu the cua dong chay tong hôp trong vung bien nay cung ña ñöôc nhieu tac gia trong nöôc ñe cap ñen, tuy nhien con ô möc ño chöa hoan chænh ñe ñöa ra cac ket luan vôi ño tin cay bao ñam [2, 3].

- Ô vung bien phía tay Bach Long Vó, dong chay tong hôp tai tang 5m co höông bac chiem öu the vôi tan suat 39%, höông tay nam vôi tan suat 26% va sau ño la höông nam vôi tan suat 16%. Tai tang 15m, dong chay co cac höông chiem öu the la ñong bac (tan suat 44%) va tay nam (tan suat 39%), dong chay theo cac höông khac hau nhö khong ton tai hoac ton tai nhöng vôi tan suat nho hôn 5%. Tai tang 25m, dong chay cung co xu the töông tö nhö ô tang 15m, töc la co hai höông chu yeu la ñong bac va tay nam, ngöôc chieu nhau (Hình 4). Toc ño dong chay cöc ñai la 61,0cm/s tai tang 5m, 56,0cm/s tai tang 15m va 46,0cm/s tai tang 25m (Bang 1). Tom lai co the rut ra nhan xet rang, dong chay tong hôp tai vung bien Bach Long Vó, tö tang mat ñen tang ñay ñeu co hai höông öu the ngöôc chieu nhau, ño la höông ñong bac va höông tay nam, nghóa la trung vôi cac höông chi phoi manh bôi cac dong nhat trieu K1, O1.

2. Ñac ñiem cua dong trung bình

Dong trung bình la thanh phan dong ñöôc trung bình hoa sau khi ña tach thanh phan dong trieu tö dong tong hôp. Ket qua phan tích dong trung bình cho thay rang:

- Ô vung bien phía Nam Cu Lao Cham, dong trung bình tai tang 5m co höông gan trung vôi höông chiem öu the cua dong tong hôp va co gia trò töông ñoi lôn, vao khoang 19,0cm/s

(Bang 2, Hình 5). Nhöng khi xuong ñen tang 20m va 40m, höông cua dong trung bình quay sang höông tay nam va co gia trò nho hôn 10cm/s.

- Ô vung bien Le Thuy, dong trung bình tö tang mat ñen tang ñay chæ ton tai theo höông ñong nam, gan trung vôi höông öu the cua dong tong hôp. Toc ño cua dong trung bình tai tang 5m va 15m la kha lôn, tö 18cm/s ñen 21cm/s, toc ño dong trung bình tai tang 25m co gia trò nho hôn 9cm/s (Bang 2, Hình 5).

- Ô vung bien phía tay Bach Long Vó, dong trung bình tai tang 5m co gia trò nho hôn 5cm/s va khi cang xuong sau thì co xu the triet tieu hoac co gia trò khong ñang ke, nho hôn 2cm/s (Bang 2, Hình 5).

Bang 1: Toc ño trung bình, cöc ñai va cöc tieu cua dong chay tong hôp
The average, maximum and minimum velocities of currents

Vung nghien cöu	Tang ño (m)	Toc ño cua dong chay tong hôp		
		Trung bình (cm/s)	Cöc ñai (cm/s)	Cöc tieu (cm/s)
Vung bien phía nam Cu Lao Cham (Tr. LT14)	5m	25,5	57,0	8,0
	20m	18,6	53,0	2,0
	40m	17,9	33,0	2,0
Vung bien Le Thuy (Tr. LT8)	5m	31,4	74,0	4,0
	15m	26,3	62,0	2,0
	25m	13,8	32,0	1,0
Vung bien phía tay Bach Long Vó (Tr. LT1)	5m	34,3	61,0	3,0
	15m	27,3	56,0	2,0
	25m	21,5	46,0	2,0

Bang 2: Toc ño cua dong trung bình ô cac vung nghien cöu
The average velocities of currents

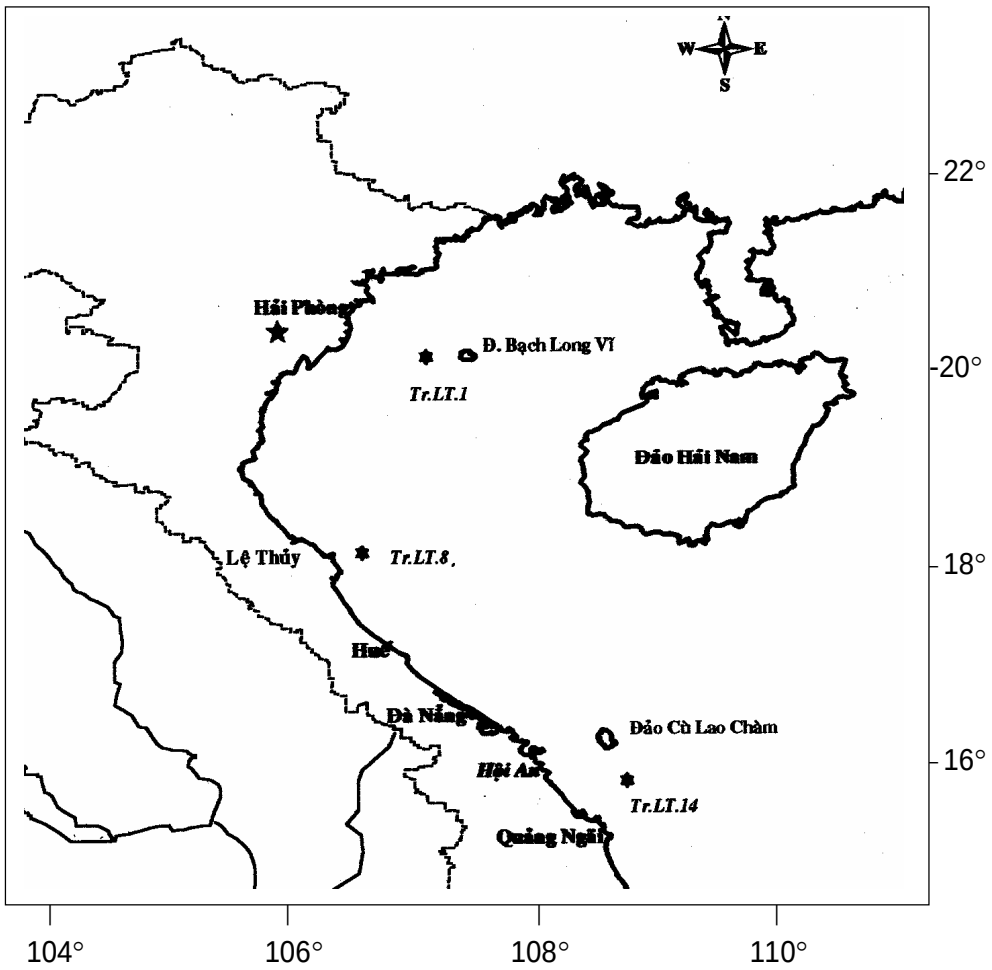
Vung bien nghien cöu	Tang ño (m)	Toc ño cua dong trung bình	
		Toc ño theo phöông vó tuyen (u. cm/s)	Toc ño theo phöông kinh tuyen (v. cm/s)
Vung bien phía nam Cu Lao Cham (Tr. LT14)	5m	-9,3	16,5
	20m	-8,22	-6,21
	40m	-2,44	-1,7
Vung bien Le Thuy (Tr. LT8)	5m	19,98	-20,33
	15m	17,75	-13,02
	25m	8,10	-4,67
Vung bien phía tay Bach Long Vó (Tr. LT1)	5m	-3,69	4,84
	15m	-0,66	-1,45
	25m	0,39	-1,15

3. Ñac ñiem cua dong trieu

Ña sö dung hai phöông phap kha pho bien hien nay ñe tính toan cac hang so ñieu hoa cua dong trieu, ño la: phöông phap "Franco" va phöông phap "Hoa tieu". Phöông phap "Franco" ñöôc ap dung tren cô sô phan tích chuoi so lieu ño ñac ve dong chay lôn hôn hoac bang 7 ngay ñem, con phöông phap "Hoa tieu" thì ap dung chuoi so lieu dong chay trong khoang 2 – 3 ngay ñem. Ket qua tính toan cho thay:

- Che ño dong trieu tai cac vung nghien cöu the hien kha ro net quy

luat öu the tuyet ñoi cua cac dong nhat trieu K1 va O1 so vôi cac dong ban nhat trieu M2 va S2 (Bang 3, Hình 6, 7, 8). Ô vung bien Cu Lao Cham, dong nhat trieu K1, O1 tai cac tang 5m va 20m co höông chay chính la cac höông tay bac va ñong nam va tai tang 40m la höông ñong bac va tay nam (Hình 6). Toc ño dong nhat trieu K1 lôn nhat ô vung bien Cu Lao Cham co the ñat cöc ñai 17,0cm/s. Ô vung bien Le Thuy (Bang 3, Hình 7), tö tang mat ñen tang ñay dong trieu K1 va O1 ñeu co höông öu the la tay bac va ñong nam. Ô ñay dong nhat trieu lôn nhat khong phai la K1 ma O1 vôi toc ño cöc ñai la 31,0cm/s, lôn gap gan 2 lan so vôi toc ño dong trieu K1 lôn nhat tai vung bien Cu Lao Cham. Ô vung bien Bach Long Vó, tö tang mat tôi tang ñay, dong trieu K1, O1 co höông öu the la ñong bac va tay nam va co toc ño rat lôn. Ñieu nay co the nhan thay qua sö phan bo cua cac elip dong trieu K1 va O1 co dang rat det theo höông ñong bac - tay nam. Toc ño cöc ñai cua dong nhat trieu K1 va O1 rat lôn va co the ñat tôi gia trò 40cm/s (Bang 3, Hình 8).



Hình 1: Vò trí cua cac tram ño ñac lien tuc nhieu ngay ñem tren bien, trong ñôt "Khao sat ñònh ky Bien Ñong", thang 6/2000 (ky hieu: Tr. LT1 – tram lien tuc vung bien phía tay Bach Long Vó; Tr. LT8 – vung bien Le Thuy; Tr. LT14 – vung bien phía nam Cu Lao Cham)

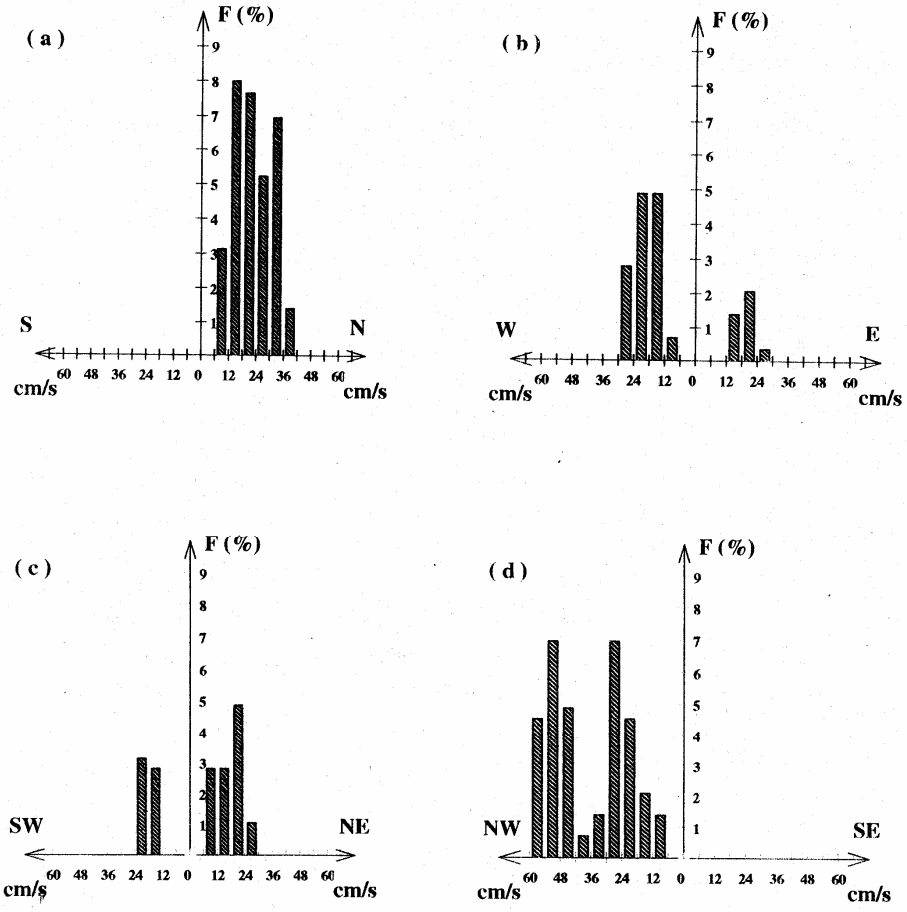
Position of the mooring stations of the marine survey in the period of June 2000

Bang 3: Cac hang so ñieu hoa cua dong trieu
The harmonical constants of tidal currents

Vung bien nghien cöu	Dong trieu	Tang ño (m)	Thanh phan dong trieu theo vó tuyen		Thanh phan dong trieu theo kinh tuyen	
			U (cm/s)	Gu (ño)	V (cm/s)	Gv (ño)
Vung bien phía tay Cu Lao Cham (Tr. LT14)	M2	5m	5,11	20	2,55	308
		20m	0,81	87	1,62	29
		40m	4,12	94	1,9	205
	S2	5m	1,64	58	0,82	346
		20m	0,26	125	0,52	67
		40m	1,32	132	0,61	143
	K1	5m	14,99	242	12,91	47
		20m	11,07	206	12,29	31
		40m	10,67	191	4,09	158
	O1	5m	8,39	191	7,22	356
		20m	6,2	155	6,88	340
		40m	5,98	140	2,29	107
Vung bien Le Thuy Quang Bình (Tr. LT8)	M2	5m	3,57	175	5,31	17
		15m	4,51	166	2,72	342
		25m	2,77	146	1,39	316
	S2	5m	0,5	156	3,74	167
		15m	1,16	33	1,80	359
		25m	1,5	152	1,51	339
	K1	5m	16,38	159	15,43	357
		15m	17,32	175	10,74	5
		25m	9,18	179	7,41	340
	O1	5m	20,69	121	18,18	319
		15m	22,56	133	15,79	314
		25m	12,720	138	8,87	293
Vung bien Bach Long Vó (Tr. LT1)	M2	5m	4,09	257	11	286
		15m	6,41	304	6,94	294
		25m	6,56	317	8,08	301
	S2	5m	0,34	345	0,92	14
		15m	0,53	32	0,58	22
		25m	0,54	45	0,67	29
	K1	5m	11	341	33,54	336
		15m	12,72	309	23,37	312
		25m	10,58	295	16,71	306
	O1	5m	10,56	275	32,2	270
		15m	12,21	243	22,43	246
		25m	10,15	229	16,05	240

- Tom lai co the neu ra mot nhan xet chung sau ñay: cöông ño dong trieu tai cac vung bien nghien cöu co xu the tang dan tö nam ñen bac. Toc ño cöc ñai cua cac dong nhat trieu K1 va O1 tai vung bien Bach Long Vó co gia trò rat lôn, gap gan 2,5 lan so vôi vung bien Cu Lao Cham va 1,5 lan so vôi vung bien Le Thuy. Dong trieu co xu the chay manh theo höông ñong bac va tay nam tai vung bien Bach Long Vó, theo höông tay bac va ñong nam tai

vung bien Le Thuy va Cu Lao Cham.



Hình 2: Tan suat cua dong chay tong hôp theo höông va toc ño ô vung bien phía nam Cu Lao Cham, tai tang 5m, thang 6/2000
(a): Theo höông N-S; (b): Theo höông E–W; (c): Theo höông NE-SW; (d): Theo höông SE-NW
The direction and velocity frequencies of currents in the southern area of Cu Lao Cham island, at the depth of 5m, in the period of June 2000

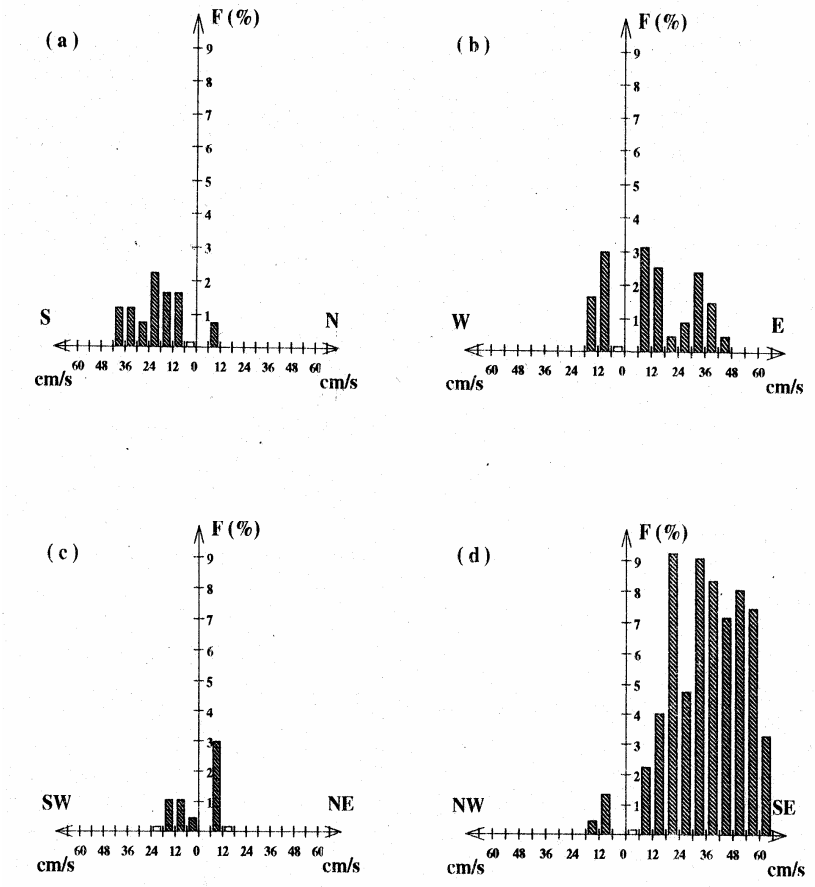
IV. CAC KET LUAN CHÍNH

- Ñac ñiem ñong löc cua dong chay tong hôp tai vung bien phía nam Cu Lao Cham la sö chiem öu the theo höông tay bac cua dong chay gio tai cac tang mat va sö yeu dan ve toc ño va khong on ñònh ve höông khi cang xuong sau hôn. Tai tang gan ñay, khi anh höông cua dong gio la thö yeu thì dong trieu bat ñau chiem öu the. Ô vung bien Le Thuy, mot mat do anh höông cuc bo cua he thong gio mua tay nam hoat ñong kha on ñònh trong vung nghien cöu, mat khac do sö chi phoi cua he thong hoan löu xoay thuan vònh Bac Bo, nen dong chay tong hôp co xu the rat on ñònh ve höông tö tang mat ñen tang ñay. Neu nhö ñac ñiem ñong löc ô vung bien Cu Lao Cham va vung bien Le Thuy chu yeu la do anh höông cua dong chay gio gay nen, thì tai vung

bien Bach Long Vó, ñac ñiem ñong löc chu yeu la do dong trieu chi phoi.

- Tai vung bien Cu Lao Cham va Le Thuy, xu the bien ñoi cua dong trung bình gan giong nhö cua dong tong hôp, chæ rieng ô vung bien Bach Long Vó dong trung bình co gia trò rat nho nen sö anh höông cua no ñoi vôi xu the chung cua dong tong hôp khong ñang ke. Dong trung bình tai vung bien Le Thuy co gia trò lôn nhat so vôi cac vung khac, co the do nguyen nhan trong thôi gian tien hanh ñôt khao sat bò anh höông cua hien töông "dong" va "gio xoay" ñot ngot xay ra vôi toc ño ño ñöôc gan 16m/s.

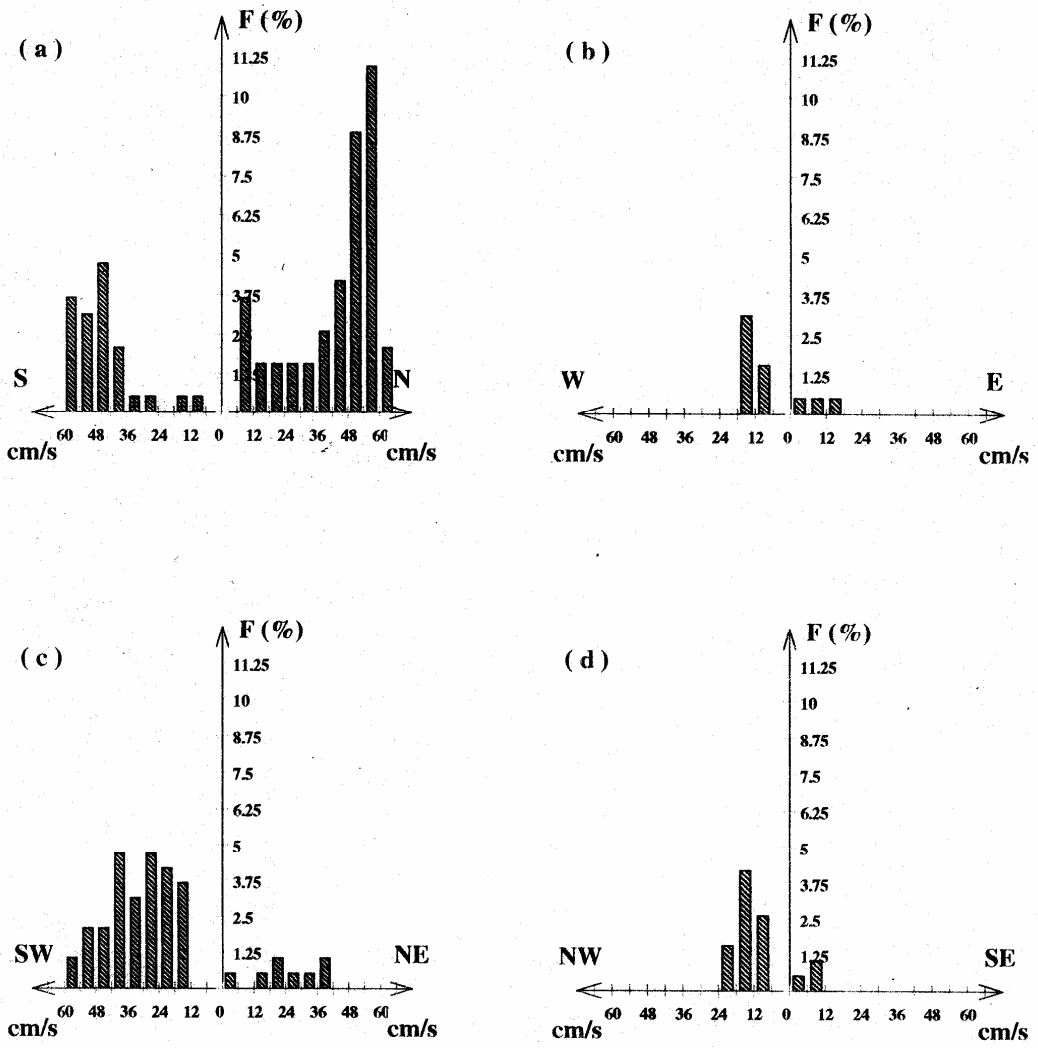
- Xu the bien ñoi cua dong trieu tai cac vung bien them luc ñòa Viet Nam töông ñoi khac nhau. Tuy dong trieu tai cac vung bien nghien cöu chu yeu la do dong nhat trieu K1 va O1 chi phoi, nhöng cöông ño cua chung rat khac khau. Dong nhat trieu cöc ñai ô vung bien Bach Long Vó vôi toc ño co the lôn gap gan 2,5 lan so vôi vung bien Cu Lao Cham va 1,5 lan so vôi vung bien Le Thuy.



Hình 3: Tan suat dong chay tong hôp theo höông va toc ño ô vung bien ven bô Le thuy (Quang Bình), tai tang 5m, thang 6/2000

(a): Theo höông N-S; (b): theo höông E-W; (c): Theo höông NE-SW; (d): Theo höông SE-NW

The direction and velocity frequencies of currents in the coastal zone of Le Thuy, at the depth of 5m, in the period of June 2000 - (a): N-S direction; (b): E-W direction; (c): NE-SW direction; (d): SE-NW direction

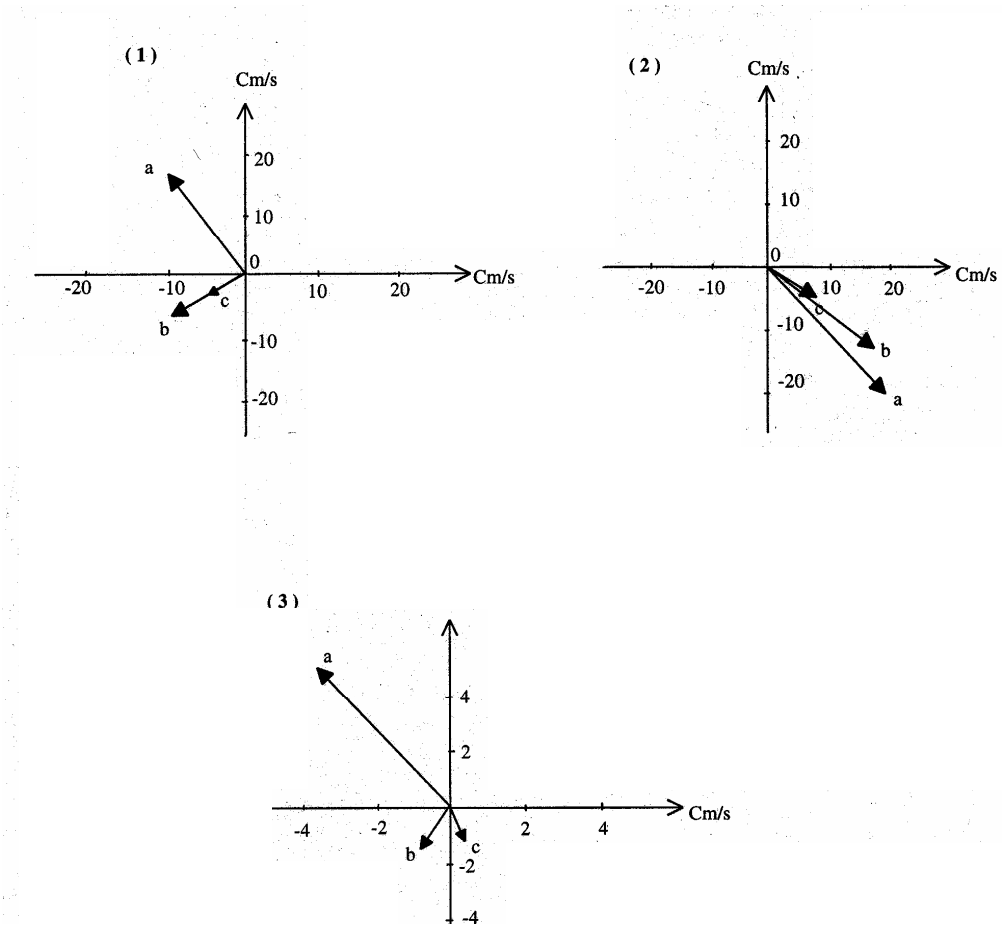


Hình 4: Tan suat dong chay tong hôp theo höông va toc ño ô vung bien phía tay ñao Bach Long Vó, tai tang 5m, thang 6/2000

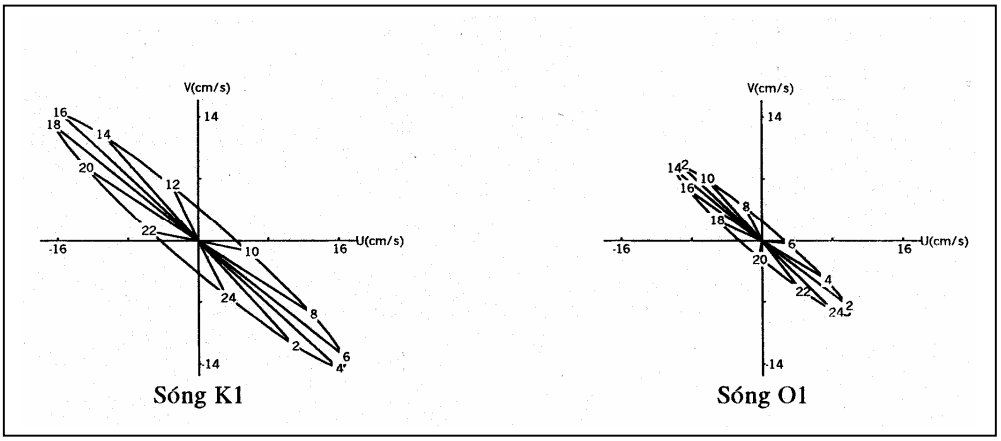
(a): Theo höông N-S (b): theo höông E-W
(c): Theo höông NE-SW (d): Theo höông SE-NW

The direction and velocity frequencies of currents in the western area of Bach Long Vi island, at the depth of 25m, in the period of June 2000

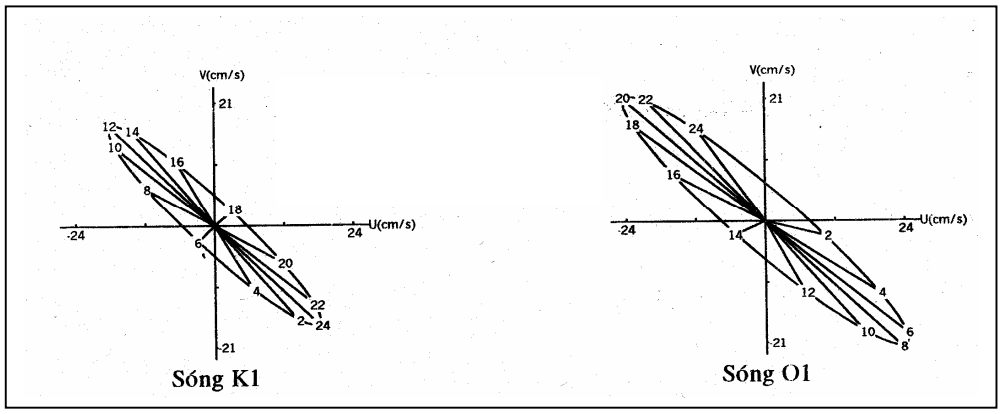
(a): N-S direction; (b): E-W direction
(c): NE-SW direction; (d): SE-NW direction



Hình 5: Vec tô dong trung bình tai cac vung bien trong thôi ky khao sat, thang 6/2000
(1): Ô vung bien phía nam Cu Lao Cham, tai tang 5m (a), 20m (b), 40m (c)
(2): Ô vung bien Le Thuy (Quang Bình), tai tang 5m (a), 15m (b), 25m (c)
(3): Ô vung bien phía tay Bach Long Vó, tai tang 5m (a), 15m (b), 25m (c)
Theo vectors of the average currents - (1): In the south region of Cu Lao Cham island, at the depths of 5m (a), 20m (b), 40m (c); (2): In the coastal zone of Le Thuy, 5m (a), 20m (b), 40m (c); (3): In the region of Bach Long Vi island, 5m (a), 20m (b), 40m (c)



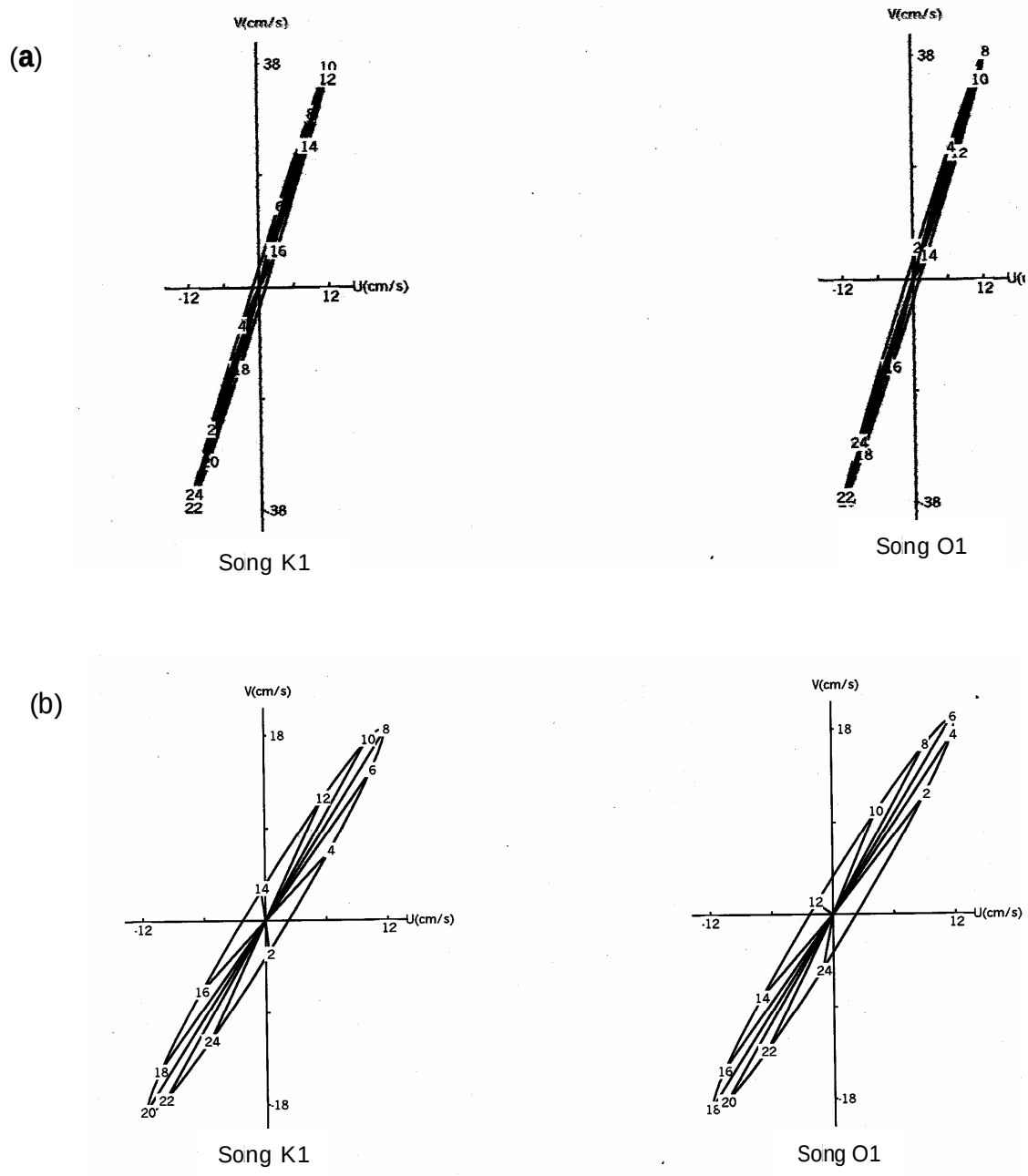
Hình 6: Cac elip dong nhat trieu ô vung bien phía nam ñao Cu Lao Cham, tai tang 5m, thang 6/2000
The tidal diurnal ellips of currents in the region of Cu Lao Cham isl., at 5m horizon, 6/2000



Hình 7: Cac elip dong nhat trieu ô vung bien Le Thuy (Quang Bình)
tai tang 5m, thang 6/2000
The tidal diurnal ellips of currents in the region of Le Thuy (Quang Binh province),
at the 5m horizon, in period of June 2000

TAI LIEU THAM KHAO

1. Nguyen Ba Xuan va ctv, 2000. Ñac ñiem khí töông, thuy van va ñong löc tai cac vung them luc ñòa bac Bien Ñong Viet Nam, qua so lieu ño ñac tai cac tram lien tuc trong ñôt "Khao sat ñònh ky Bien Ñong", thang 6/2000 (Bao cao cac ket qua nghien cöu khoa hoc cua chuyen khao sat, tai lieu chöa cong bo).
2. Nguyen Ba Xuan, 1997. Ñac ñiem thuy van va khoi nöôc tai vung bien Mien Trung Viet Nam (Bao cao chuyen ñe nghien cöu khoa hoc cua ñe tai cap nha nöôc KT-03-01, tai lieu chöa cong bo).
3. Nguyen Tien Ñat va ctv, 1999. Ket qua ñieu tra khao sat cac yeu to thuy van ñong löc va moi tröông mat cat cöa vònh Bac Bo. Tuyen tap bao cao khoa hoc – Hoi nghò Khoa hoc Bien toan quoc lan thö IV, Ha Noi, 12-13/11/2000.



Hình 8: Cac elip dong nhat trieu ô vung bien phía tay ñao Bach Long Vó, tai tang 5m (a) va tang 25m (b), trong thôi ky mua he thang 6/2000

The tidal diurnal ellips of currents in the western region of Bach Long Vi island, at the 5m (a) and 25m (b) layers in the period of the June 2000