

M>D551.466

< L<ehg_gdhDhefnghNmdk , 2013
KZgdI-I_l_j[mj]kdbc[hkmZjkl\ggucmgb\jkl_l
btvlisab@yandex.ru

DBG?F:LBD:KLHYQ? -IKMEUHKKB



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ky ijb ZgZeba_kimlgbdhùoZevlbf_ljbq_kdbo dZjl\p^kkl_fu maehùo ebgbc
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jbq_kdbobaf_j_gbcèyk_\jh -aZiZgZhcqZklbLboh]hhd_ZgZaZ ±]]ihe m
q_gu hp_gdb iZjZf_ljh\bkke_fm fu o heg èbgZ i_jbh^nZahZy kdhjhklv heg
jZkijhkljZgyxsbokyf_fm maeZfbZlZd_jZkklhygb_f_fmihke_gbfb .

Dexq_ù_ IK klhyq_-ihklmiZl_evgu_heguJhkk[bmjh\gvhd_ZgZk_\jh -aZiZgZyqZklbLboh]h
hd_ZgZdbg_fZljbq_kdb_fh^eb .

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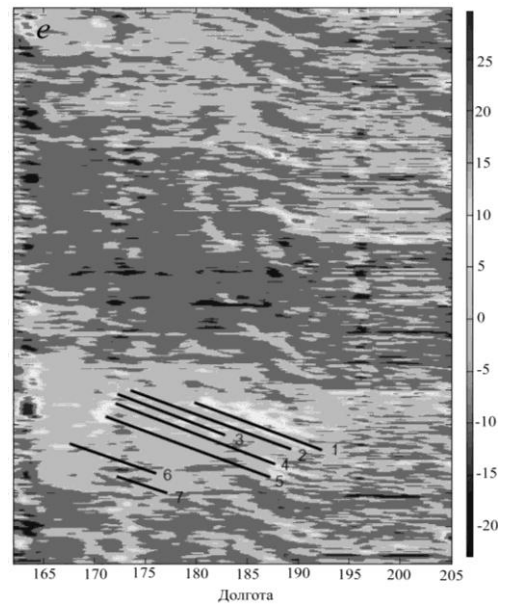
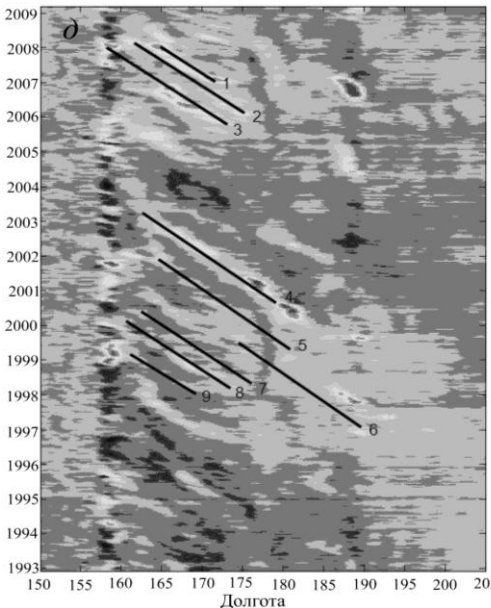
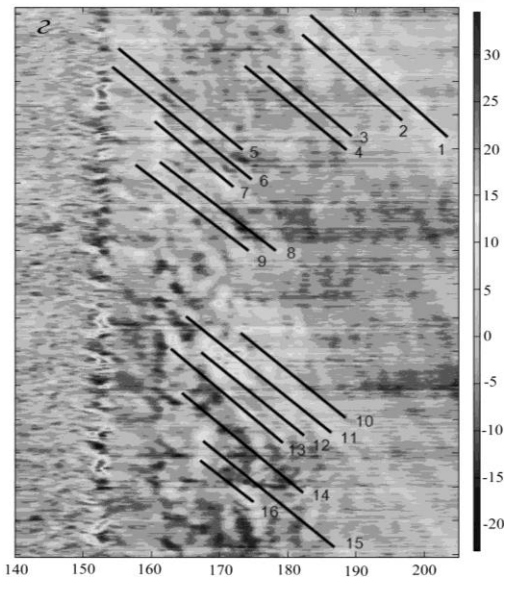
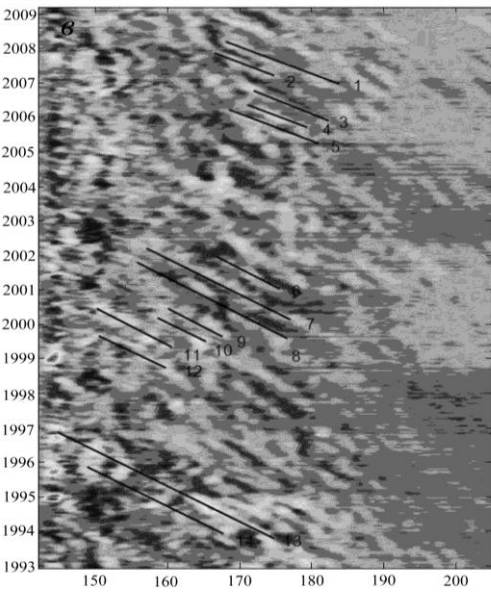
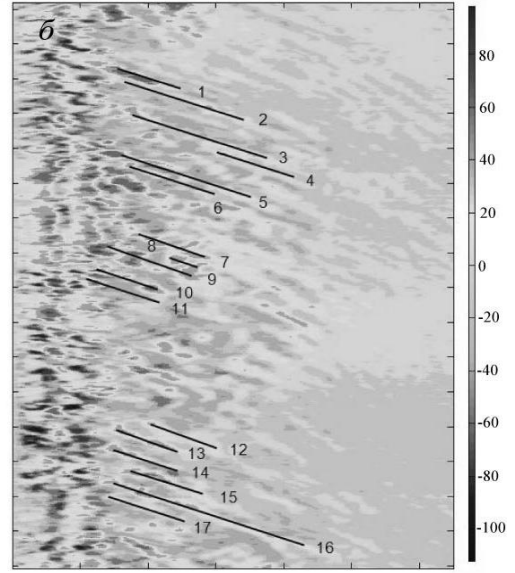
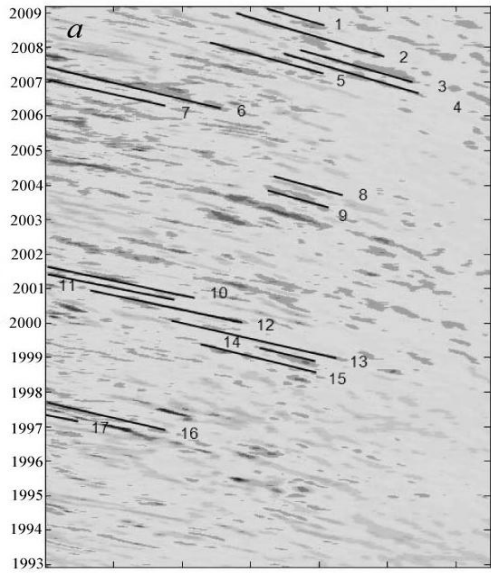
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lZevguoZgguo h dhe_[Zgbyo mjhgycfhjy ijb_dhlhjh]qZklghklb\mjh_gguoi h
eyo_ù^eyxlky maehù_eb gbb_b_gZ[exZxlky kdZqdb_nZa dhe_[Zgbc > ±10]._h_`
_fy_ij_èlZè_gby_h klhyq_-ihklmiZl_evghf_oZjZdl_j_ heg Jhkk[b ijhlbj_q Zl
kehè\bfky_n_ghf_gheh]bq_kdbf_ij_èlZè_gbyf_h_gbadhqZklhlghc heghhc ðg Z
fbd_dhlhju_hibjZxlky_gZ ml_j^gby_hqbkhl ihklmiZl_evghf_lbi_wlbo heghùo

HgZdh j_amevlZlu dhlhju_ g_mdeZ0ZxIky \jZfdb hibkZgby ihklmi Z
 l_evgh]h oZjZdl_jZ ljZb_glgh -boj_uo heg fhgh h[tykglv k ihabpbb klhyq_ -
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 ZlZd_ fm]b_dbg_fZlBq_kdb_hkh[_gghklb heggh]h\`gby .
 klhyq_ -ihklmiZl_evghchegeg_ heghh_ ihe_ ij_ klZey_lkkl_fmklZpbhgZjguo
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 jZagh_baf_g_gb_nZau dhe_[Zgbc_mjhgy gZ ijhlbhiheghmx qlh ihahey_l bgl_ j
 ij_lbjhZlvwlbheghh_`gbydZdklhyq_ -ihklmiZl_evgu_Kb^l_evklhfj_Ze v
 ghklb lZdhc hegghc dgZfbd f h]ml [ulv qZklh gZ[exZ_fu_ \ihe_ heg maehuo
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 Qhygb_mjhgy^haür_gb_mjhgy g_hlebqZ_lky hl gmey dZq_kl_ ijbf_jZ gZ
 jbkij_klZè_guahgZevguo_bahie_luZghfZebcmjhgy k_\jh -aZiZghcZklbLboh]h
 hd_ZgZkù^e_ggufb]j_[gyfbjZkijhkljZgyxsboky heg éy bahie_l`hev bZ
 krù^ _e_gh lj_[g_ cheg éy kr ± éy kr ± éy kr ± éy
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 rbjhlfhghh[gZjmbvbmahuo_ebgb]^mjh\gvg_f_gy_lkybkdZqdbnZa]^
 lj_[_gvhegug_hbZgghij_jZsZ_lkyihhrrm
 Bkihevam_fuc \jZ[h_l_fZkkb\Zevlbf_ljbq_kdhc bgnhjfZpb [ue ihemq_g ba
 [ZgdZZgguo \$,62 ¹ (Archiving, Validation and Interpretation of Satellite Oceanographic
 GDWDijh_dIz'8&6'DWD8QLILFDWLRQDQG\$WLPWHU&RPELQDWLRQ6VWHPdhlhjucyè
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 66\$7j_Zebam_fucNjZ gpmakdbf dhkfbq_kdbf Z]_glklhf&l(6
 >eyihkljh_gbybahie_l\bkohguoZgguo[ZghfZebymjhgy[uebhlnbev] h
 Zgukl_jbq_kdb_dhe_[Zgbyiml_fmZe_gbykj_g_fgh]he_lg_]hk_ahggh]hohZihke_
 q_lhheghZykljmdlmjZgZahgZevguobahie_lZoklZgh\lky [he_ùjZ_gghc wlhi h
 ahey_l_ù^eblv hl^evgu_ lj_[g_b heg b hij_ ^eblv iZjZf_lju gZ[exZ_fuo heg
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 jZkkqblZgguo_ ihahgZevguf bahie_lZf éy dZhc rbjhlugZhl^evguo m qZkldZoi h
 klmiZl_evgh]h\`gby hegu LZ[ebpZ

OzjZdljbklbdbhegJhkkbihkimlgbdhufahgZevguf
 ZljhfhlelZmjbyh -aZghhZ

kr		kr		kr		kr		kr		kr	
L	T	L	T	L	T	L	T	L	T	L	T
620	110	905	284	522	162	385	284	109	110	143	122
425	73	862	243	522	162	370	243	315	219	103	81
425	73	905	284	427	122	385	284	576	365	103	81
680	110	905	284	617	284	385	284	360	292	168	162
890	146	905	284	474	203	385	284	274	183	168	162
540	73	774	162	332	162	294	162	360	292	113	122
540	73	949	284	617	162	389	284	159	110	103	81
480	73	949	284	522	243	389	284	245	219	103	81
720	110	774	243	522	162	364	243	576	365	168	162
720	110	862	243	522	162	322	243	360	292	168	162

¹ <http://atoll-motu.aviso.oceanobs.com>



JbkAhgZevgu_bahie_luZghfZebcmjhgyfhjyih
 b kr _k u^e ggufb i_j_f_s_gbyfb lj_[g_c heg \bkohguo Zgguo
 kj_g_fgh]he_lgbck_ahggucohfnZe_g

Z), 35 ([), 40 (\), 45 (]), 50 (^)

HljZsZx lgZk [y\gbfZgb_i_kljZydZjlbGZq_j hZgbciehb_l evguobhlj b
 pZl evguoZghfZebcmjhgyhd_ZgZgZZevlbf_ljbq_kdbodZjlZobkms_klhZgb_maeh\
 maeh\uo ebgbc\dhlhjuo mjh\gv_g f_gy_lky b^y dhlhjuo oZjZdl_jgh kdZqdhh [
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L_jfbg @klhyq_-ihklmiZl evgZy^a klhyq_-ijh]j_kkb\ZyhegZbkihevam_lkydZd\
 aZjm[_ghc ebl_jZlmj_ standing-progressive wave beb progressive-standing wavelZdb\
 jmkkdhyauqghcgZmqghcebl_jZlmj_kfgZij ., [11, 12]).

HgZdhk_ljh]b_hp_gdbiZjZf_ljhklh yq_-ihklmiZl evguoheg Jhkk[b hafh\gu
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 lky [m^nl kh\ZZlv k maeZfb klhyq -ihklmiZl evghc hegu MqZkldb_f_fmZmaeZfb
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 guo]_hf_ljbq_kdbonhjbfb_xlhgmblm`h[smxkljmdlmjm ± jZkijhkljZgyxsb_ky
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 gu HgZdh [sZyl_hjby]jZb_glgh -boj_uoheg\ aZfdgmluo [Zkk_cgZo_s_g_h k
 lZlhqghjZabZ .

Fh^evklhyq_ -ihklmiZl evghchegufh_l[ulvaZibkZgZ\ ke_^mxs_f b^

$$[: \cos mx \cos ly \cos Vt \quad kx \quad ny . \tag{1}$$

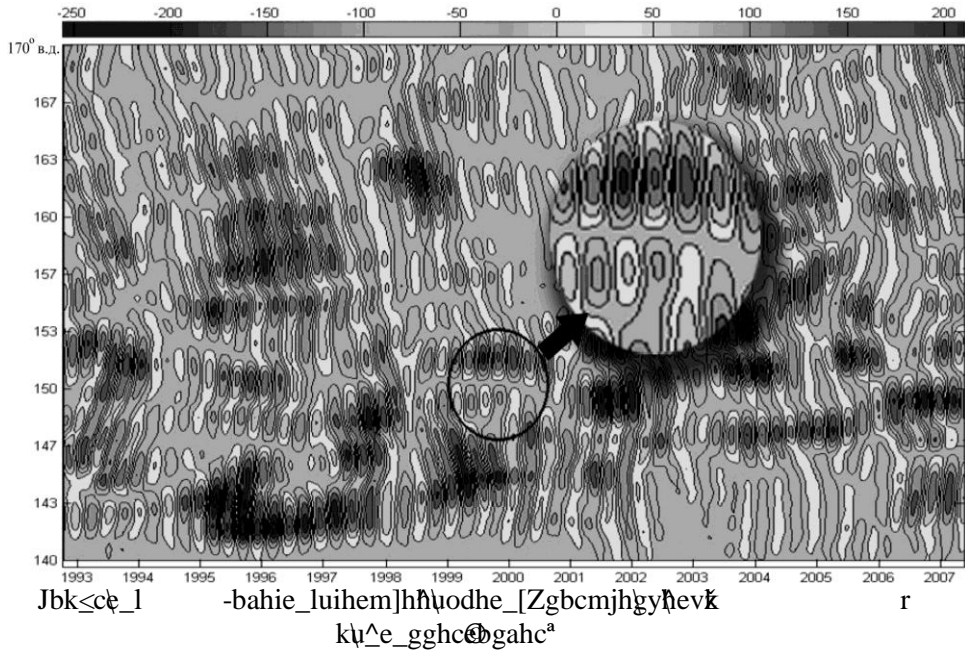
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 \ebqbgZfbdlhju_h[jZlghijhijpbhgZevguijhkljZgkl_ggufjZaf_jZfyq_cdb ; :
 ± ZfieblmZklhyq_ -ihklmiZl evghchegu

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 qb^klvdhe [ZgbcnbdkbjhZggh]hfZkrlZ[Z .

d Zq_kl\ijfb_jZ^ ey^lZevgh]hZgZebaZklhyq_ -ihklmiZl evghcckljmdlmjuheg
 Jhkk[b jZkklfhljfb\c_e_l -bahie_lu ihem]h^h]hfZkrlZ[Z GZjkb ij_RlZ_e_gu

ahgZevgu_\cè_l -bahie_lumjhgyLboh]hhd_ZgZèykrhlhñ h
 kljh_ggu_ih^ Zgguf AVISO. GZjbkmgd_fhghlf_lblvoZjZdl_jgucgZdehg_\cè_l -
 bahie_ldhlhjucihdZauZ_li_j_f_s_gb_mjhgy_\cè_l -bahie_lj_bfms_kl\ggh\
 aZiZghf_gZijZè_gbb Djhf_lh]h a_kv fhgh h[gZjmblv maehù _ lhq db bj_ad mx
 kf_g mnZau hegu Hðg ba lZdbo ijb_f_jhèy i_jbhZ 1999±]] \m\ebq_gbb
 i j_klZè_g gZwlhfjbkmgd_ : \ maehhc_lhq_ mjh\gvg_f_gy_lkyZnZaZ hegu kdZq
 dhh[jZaghabaf_gy_lkygZijhblbhihehgmx



Kh]eZkghl_hjbbi_ jbhù ihklmiZl_evguohègJhkk[bkhlZèyxl hlg_kdhevdbò
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 f_ljh\ >eyk_\jh -aZiZghcqZklbLboh]hhd_ZgZihbahie_lZfjZkkqblZ gub ij_klZ \
 e_gu \ lZ[e kj_èb_wfibjq_kdb_oZjZdl_jbklbdb klhyq_ -ihklmiZl_evguo hèg ±
 èbgZi_jbhñZkklhygb _f_ñmaeZfbbnZahZykdhjhklvjZkijhkljZgyxsbokyf_
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 hggufkhhlg_r_gbyf .

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IzjZfljujZkijhkljZgyxsbokyf_ñmaeZfbklhyq_
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-ikmiLguohg]b

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	30	35	40	45	50	55
Kj_èyyèbgZhegudf	604	879	508	367	333	134
Kj_èbci_jbhñml	95	259	182	259	245	121
JZkklhygb_f_ñmaeZfbdf	>2000	>2200	>1800	>1800	>800	>800
NZahZykdhjhklvj_ñmaeZfbkfk	7.4	3.9	3.2	1.6	1.5	1.3

I_j_c^f l_i_jv djZkkfhlj_gbx dbg_fZlbdklhyq_ -ihklmiZl_evguohègJhkk[b
 bkihevamy_l_hkljhn bq_kdh _ ijb[èb_gb _;m^f bkohðlv ba lh]h qlh hègZo wlh]h
 lbiZkhojZgy_lky[ZèZgkkbel _ . mdehgumjhgymjZgh_rbz_xlkyhldehgyxs_ckbehc
 jZs_gbyA_feb

$$U = \frac{g}{f} \frac{w}{wy}, \quad V = \frac{g}{f} \frac{w}{wx}. \quad (2)$$

$A^{\wedge}kv \ U \ b \ V \ \pm \ khklZ\eyxsb_]_ hkljhnbc_ kdchckdhjhklbl_ q_ gby \ ; \ g \ \pm \ mkdhj_ gb_ kh[h \ ^$
 $gh]hiZ^{\wedge}gby \ f \ \pm \ iZjZf_ ljDhjbhebkZ$

Ba nhjfme (1), (ihemqbfujZ_ gb_ \eykhklZ\eyxsbokdhjhkl_ cl_ q_ gby

$$\begin{aligned} \overset{\circ}{U} &= \frac{g}{f} A \cos mx \ l \sin ly \ \cos Vt \ kx \ ny \ n \cos ly \ \sin Vt \ kx \ ny \\ \overset{\circ}{V} &= \frac{g}{f} A \cos ly \ m \sin mx \ \cos Vt \ kx \ ny \ k \cos mx \ \sin Vt \ kx \ ny \end{aligned} \quad (3)$$

>ey ihgbfZgbydbg_fZlbdbye_gbyhibkuZ_fh]hnhjfmeZfb_bjZkkfh 1
 jbfg_kdhevdhijhkluofoh^e_c

IhklmiZl_evgZy\hegZ [: \cos Vt \ kx . \ahjfmeZo \eyjZkq_lZl_q_gbc ijb
 qbke_gghcj_ZebaZpbb aZZ\Zebk v ke_fnxsb_iZjZf_lju A = 1, k = \pm 2\GjZdf 1
 \CEjZkml . A^{\wedge}kvihklmiZl_evgZy\hegZ\ebghe dfbi_jbh\hf kmljZkij h
 kljZgy_lky\azizghfgZijZ\egbbknZah\ckdhjhklvx .kfkAhgZevgu_b_gby
 qZklbp_hlkmklmxl qZklbp_f_jb\dh gZevghfgZijZ\egbbkh_jrZxl hj[blZevgu_
 b_gby \hegZi_j_f_sZykv\azizghfgZijZ\egbbijhyey_lky_hi_j_qguol -
 q_gbyoi_ji_g\bdmeyjghgZijZ\egbxjZkijhkljZg_gbyheguL_q_gbyhlkmklmxl\
 h[eZklyowdklj_fZevguoagZq_gbc mjhgyb\hklb]Zxl fZd kbfZevguoagZq_gbc\h[eZ k
 lyo gme_h]h mjhgy b ijb kf_g_]h agZdZ wlb f_jb\dhgZevgu_l_q_gby ihkl_i_ggh
 mf_gvrZxlkyih_ebqbg_hklb]Z y gme_uoagZq_gbc\wdklj_fZevghch[eZklbihe_
 q_]hf_gyxl gZijZ\eg_gb_gZijh\lbiheh\gh_

AhgZevgZyklhyq_ -ikmi\eg\hgZ [: \cos mx \ \cos Vt \ kx .

Ak A = 1, k = \pm 2\df1 \Zkml m \ZdfJZkklhygb_f -
 \nmaeZfb\jZaZij_urZ_l\ebgm\hegumaegZoh\lky\lhdqZo x Sj/m, j = 0, 1,

2, \Z jZkijhkljZgyxsZyky gZ aZiZ\hegZ dZd b \ij_ufns_c fh^eb ijhyey_lky
 lhevdhf_jb\dhgZevguol_q_gbyo\ebqbgZkdjhklbl_q_gbc\hklb]Z_lfZdkbfZevguo
 agZq_gbc\hjhglZevguoahgZoaZnbdkbjhZgguoGZjbkmgd_k]ms_gb_fbahebgbcmjh \
 gy \h[eZklyo fb gbfZevguo b fZdkbfZevguo agZq_gbc mjhgy l_q_gby hlkmklmxl b
 kdjhklb\hklb]ZxlgZb[havrboh[eZklyok]ms_gbybahebgbc

G_ljm\gh ihgylv qlh h [_jZkkfh]j_ggu_fh^eb_g_khh\ \lklmxl gZ[exZ_fuf
 gZZevlbf_ljbq_kdbo dZjlZo i_j_f_sZxsbfky g_h\ghjh\ghklyf \ihe_mjhgy b ke -
 \hZl_evgh g_fh]mlZ^dZlgh hibkZlv jZkijhkljZgyxsb_ky \azizghfgZijZ\egbb
 heguJhkk[b

AhgZevgZyihklmiZl_evgZy\hegZ]Zjfhgbq_kdbfh\nebjhZggZyihZfiebl m
 \^f_jb\dhgZevghfgZijZ\egbb [: \cos ly \ \cos Vt \ kx . J_ZebaZpby fh^eb[ueZ

ijh_^gZijbke_fnxsb_iZjZf_ljZo A = 1, l \CEjZdf k = \pm \CE jZ^/df 1
 \Zkml JZkklhygb_f_nmaeZfb\ 2 jZaZij_urZ_l\ebgm\hegujZkijhklj Z

gyxsmxky\azizghfgZijZ\egbb A^{\wedge}kv \heqb_hl ij_ufnsbo fh^e_cm_ ij b
 kmlklmxl \ khklZ\eyxsb_]_ hkljhnbc_ kd]hl_q_gbyahgZevgZybf_jb\dhgZevgZyZ

ihe_mjh_gghe ih_joghklb ijbgbfZ_lyq_bklmx kljmdlmjm AgZq_gby mjhgy baf_g y
 xlkyhl \h Qbke_ggZyj_ZebaZpbyihdZaZeZqlh\ ihe_mjhgyh[jZam_lkyrZofZ 1

gZy miZdh\Z g_h\ghjh\ghkl_c pbdehgbq_kd]h b Zglbpbdehgbq_kd]h lbiZ dhlhju_
 i_j_b]Zxlky\azizghfgZijZ\egbb<dlh]Z]_hkljhnbc_kdbokdhjhkl_c\hklb]Zxl

fZdkbfZevguo agZq_gbc gZ ljZgbpZo wlb oi_j_f_sZxsboky g_h\ghjh\ghkl_c \mae h
 \uoebgyo\ulygmluo\ahg ZevghfgZijZ\egbbf_jb\dhgZevgZykhklZ\eyxsZyhlkm 1

klm_lZ\dlhjZahgZevghc khklZeyxs_c gZijZē_gu khh\lklbb khagZdhfi_j _
f_sZxsbokyg_hghjhghkl_c

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fZkrlZ[guohd_Zgkdbowdki_jbf_glZ olZdb ogZijbf_j dZd@]Ziheb]hgZd` k _
]Z_ljZdlhZebkv kihabpbc_boy_hc_ijkjhû wlbo_g_hghjhghkl_c b_bodbg_fZlbdZ
g_kyauZeZkvkheghhc_b_gZfbdhc

th`_j_fy ij_ēh`gZy_ür_ ijhklZy fh^ev Z^dZlgh hibkuZ_l gZ[e x
Z_fh_yē_gb_ QofZlgmx`yq_bklmx_kljmdlmjmi_j_f_sZxsbokyg_hghjhghkl_c
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HgZdhwlZfh^ev g_hljZZ_lj_adb_nZah`_baf_g_gbymjhgy `u^ey_fu_ gZ
Zevlbf_ljbq_kdbodZjlZo dhlhju_d Zd_m`_hhjbehkv fukyauZ_fkijbjhcklh y
q_`ihklmiZl_evguohegKe_fnxsbcrZ]Z_lZdmx`hafhghklv

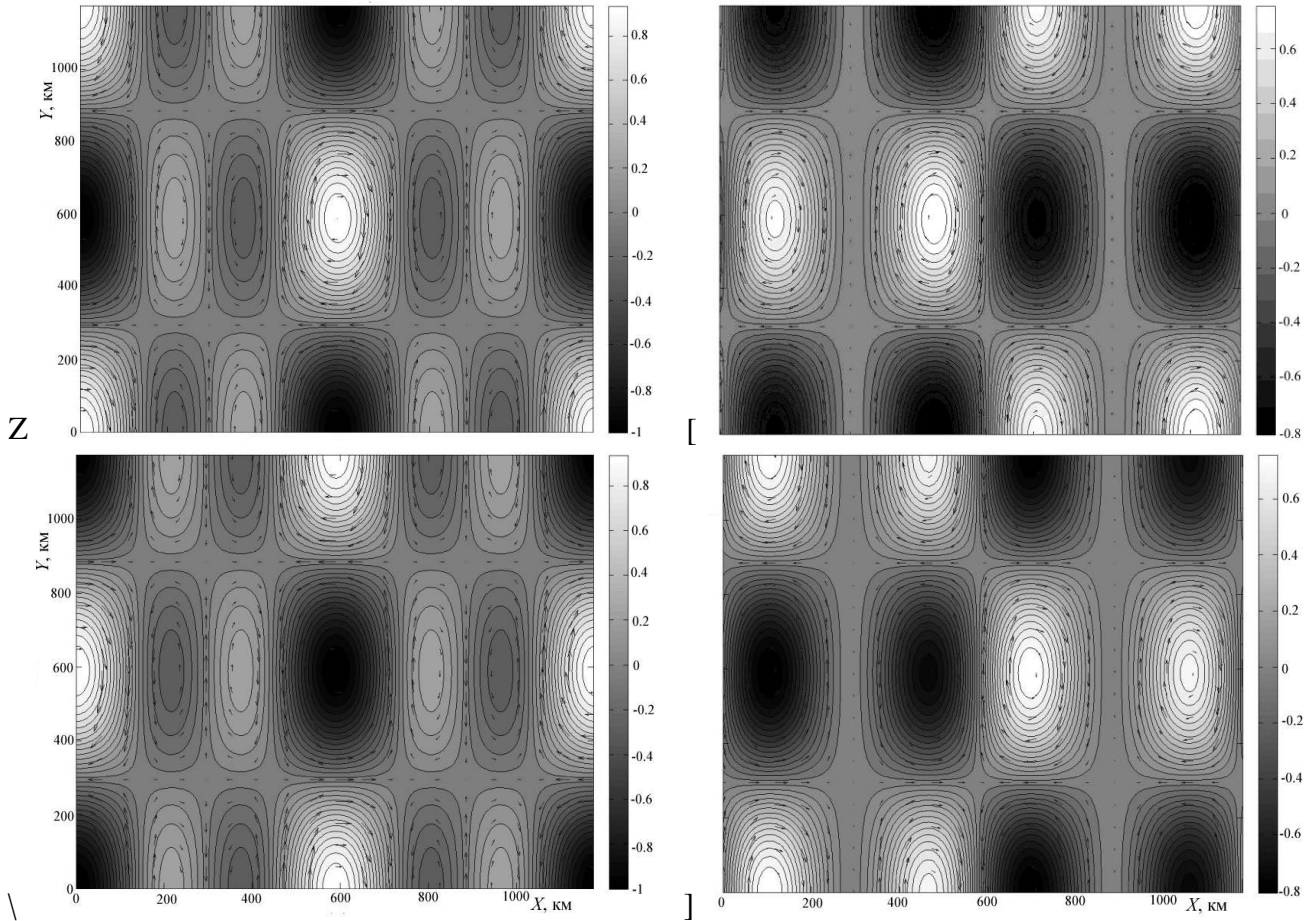
Klhyq_ **-ikmiLgZbgZ** **njfmou** J_ZebaZpby_wlhc fh^eb ij_ ^
klZē_gZgZjbki_jbke_fnxsoiZjZf_ljZo m = l = QZdf k = ±2QZdf n
= 0, 1 = 2QZkml GZ_jbkmgd_ ihdZaZgu_ljZgknjhfZpby heghhc ih`_joghklb b
ihe_kdhjhkl_cjZaebqgu_fhf_glu`_f_gbH[jZlbfgbfZgb_gZyq_bklmx_kljmdl m
jmbaf_gqbhklbmjhgy_ijkb_fu^eyxlky_g_lhevdaHgZevgu_maeh`_ebgbbgh b
f_jb`bhgZevgu_maeh`_oebgbyokdhjhklbl_q_gbcbf_xlj`_jkb`gucoZjZdl_jijb
wlhfahgZevguo_maeh`_oebgbyohgbf_gyxlky_gZijZē_gbbaZiZ^ ±hklhdZf_j b
bhgZevguo ±k`_j ±x]

<ebqbgZ_yq_cdb ± jZkklhygb_f_m_maeZfb klhyq_c hegu_h]b[Zxs_c j]miuu
wg_j]hg_kmsboihklmiZl_evguoheg ± jZkq_lZo_jZaZij_ürZxlēbgmhēgu?kl _
kl`_gghqlh_kebf_m_maeZfbklhyq_c hegu@deZ`Z_lky`_kdhevdehēbgihklmi Z
l_evghc hegubaf_gqbhklvj_ev_nZmjh`_gghcih`_joghklbagZqbl_evghmkehgy_lky
< gZqZevgucfhf_gl`_f_gbp_glj_[Zkk_cgZ`gmljbijyfhm]hevghcyq_cdbkh
k_oklhjhghljZgbq_gghcklZpbhgZjgufbmaeh`_fbebgyfb jZkiheh`_glj_[_gvh e
guZ_gZaZiZ^`bhklhd_ ± __ihfrZ_Maeh`_ebgbbnjfbjmxlyq_cdb`Zhc ba
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jZgZgmexj_bk , Z).

Q_j_a_q_l`_jlv_i_jbhZ heghhc_j_ev_nkf_sZ_lky_gZ_aZiZ`yq_cd_hagbdZ_l
bihev `dhljhfh]j_[_gvjZkiheh`_g`_aZiZ`hcqZklbyq_cdbZihfrZ ± hklh q
ghcWlhlbihevbf_lfZdkbfZevgu_kdhjhklbgZ]jZgbp_jZa^eyxsbcqZklb`bihey
£_jb`bhgZevguo_maeh`_oebgbyo`_ebqbgukdhjhkl_c_l_q_gbcmf_gvrZxlky`ngmey
ihke_q`_hl_q_gby ihkl_i_gghf_gy_xl kh_gZijZē_gb_gZijhlbhihehgh :gZe h
]bqgZykbmlZpbyhlgkblkybd ahgZevgufmaeh`_fbebgyfjbk , [).

Q_j_a_iheh`bgmi_jbhZ_p_glj_yq_cdbhdZauZ_lky_ihfrZ_ZgZ_aZiZ^`bh
lhd_ ± lj_[_gv hegu`_u^e_gghcyq_cd_h[jZam_lk y_boy_h_h[jZahZgb_ijkh\ h
ihehgh]h agZdZ_kfZdkbfZevgufb kdjhklyfb_gZ`_hi_jbn_jbbZ`_maeh`_oebgbyo
kdjhklbl_q_gbc`hklb]Zxlk`boi_jhgZqZevguo agZq_gbcghbf_xl_ijkhbiheh
gu_gZijZē_gbyjb k , \).

?s_q_j_a_q_l`_jlv_i_jbhZ_wdklj_fmfu kf_sZykv_gZ_aZiZ`h[jZamxl_p_glj_`
yq_cdb`bihev_ijkhbihehgh]h agZdZ`dlhjZkdjhkl_c_baf_gbeb_gZijZē_gby_gZ
ijkhbihehgh _j_bk]).



Jbk kēghū hafms_gby \ihe_ haur_gbc mjhgY rdZeZ agZq_gbc kijZZ
 b kdhjhklb l_q_gbc klj_edb ± \dlhZ kdhjhklb l_q_gby jZkkqblZgghc \jZaebqgu_
 fhf_gluj_f_gb
 Z ± \gZqZevguc fhf_gl [± q_j_a q_l\lv i_jbhZ \ ± q_j_a ihehbgm i_jbhZ
] ± q_j_ai_ jbhZ .

LZdbfh[jZahfij_ñlZe_ggZy gZjbc 3 fh^evklhyq _ihklmiZl_evguohegye y
 _kyñklZlhhqghh[s_cb Z_lZ^dZlgh_ij_ñlZe_gb_h dbg_fZlbd_ñegJhkk[bñ h
 jyobhd_ZgZo
 ZgghcZ[hl_fugZf_j_gghg_jZa^ey_f[Zjhljhigu_b[Zjhdebgnu_ñegukq b
 lZyqlhh[sZydbg_fZlbdZheghuob`gbcwlbolbi ZohegñegZ[ulvihñ[gZ
 LZdbfh[jZahfij_dbkehñbfkyn_ghf_gheh]bq_kdbfij_ñlZe_gbyfhgb a
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 ñeguFbjhñfhd_Zg_yeyxlkyij_bfms_kl_gghklhyq_ -ihklmiZl_evguñb Bkke_^ h
 Zgb_dbg_fZlbd_kdbo hkh[_gghkl_c_ñeg_gZhkgñ_kimlgbdhñ Zevlñf_ljbq_kdbo b a
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Ebl_jZlmjZ

1. L_q_gby \DZkibckdhf fhj_h[mkehñ_ggu_kñ[hñufñgbadhqZ k
 ihñufñbñegZfbF_l_hjeh]byb]bñeh]byK ±77.

2. ijhkljZgkl_ggh -j_f_gguofZkr bŷ>bgZfbdZŷZelbckdh]hfhjyŷkbgihlq_kdhfŷZiZahg_ lZ[hKI[=bŷhf_l_hbaZlk
3.]bŷheK 65. Kh[hŷu_gbadhqZklhlgu_heguŷZelbckdhffhj_F_lb
4. hd_Zg_Db_GZmdhZmfdfZk L_hjby wdZlhjbZevguo ijhlbhl_q_gbc \Fbj hhf
5. =jZb_glgh -bŷj_u_heguhd_Zg_KI[k
6. H clhyq_ -ihklmiZl_evguo hegZo Jhkk[bŷfhj_bhd_Zg_ <kIKI[=M 2012. K_j ŷiK ±103.
7. ;Zjhljhigu_klhyq_ -ihklmiZl_evguo_heguJhkk[bIhlhdbkljmdlmju\ bŷhkllyonbabdZ]_hkn_jL_abkuhdeŷZbŷhklhdBaŷZevg_hkl . n^ . mgIz 2011. K.255±259.
8. *Belonenko T.V., Foux V.R., Zakharchuk E.A.* Gradient-vorticity waves in the world ocean. Lap Lambert Academic Publishing GmbH & Co. 2010. 408 p.
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10. GbadhqZklhlgu_hegu \wdZlhjbZevghc b ljhibq_kdhc ahgZo Lboh]h hd_ZgZ <kl KI[=MK_jŷiK 101.
11. >bgZfbdZhd_Zgkdboijbebh\ -_baŷ_j_jZ[bŷŷiE=bŷhf_l_hbaZl k
12. -AgvdhbqKY ka[m^gb_ijh]j_kkbŷgh -klhyqbo hegNZjZ^y >hde :GLK ±479.
13. =_hnbabq_kdZy]bŷŷhgZfbdZŷFFbjK
14. ke guhd_Zg_l_jkZg]eihŷ_ŷhjhŷhZ:BE_hglv_ZFFbj Lk
15. *Johnson E. R., Clarke S.R.* Rossby Wave Hydraulics // Ann. Rev. Fluid Mech. 2001. V.33. J .207±230.
16. ;_jde_kdbcdmjknbabdbkeguFGZmdZL k
17. Baf_gqbŷklv mjhgy c_jh - aZiZŷhcqZklbLboh]hhd_ZgZKI[Ba^ -hKFBH -IJ?KKk
18. Hd_Zgkdb_bŷjBMNGLK ±47.

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