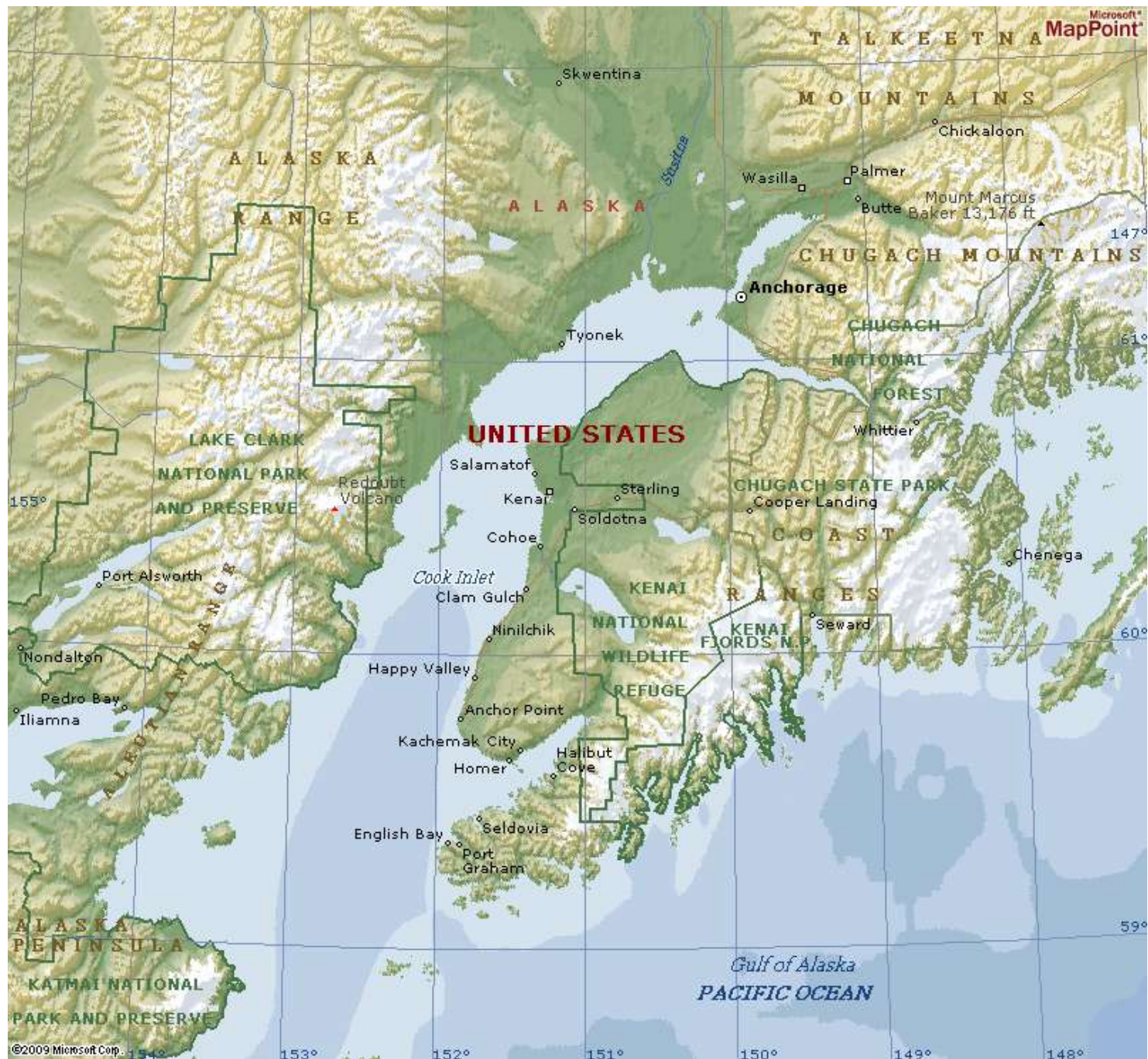
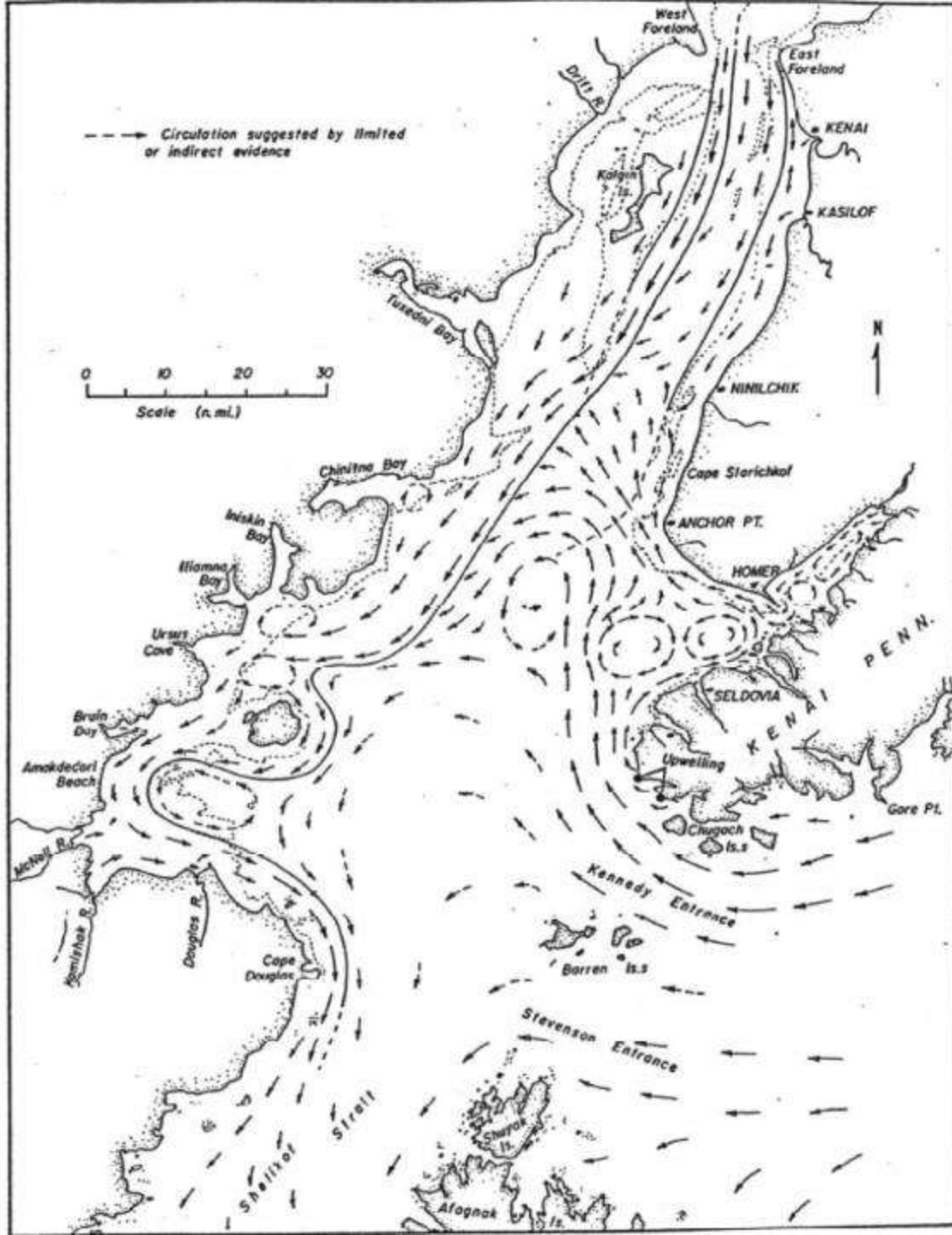


Overview: Cook Inlet Oceanography

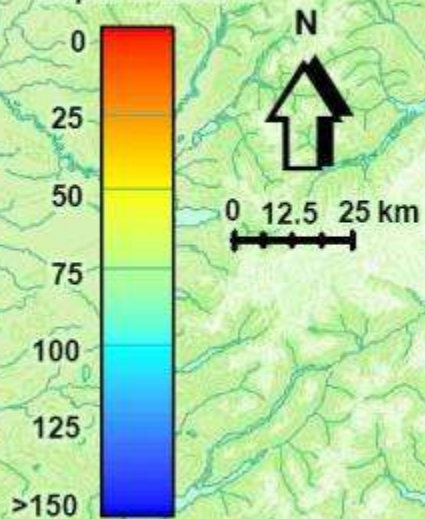
Susan Saupe “Not a Physical Oceanographer”
Cook Inlet RCAC





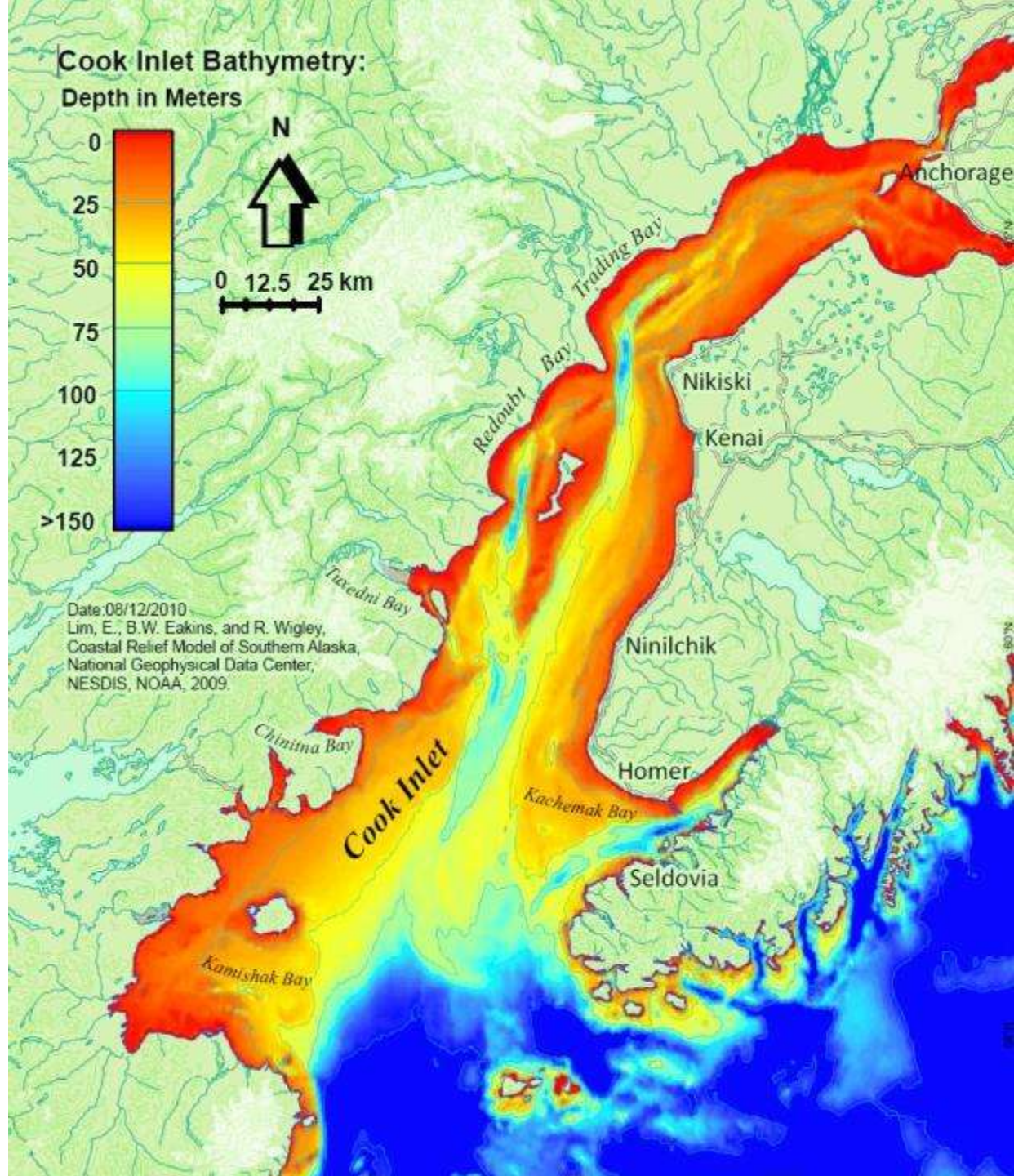
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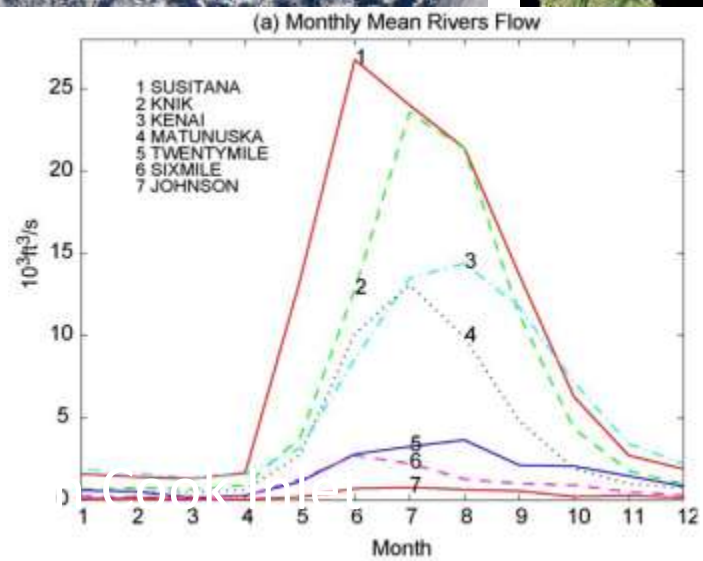
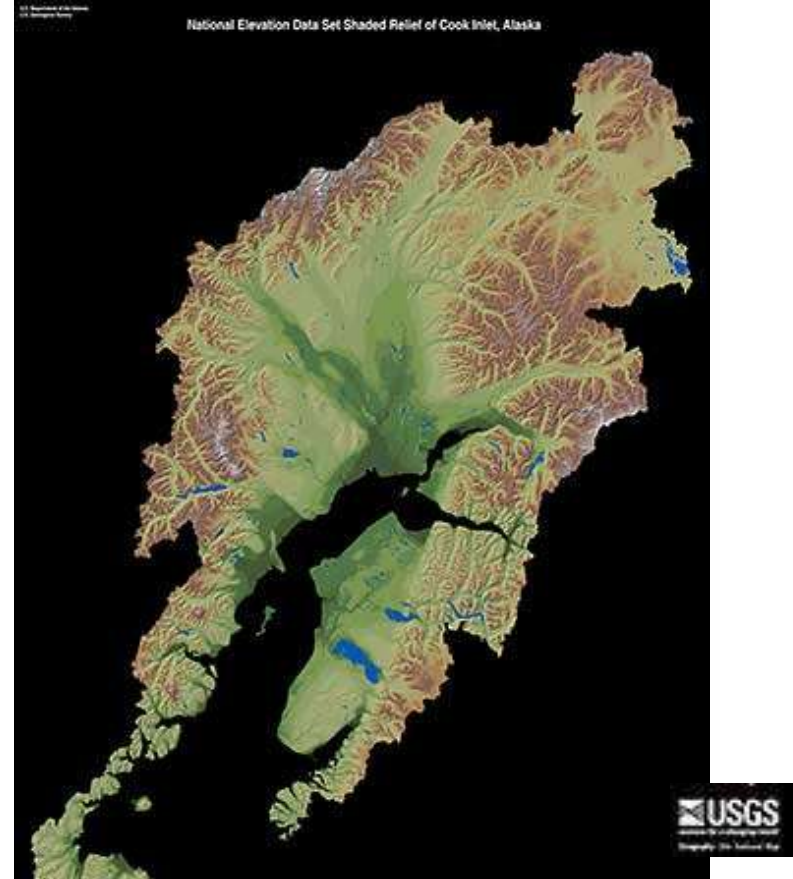
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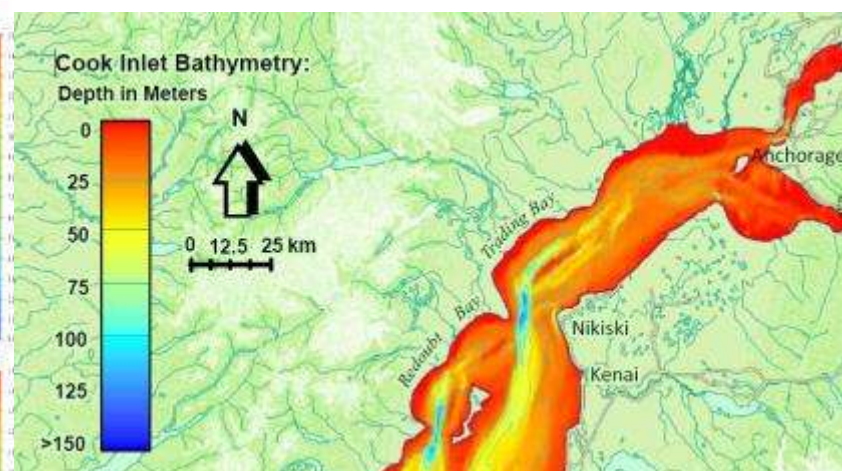
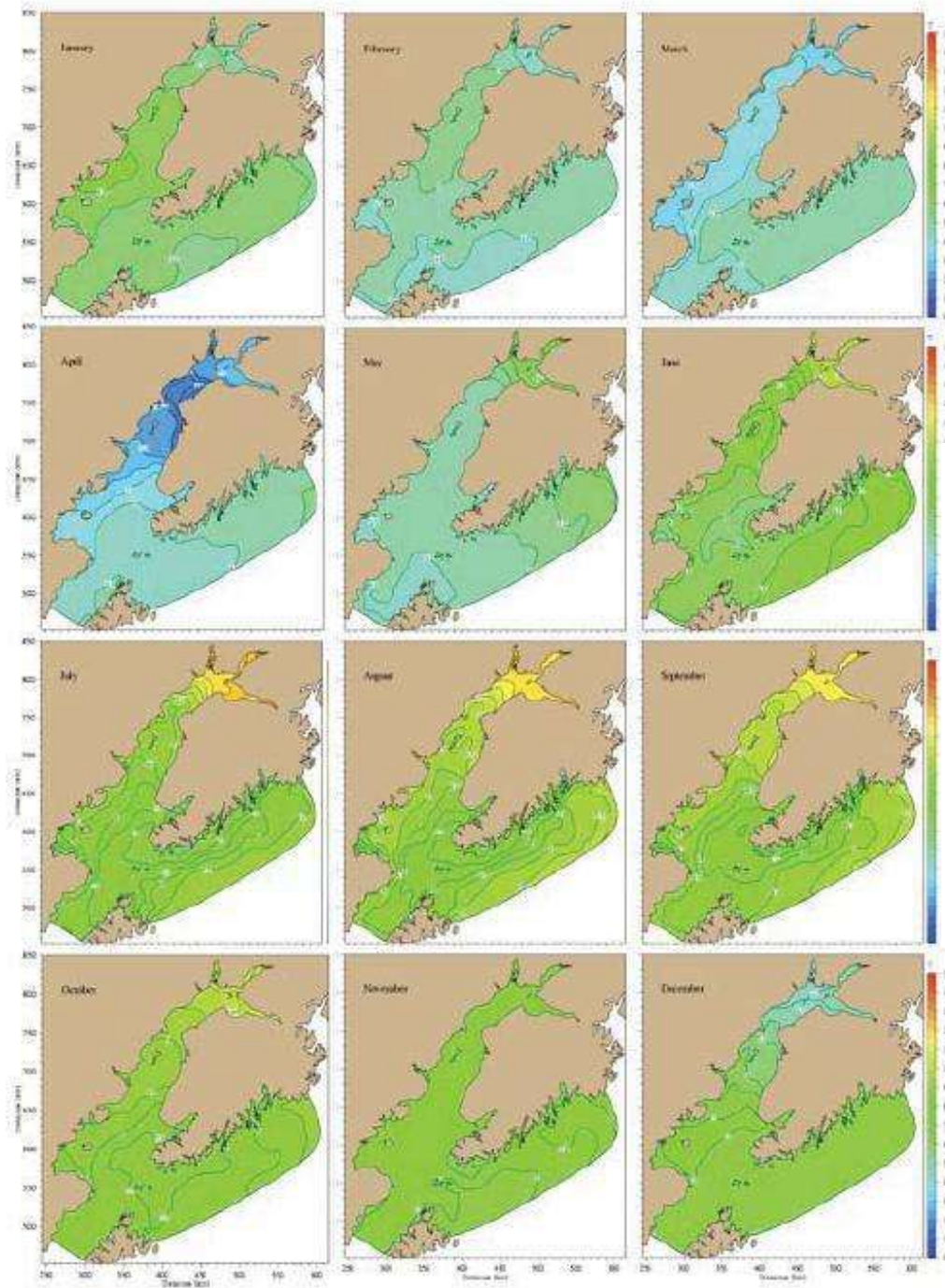


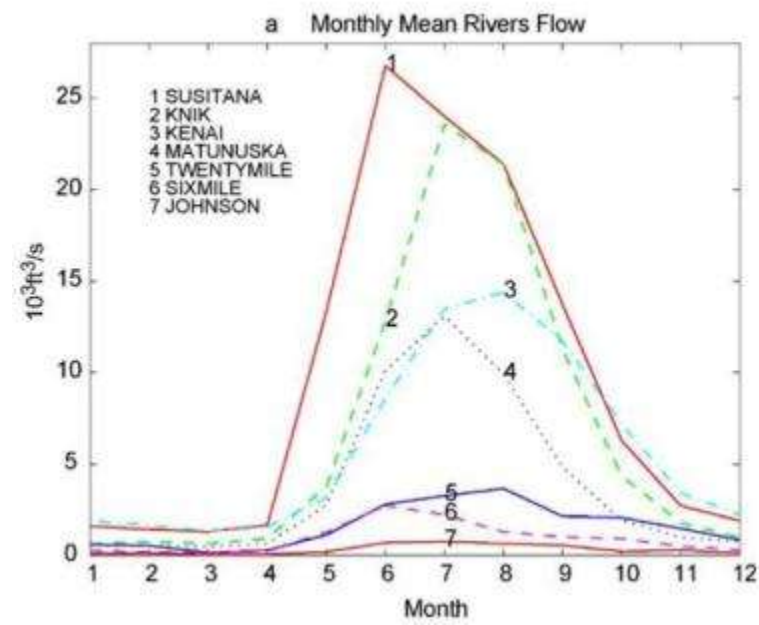
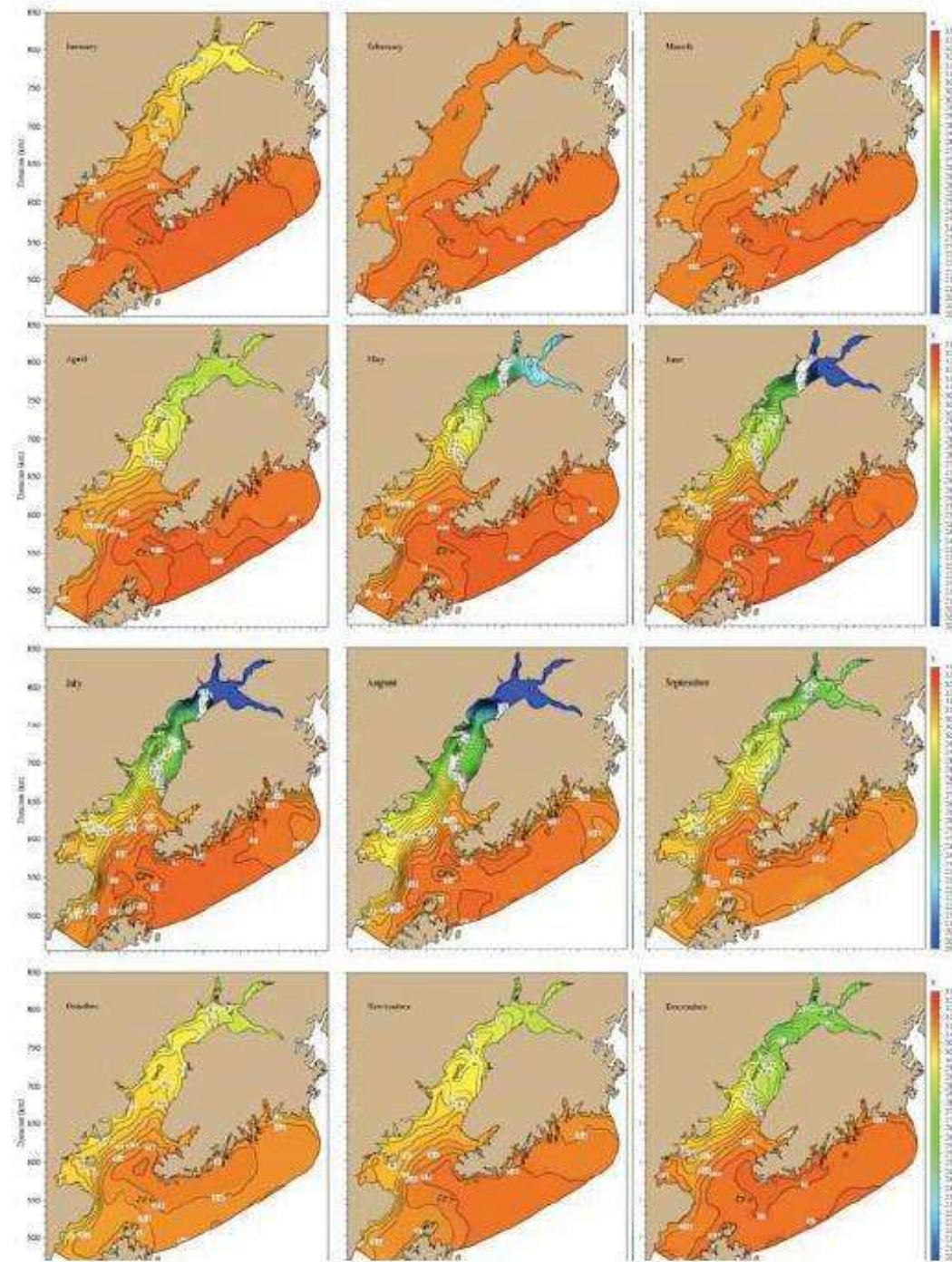
0 12.5 25 km

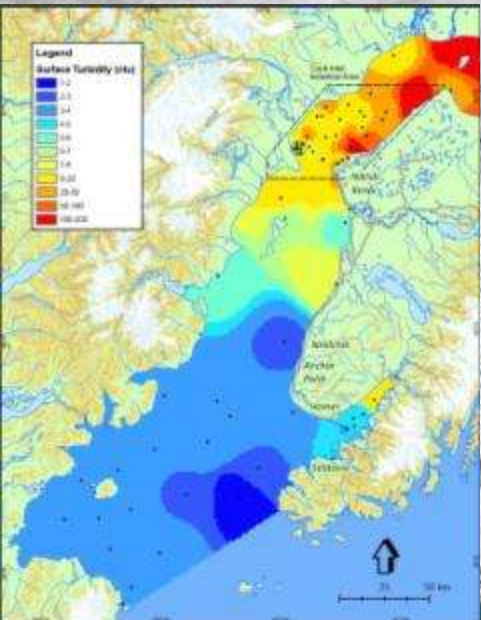
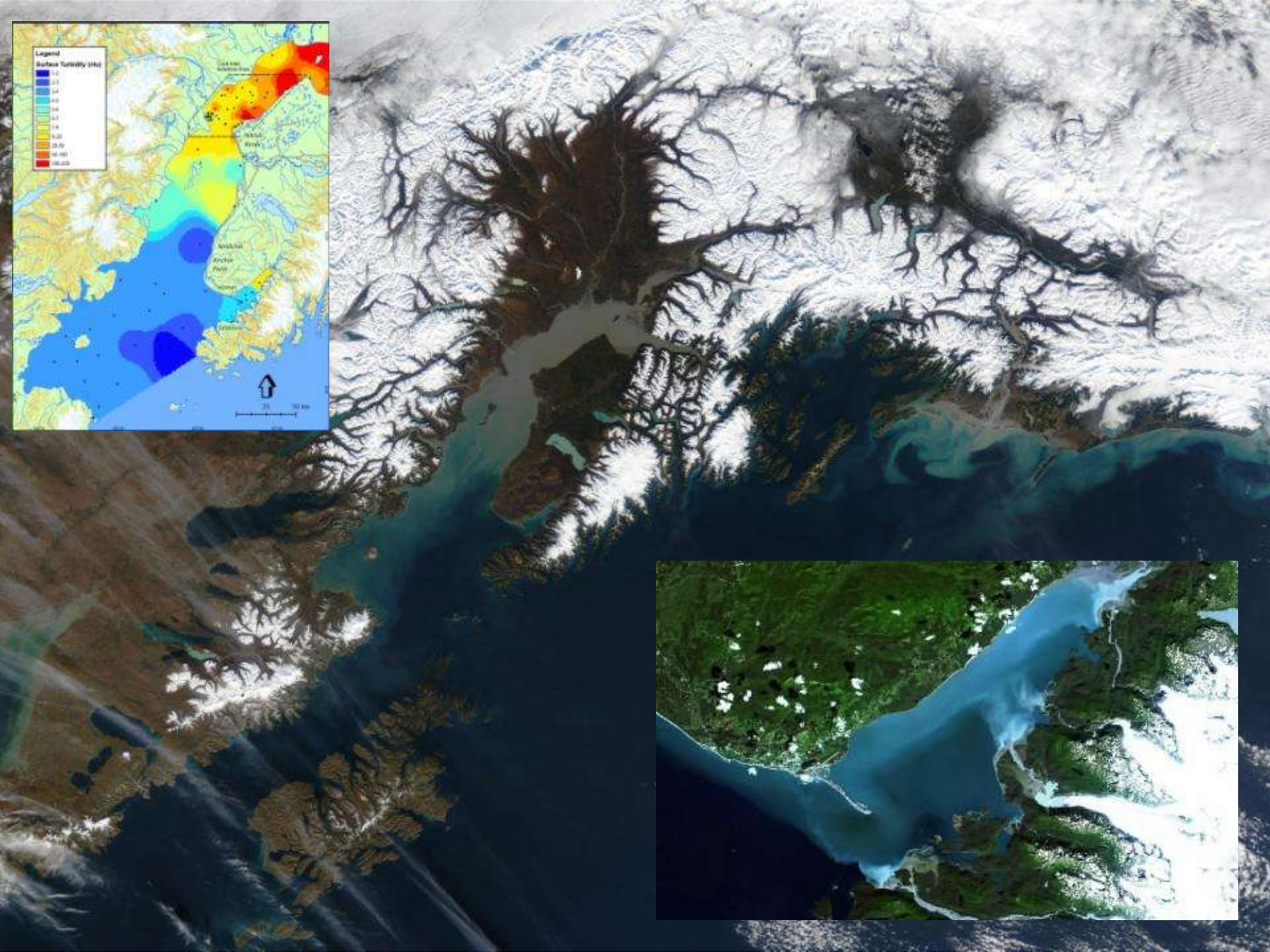
Date: 08/12/2010
Lim, E., B.W. Eakins, and R. Wigley,
Coastal Relief Model of Southern Alaska,
National Geophysical Data Center,
NESDIS, NOAA, 2009.

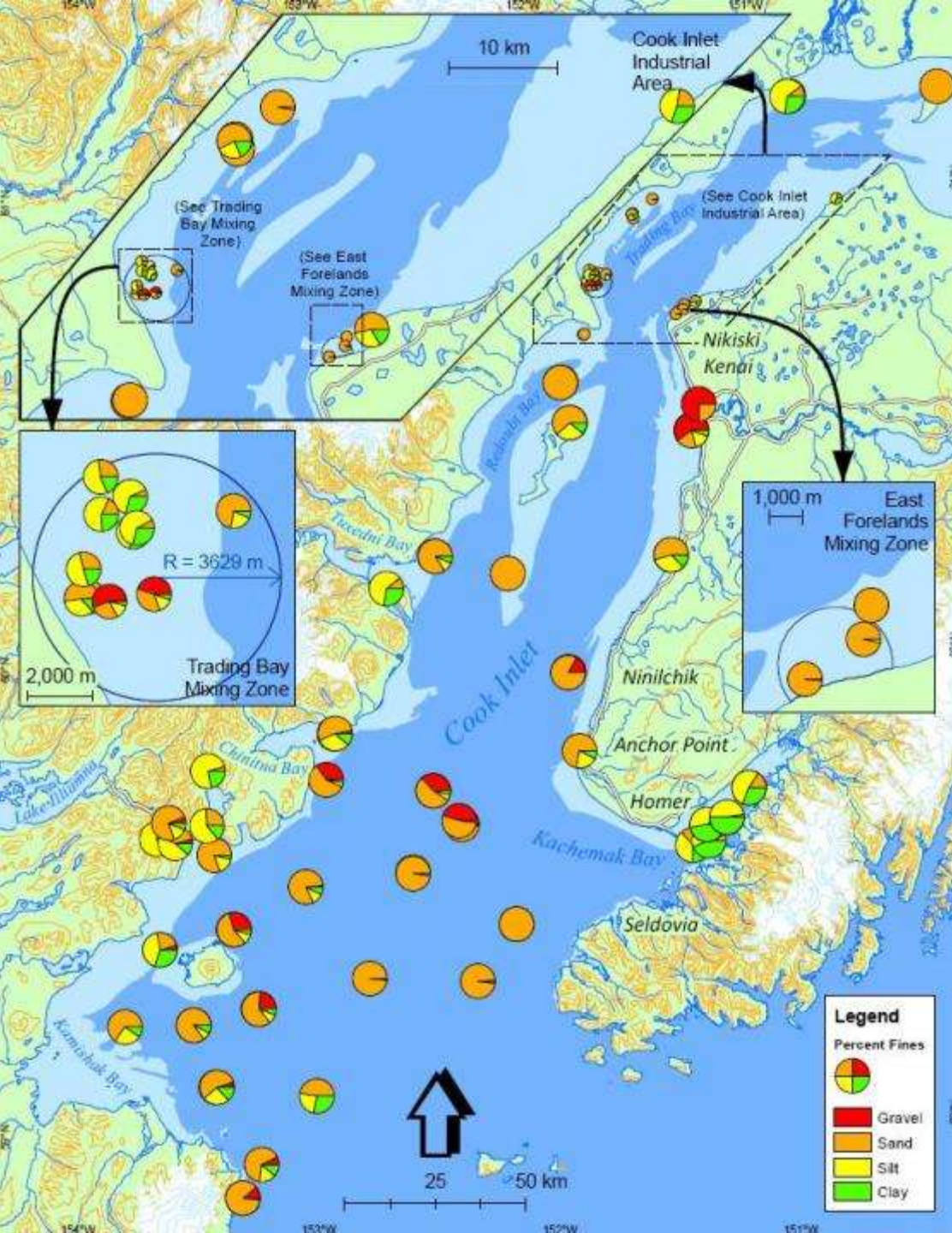












If it weren't for the currents, Cook Inlet would become a gigantic mud flat.

If it weren't for the mud, Cook Inlet would become current-swept sand and gravel beaches.

Instead, it's both....

Depositional, Erosional, and Non-mobile Shorelines















South Shoal





CIRCAC photo



CIRCAC photo



photo by Robert E. Gill, Jr., USGS



CIRCAC photo

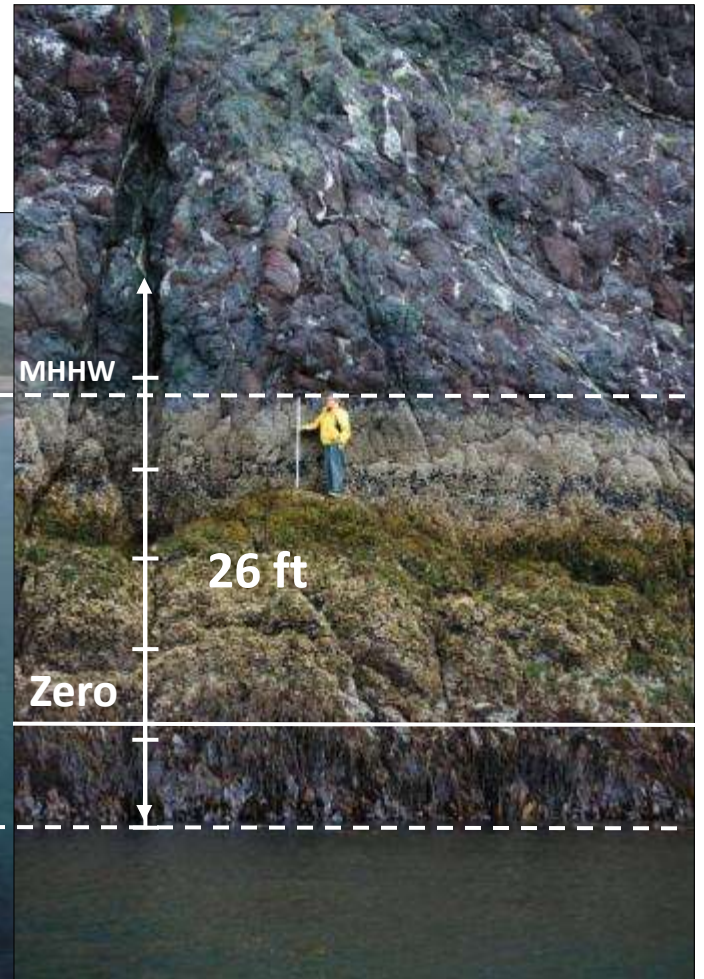


Rock ramp



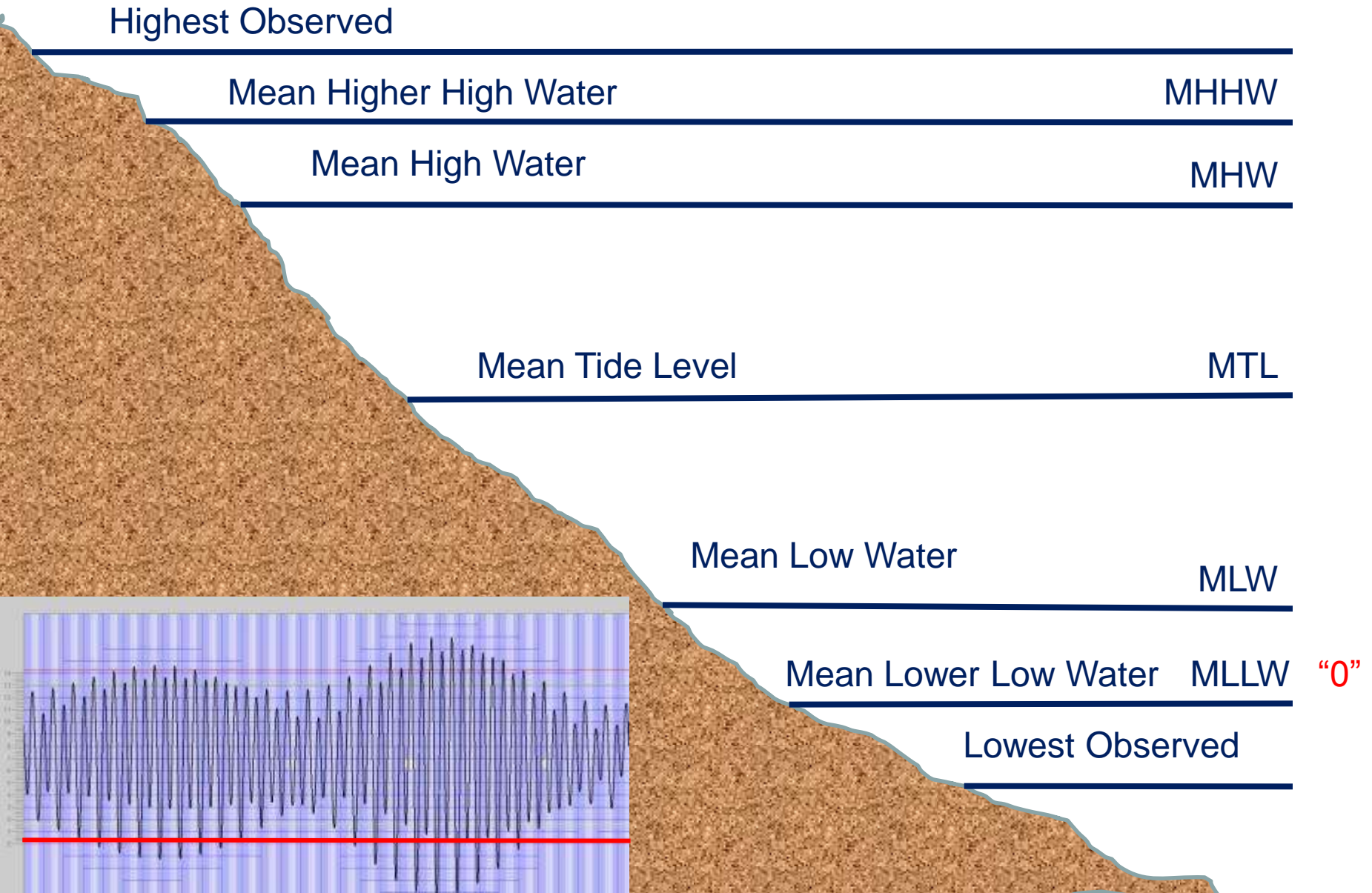
Kamishak Bay

Rock wall



Katchemak Bay

Tidal Datums



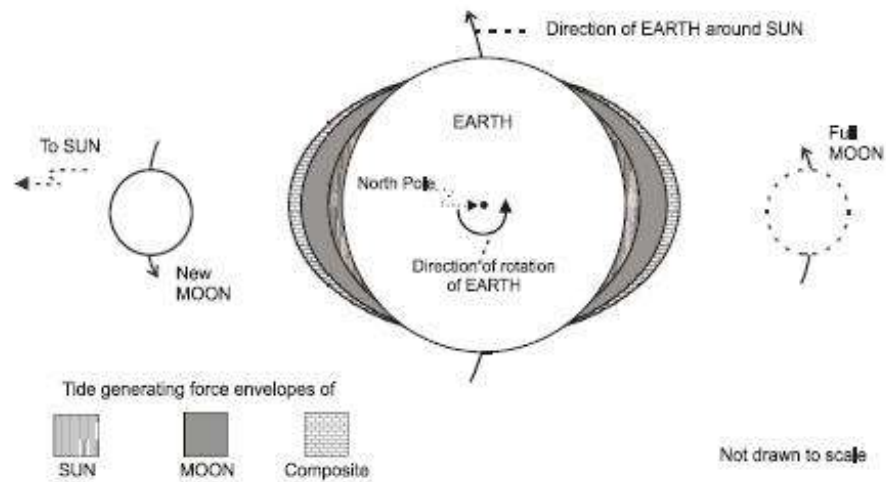


Figure 2. Spring tides

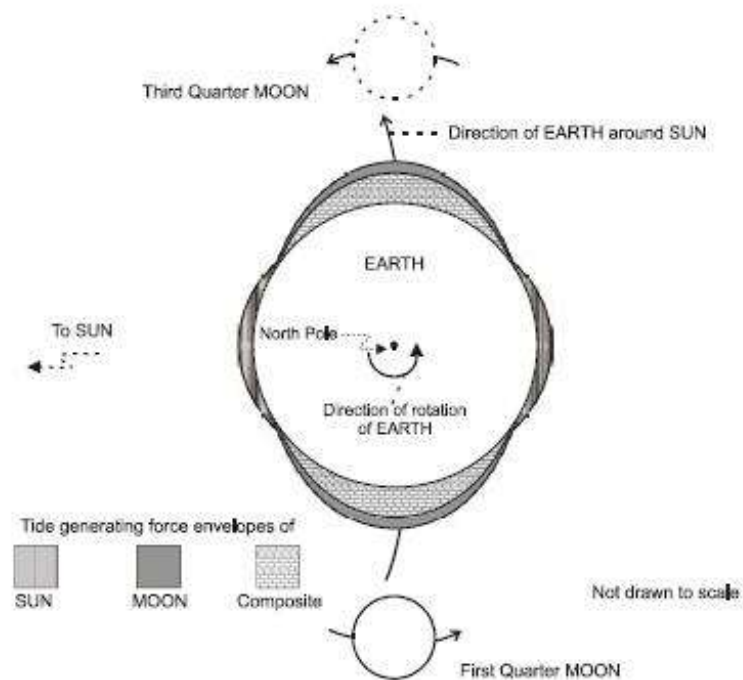


Figure 3. Neap tides

Harmonic Constituents Name Definitions

M2 - Principal lunar semidiurnal constituent
S2 - Principal solar semidiurnal constituent
N2 - Larger lunar elliptic semidiurnal constituent
K1 - Lunar diurnal constituent
M4 - Shallow water overtides of principal lunar constituent
O1 - Lunar diurnal constituent
M6 - Shallow water overtides of principal lunar constituent
MK3 - Shallow water terdiurnal
S4 - Shallow water overtides of principal solar constituent
MN4 - Shallow water quarter diurnal constituent
NU2 - Larger lunar evectional constituent
S6 - Shallow water overtides of principal solar constituent
MU2 - Variational constituent
2N2 - Lunar elliptical semidiurnal second-order constituent
OO1 - Lunar diurnal
LAM2 - Smaller lunar evectional constituent
S1 - Solar diurnal constituent
M1 - Smaller lunar elliptic diurnal constituent
J1 - Smaller lunar elliptic diurnal constituent
MM - Lunar monthly constituent
SSA - Solar semiannual constituent
SA - Solar annual constituent
MSF - Lunisolar synodic fortnightly constituent
MF - Lunisolar fortnightly constituent
RHO - Larger lunar evectional diurnal constituent
Q1 - Larger lunar elliptic diurnal constituent
T2 - Larger solar elliptic constituent
R2 - Smaller solar elliptic constituent
2Q1 - Larger elliptic diurnal
P1 - Solar diurnal constituent
2SM2 - Shallow water semidiurnal constituent
M3 - Lunar terdiurnal constituent
L2 - Smaller lunar elliptic semidiurnal constituent
2MK3 - Shallow water terdiurnal constituent
K2 - Lunisolar semidiurnal constituent
M8 - Shallow water eighth diurnal constituent
MS4 - Shallow water quarter diurnal constituent

Point Possession, AK

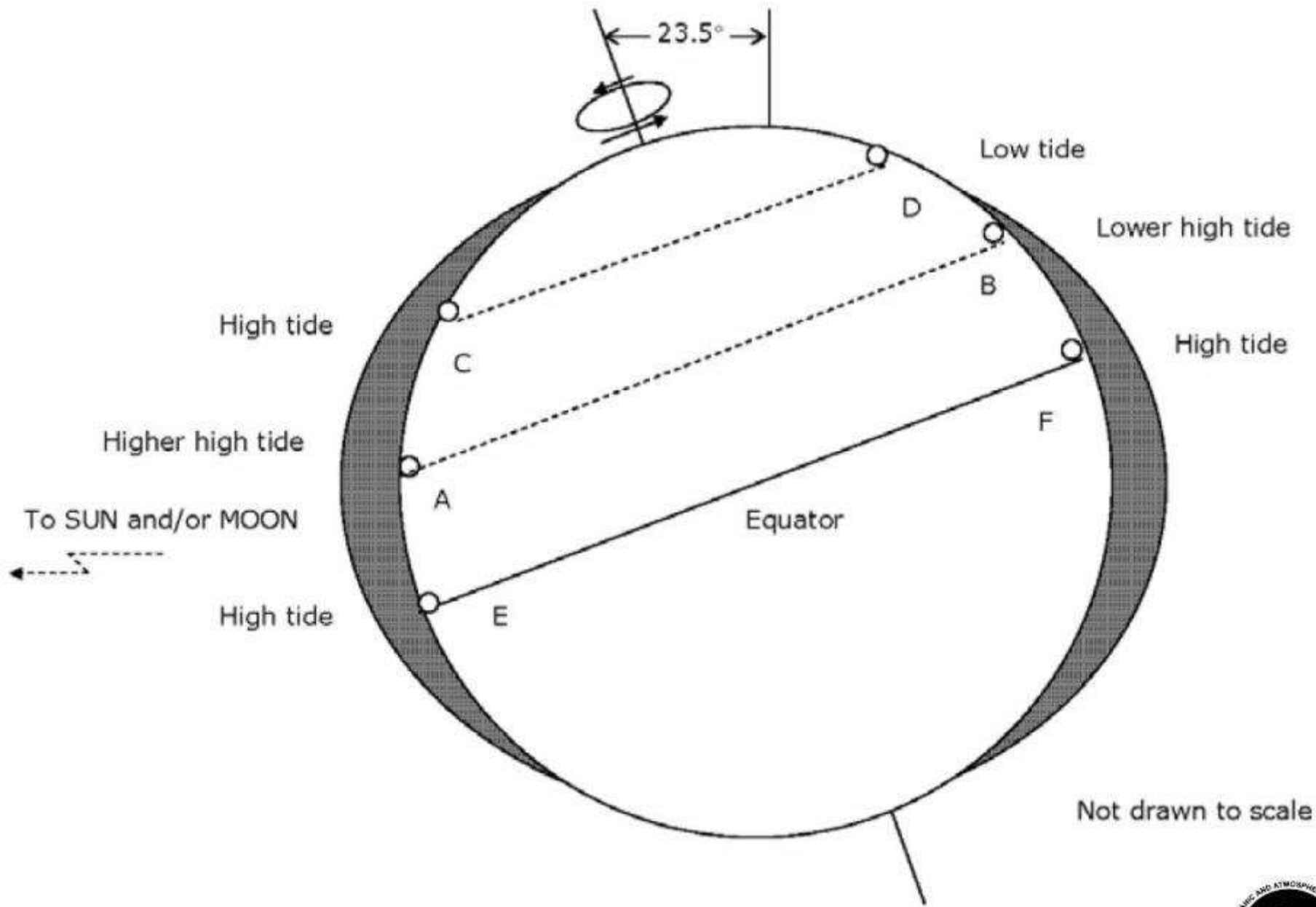
Station ID: 9455866

Anchor Point, Cook Inlet, AK

Station ID: 9455606

Const#	Name	Amplitude	Phase	Speed
1	M2	3.131	87.2	28.9841042
2	S2	0.956	122.9	30.0000000
3	N2	0.563	50.1	28.4397295
4	K1	0.675	326.1	15.0410686
5	M4	0.196	63.3	57.9682084
6	O1	0.464	309.6	13.9430356
7	M6	0.103	297.6	86.9523127
8	MK3	0.000	0.0	44.0251729
9	S4	0.020	194.7	60.0000000
10	MN4	0.000	0.0	57.4238337
11	NU2	0.109	55.1	28.5125831
12	S6	0.010	235.3	90.0000000
13	MU2	0.075	110.6	27.9682084
14	2N2	0.075	13.1	27.8953548
15	OO1	0.020	342.5	16.1391017
16	LAM2	0.022	103.8	29.4556253
17	S1	0.000	0.0	15.0000000
18	M1	0.033	317.9	14.4966939
19	J1	0.037	334.3	15.5854433
20	MM	0.000	0.0	0.5443747
21	SSA	0.000	0.0	0.0821373
22	SA	0.000	0.0	0.0410686
23	MSF	0.000	0.0	1.0158958
24	MF	0.000	0.0	1.0980331
25	RHO	0.018	302.6	13.4715145
26	Q1	0.090	301.5	13.3986609
27	T2	0.056	121.5	29.9589333
28	R2	0.008	124.3	30.0410667
29	2Q1	0.012	293.3	12.8542862
30	P1	0.223	324.9	14.9589314
31	2SM2	0.000	0.0	31.0158958
32	M3	0.000	0.0	43.4761563
33	L2	0.088	124.2	29.5284789
34	2MK3	0.000	0.0	42.9271398
35	K2	0.260	125.8	30.0821373
36	M8	0.014	295.4	115.9364166
37	MS4	0.000	0.0	58.9841042

#	Name	Ampl	Epoch	Speed
1	M2	2.284	335.0	28.9841042
2	S2	0.811	6.9	30.0000000
3	N2	0.453	307.0	28.4397295
4	K1	0.572	284.6	15.0410686
5	M4	0.057	51.9	57.9682084
6	O1	0.343	269.9	13.9430356
7	M6	0.012	205.8	86.9523127
8	MK3	0.000	0.0	44.0251729
9	S4	0.009	123.0	60.0000000
10	MN4	0.000	0.0	57.4238337
11	NU2	0.088	310.8	28.5125831
12	S6	0.001	312.7	90.0000000
13	MU2	0.055	359.4	27.9682084
14	2N2	0.060	279.0	27.8953548
15	OO1	0.015	299.3	16.1391017
16	LAM2	0.016	349.8	29.4556253
17	S1	0.000	0.0	15.0000000
18	M1	0.024	277.3	14.4966939
19	J1	0.027	291.9	15.5854433
20	MM	0.000	0.0	0.5443747
21	SSA	0.000	0.0	0.0821373
22	SA	0.000	0.0	0.0410686
23	MSF	0.000	0.0	1.0158958
24	MF	0.000	0.0	1.0980331
25	RHO	0.013	263.6	13.4715145
26	Q1	0.067	262.6	13.3986609
27	T2	0.048	5.7	29.9589333
28	R2	0.007	8.2	30.0410667
29	2Q1	0.009	255.3	12.8542862
30	P1	0.189	283.5	14.9589314
31	2SM2	0.000	0.0	31.0158958
32	M3	0.000	0.0	43.4761563
33	L2	0.064	3.1	29.5284789
34	2MK3	0.000	0.0	42.9271398
35	K2	0.221	9.5	30.0821373
36	M8	0.002	103.5	115.9364166
37	MS4	0.000	0.0	58.9841042



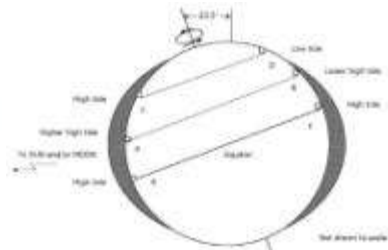
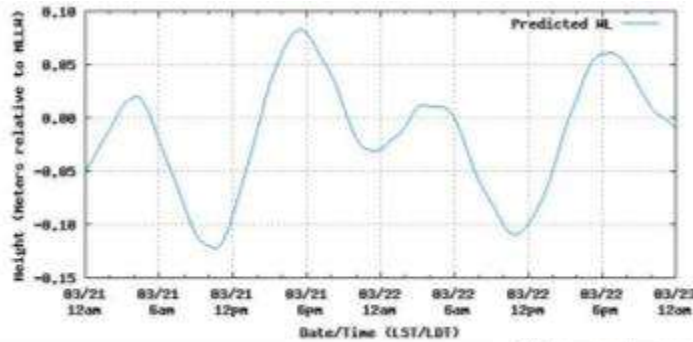
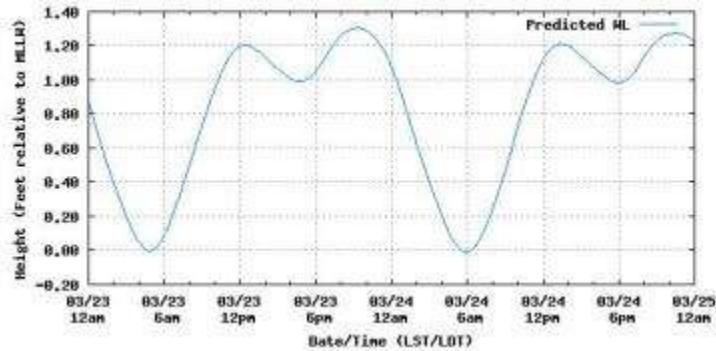
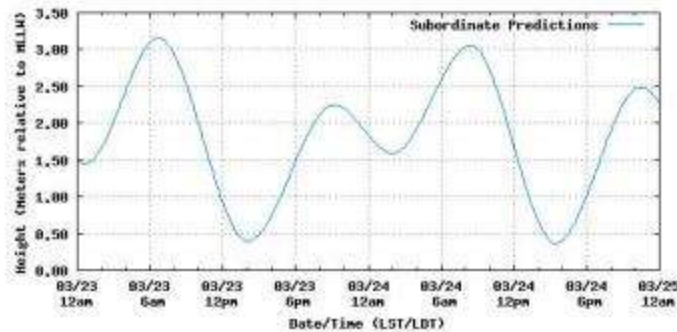
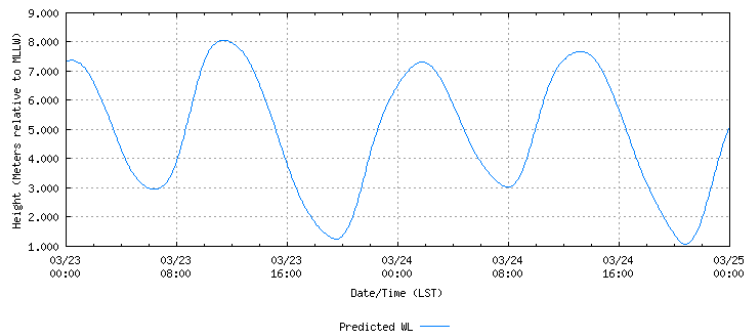
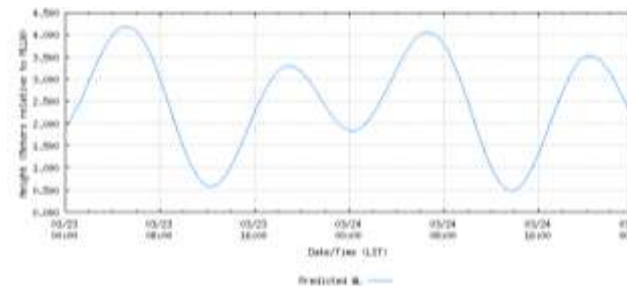
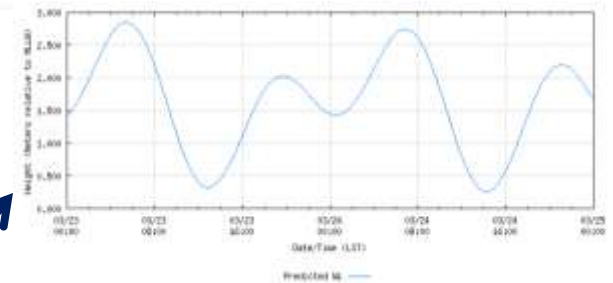
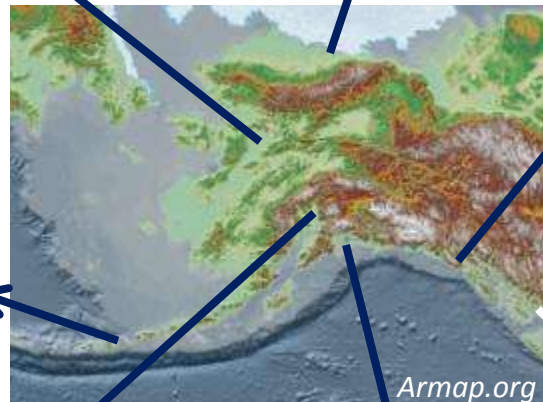
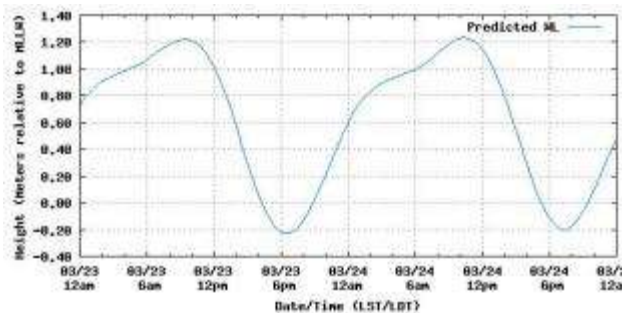
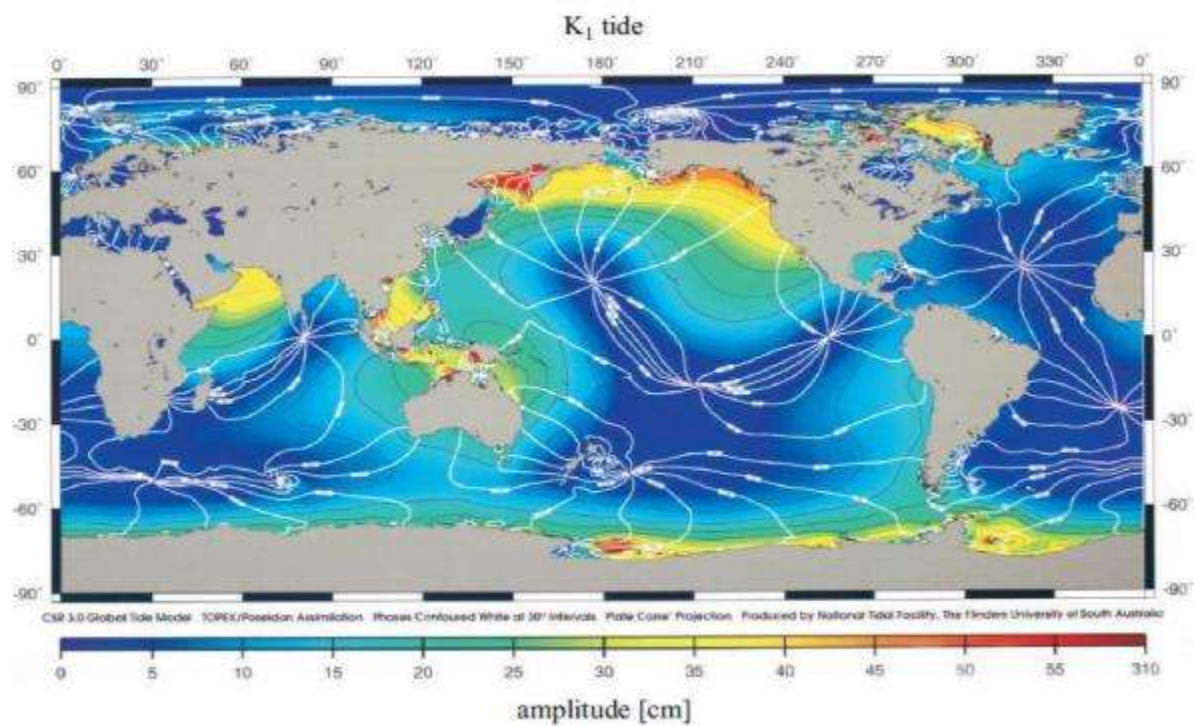
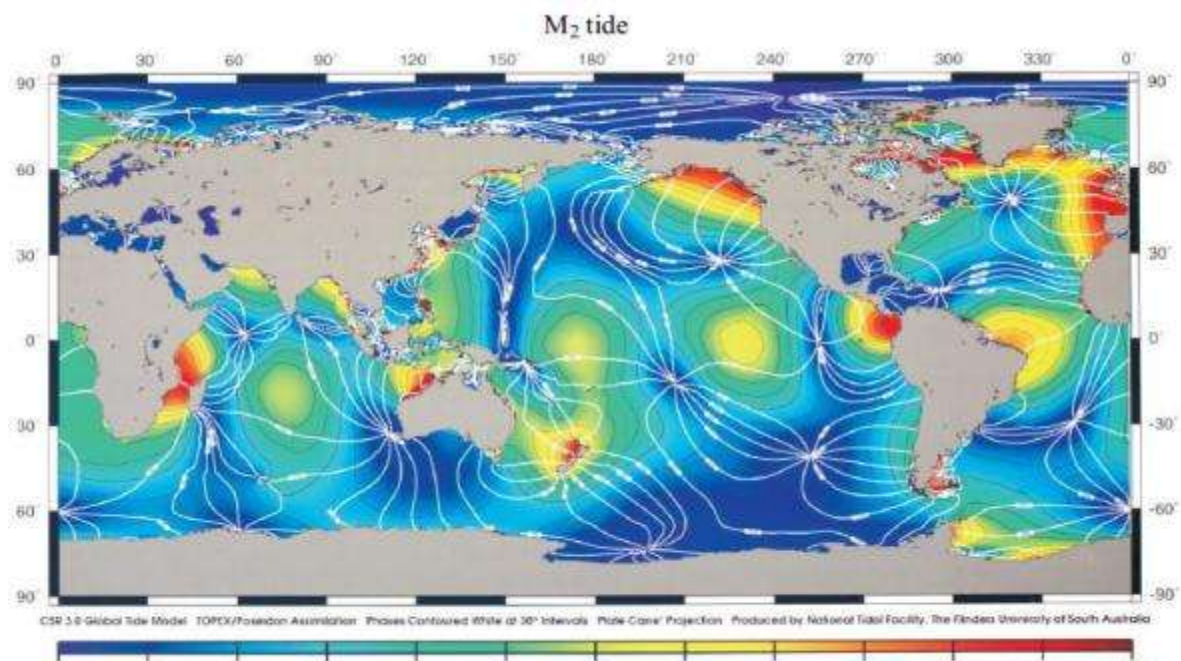
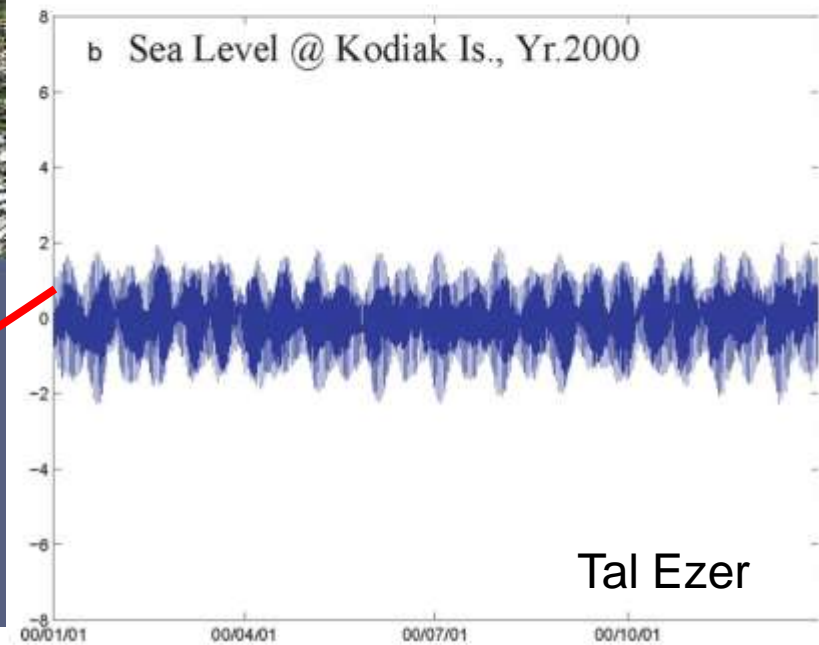
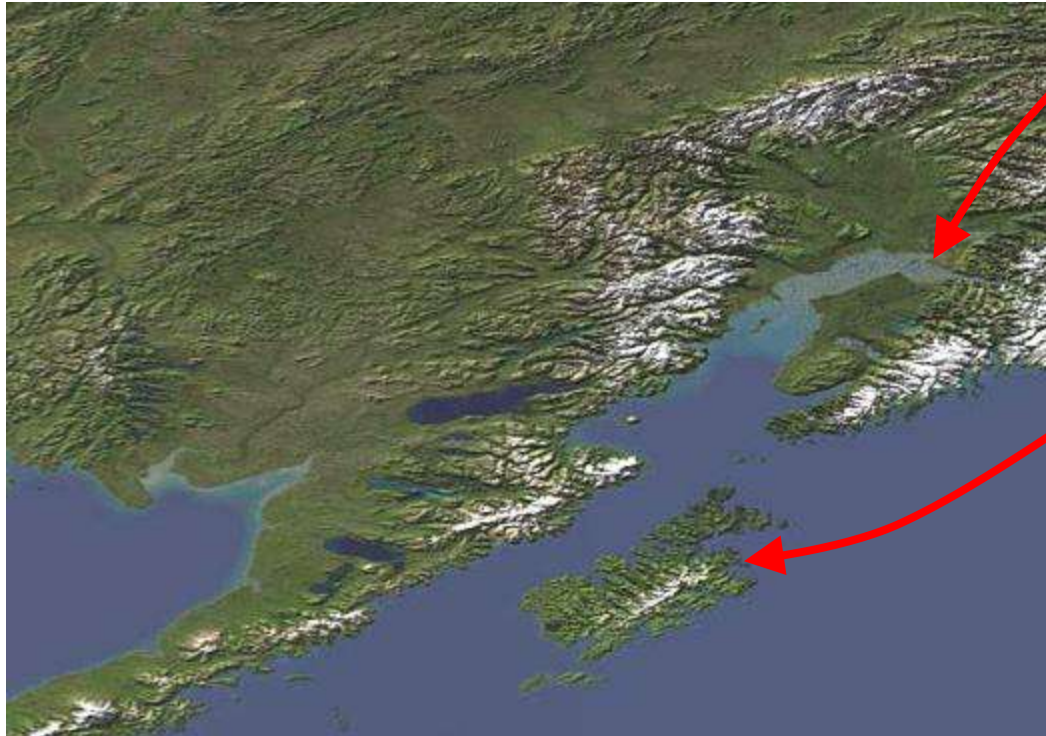
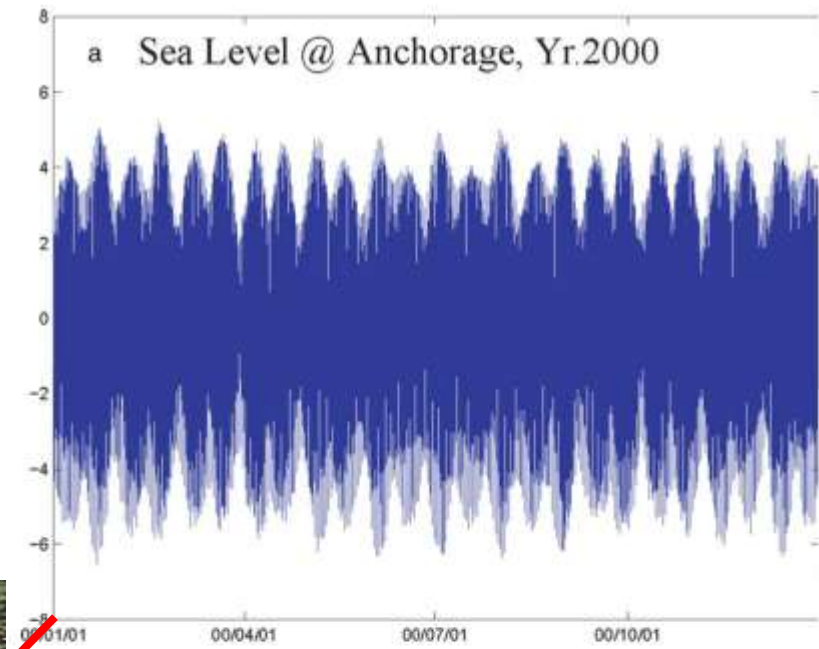
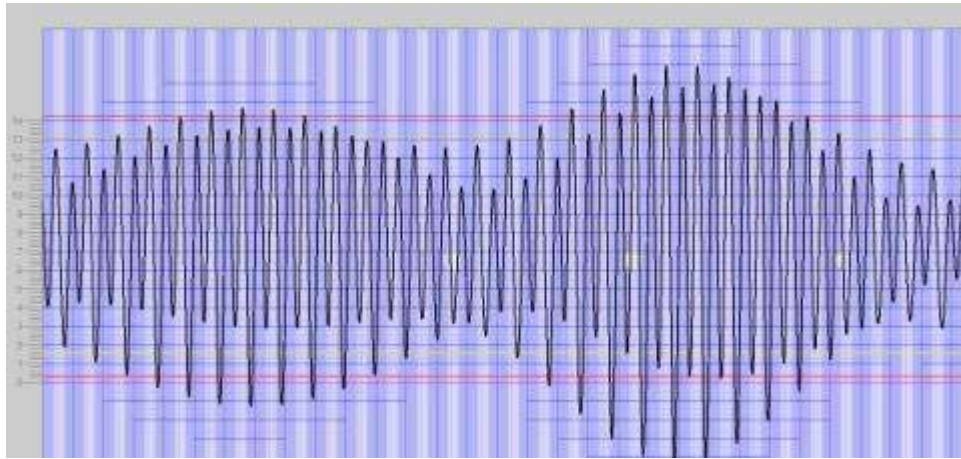


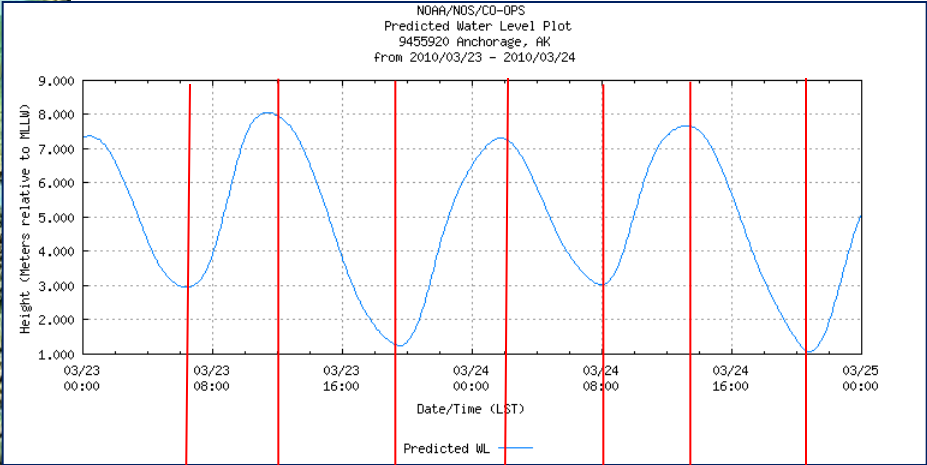
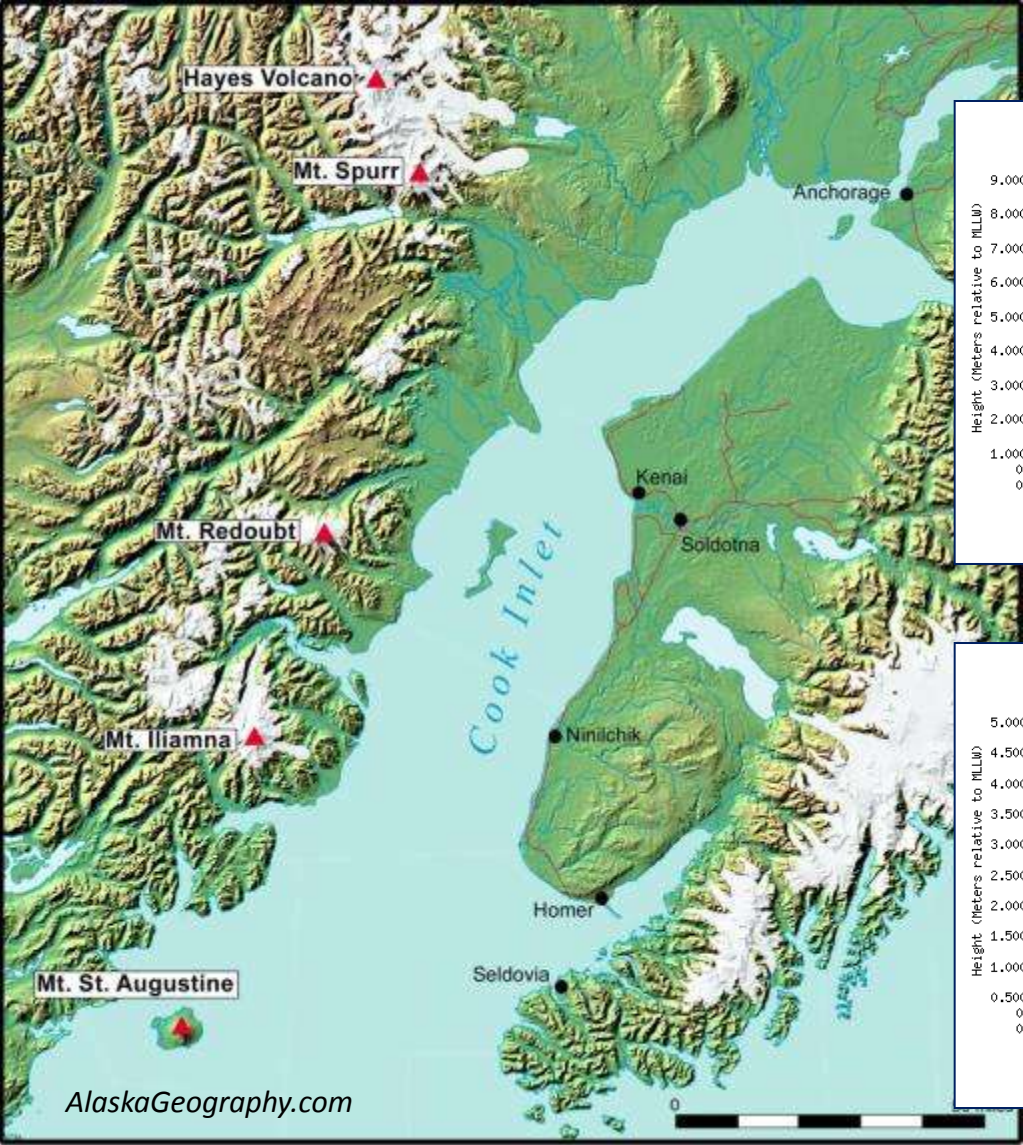
Figure 8: Dome geometry



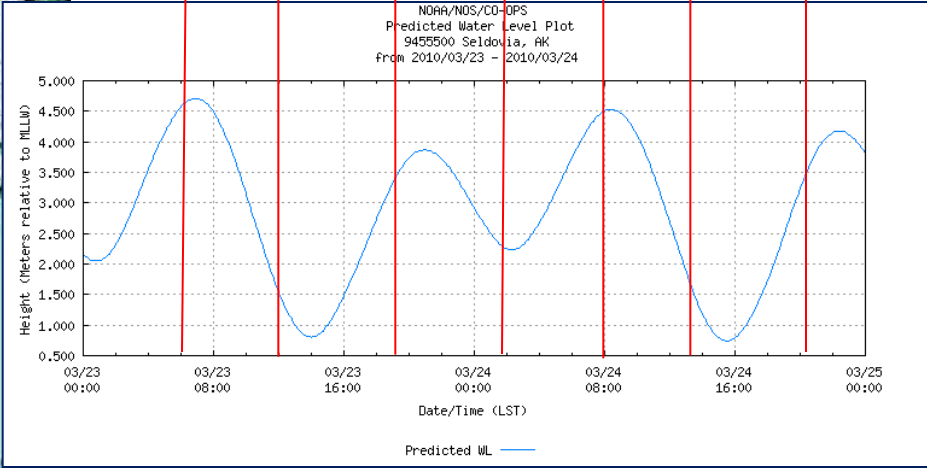




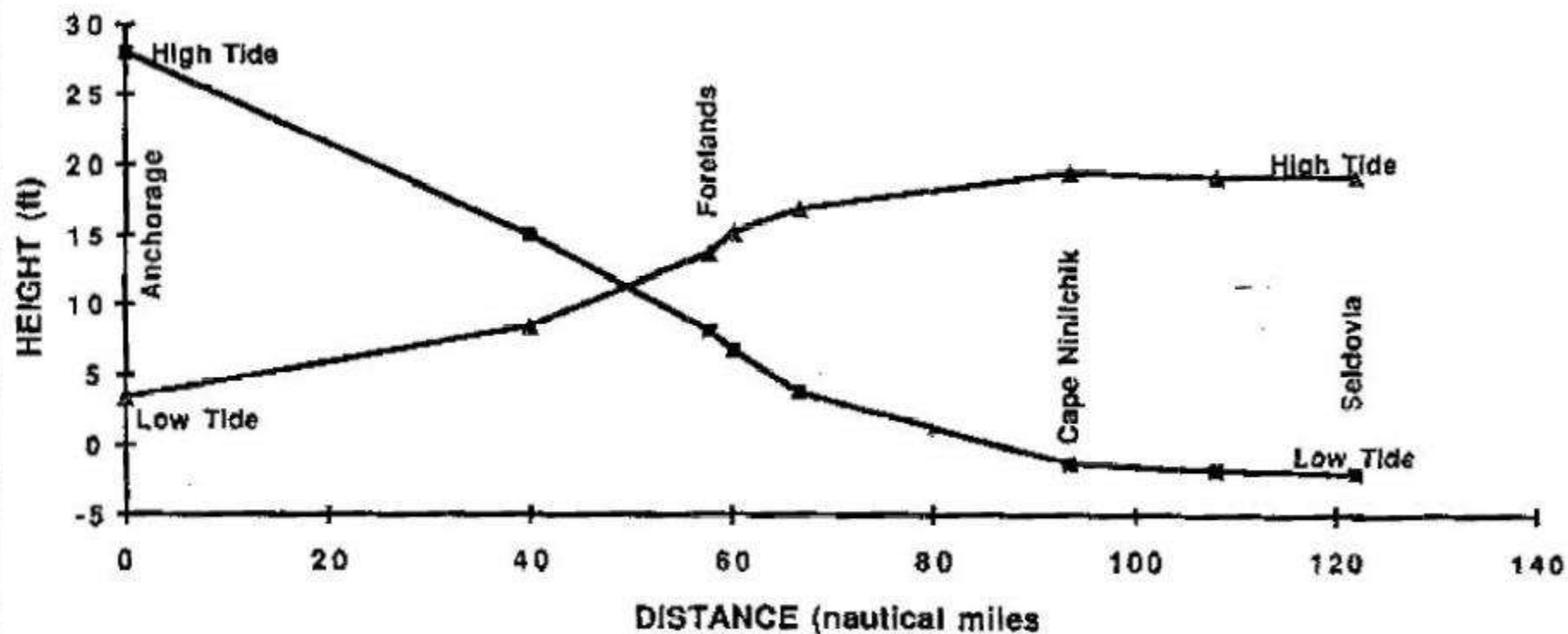
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Note Scale Difference

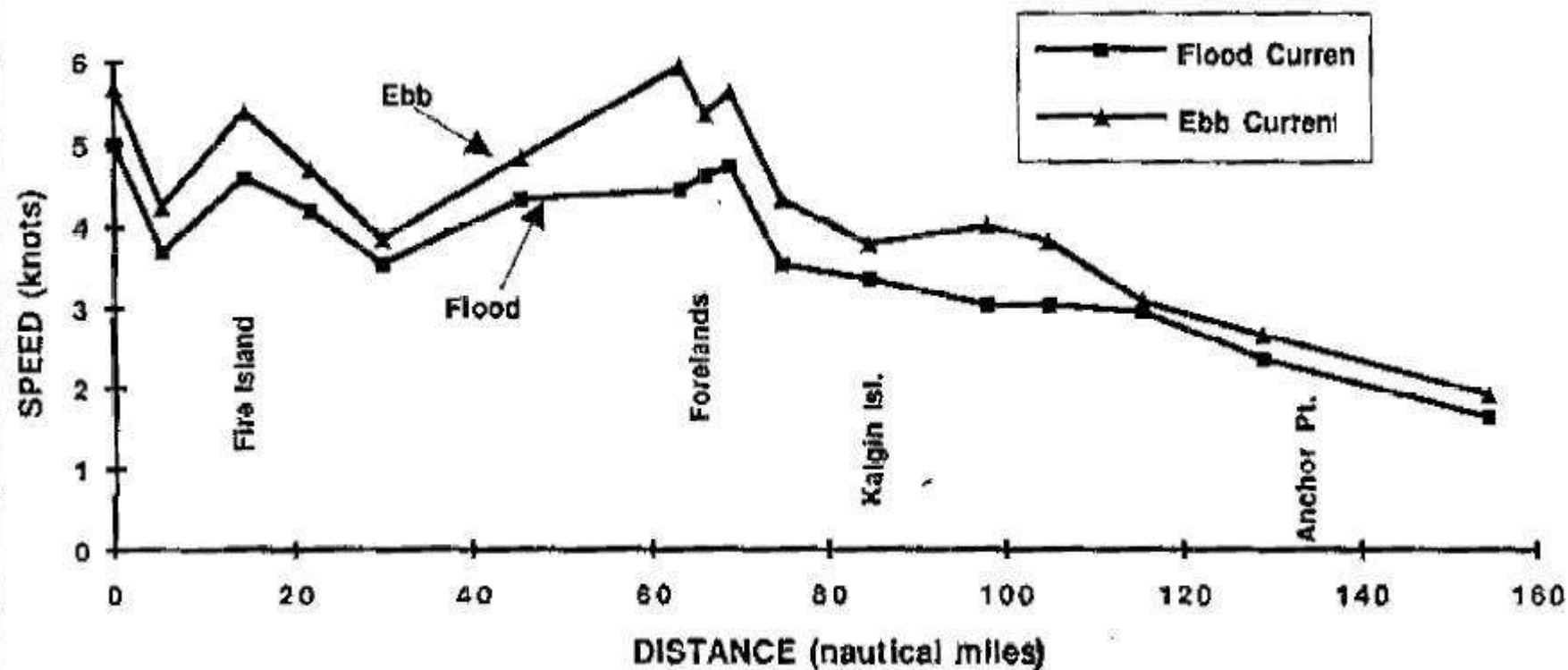


INSTANTANEOUS TIDAL HEIGHTS (north to south FOR COOK INLET



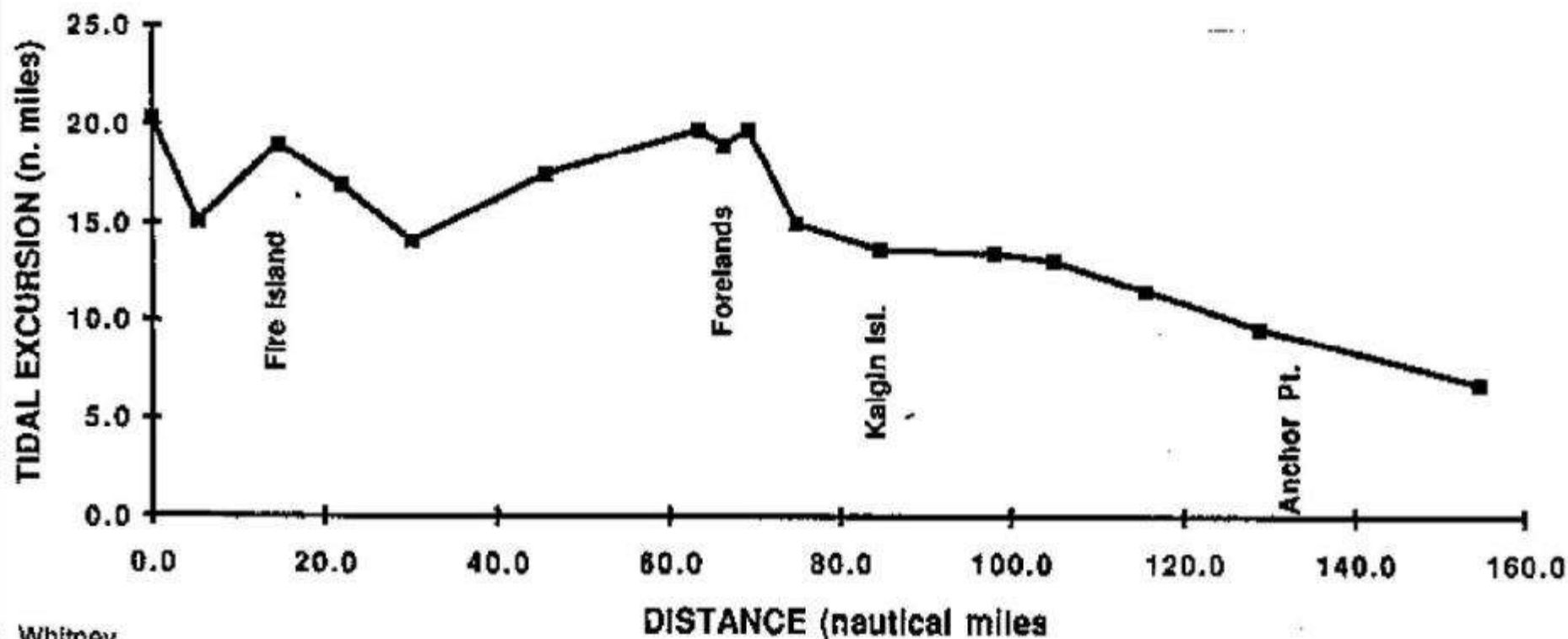
Whitney, J.W., What the Actual Movement of Oil in Cook Inlet Tells us - about the Circulation in Cook Inlet, in Proceedings: Cook Inlet Oceanography Workshop, Ed. Mark Johnson and Steve Okkonen, OCS Study MMS 2000-043. November 9, 1999, Kenai, AK.

AVERAGE MAXIMUM TIDAL CURRENTS (north to south) FOR COOK INLET

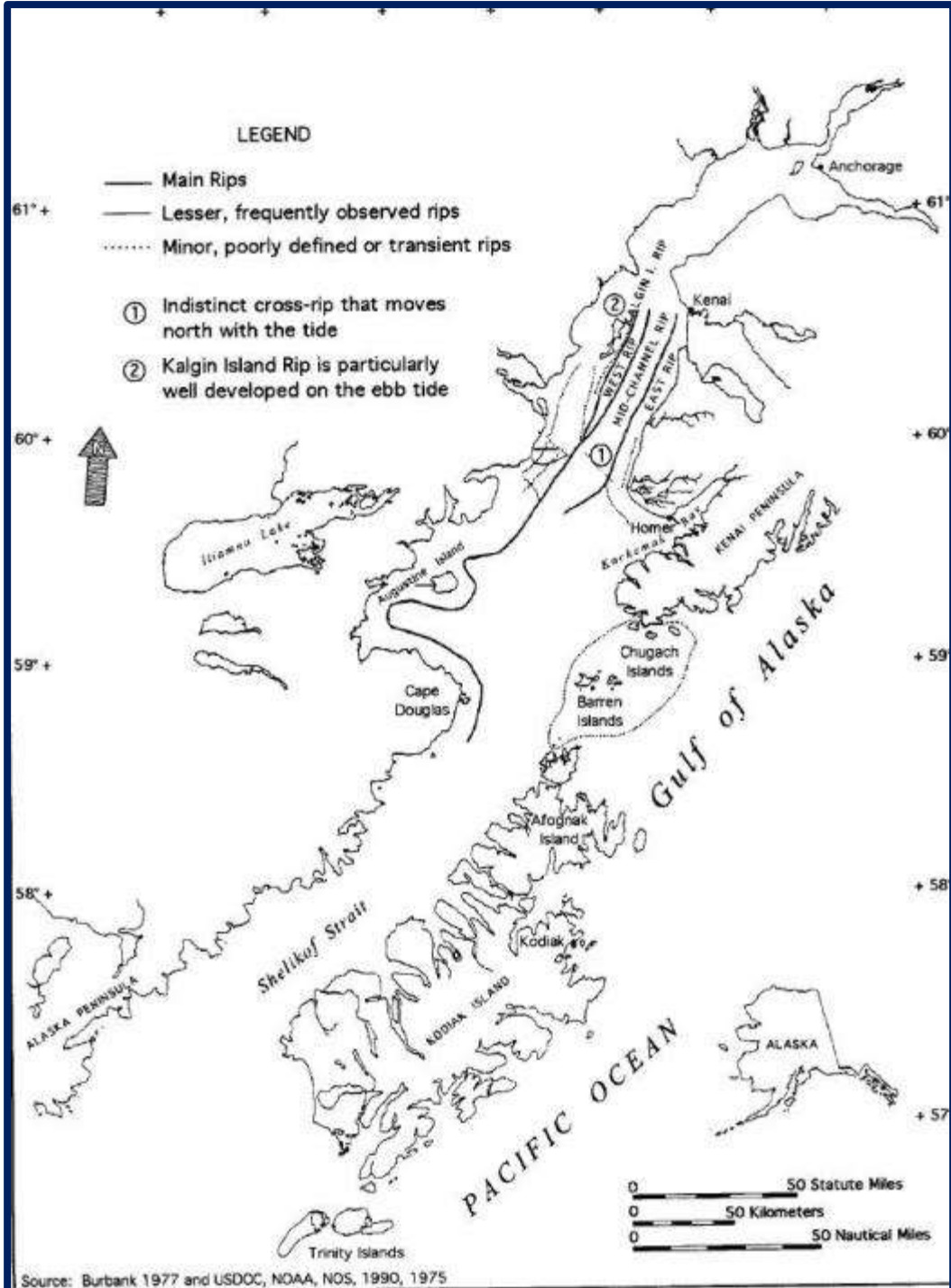


Whitney, J.W., What the Actual Movement of Oil in Cook Inlet Tells us - about the Circulation in Cook Inlet, in Proceedings: Cook Inlet Oceanography Workshop, Ed. Mark Johnson and Steve Okkonen, OCS Study MMS 2000-043. November 9, 1999, Kenai, AK.

AVERAGE MAXIMUM TIDAL EXCURSIONS (north to south) FOR COOK INLET

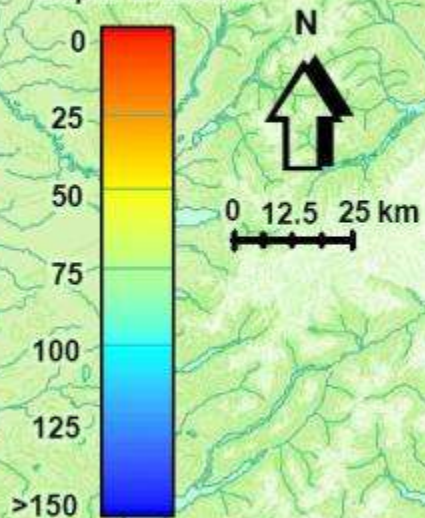


Whitney, J.W., What the Actual Movement of Oil in Cook Inlet Tells us - about the Circulation in Cook Inlet, in Proceedings: Cook Inlet Oceanography Workshop, Ed. Mark Johnson and Steve Okkonen, OCS Study MMS 2000-043, November 9, 1999, Kenai, AK.



Cook Inlet Bathymetry:

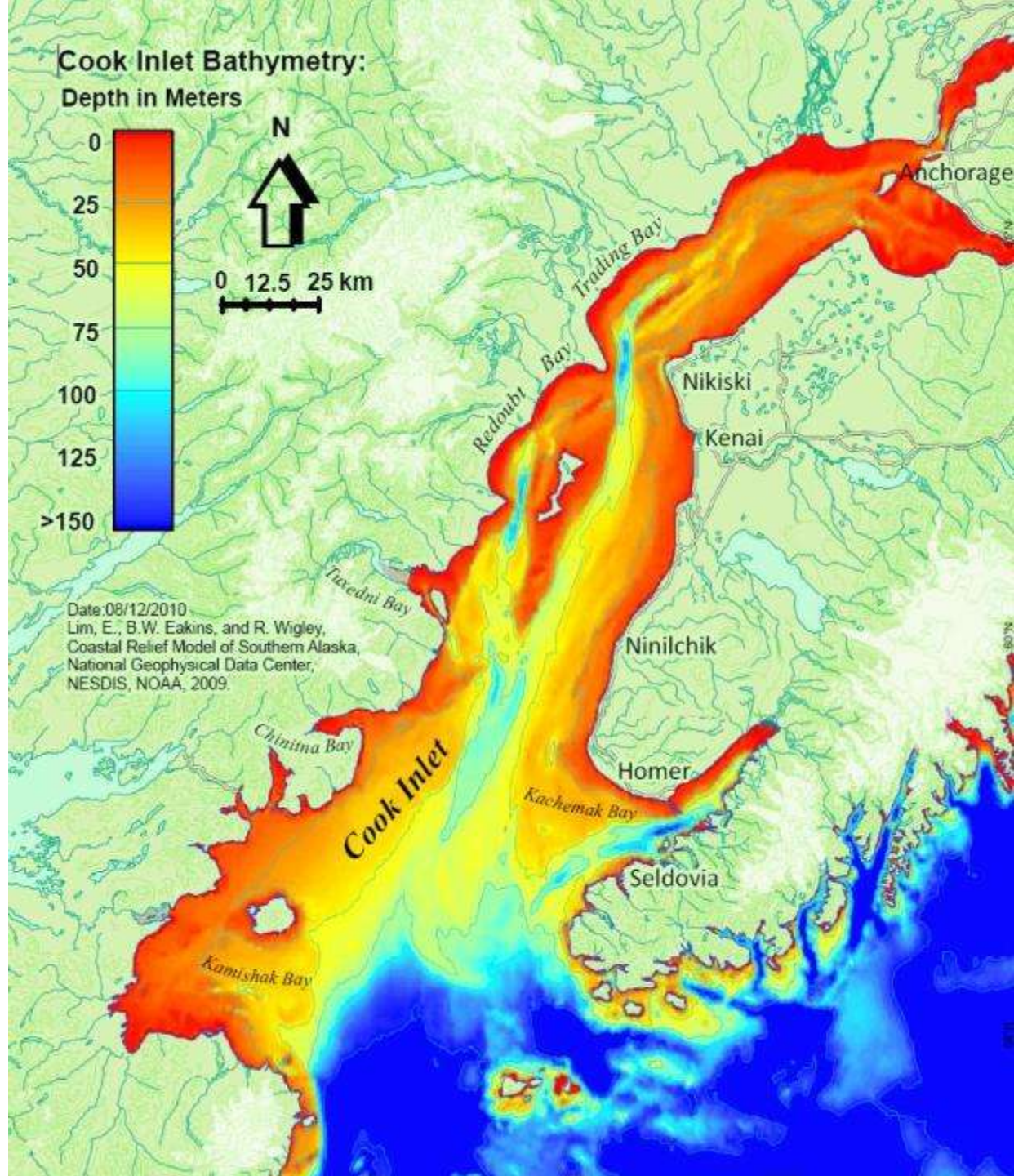
Depth in Meters

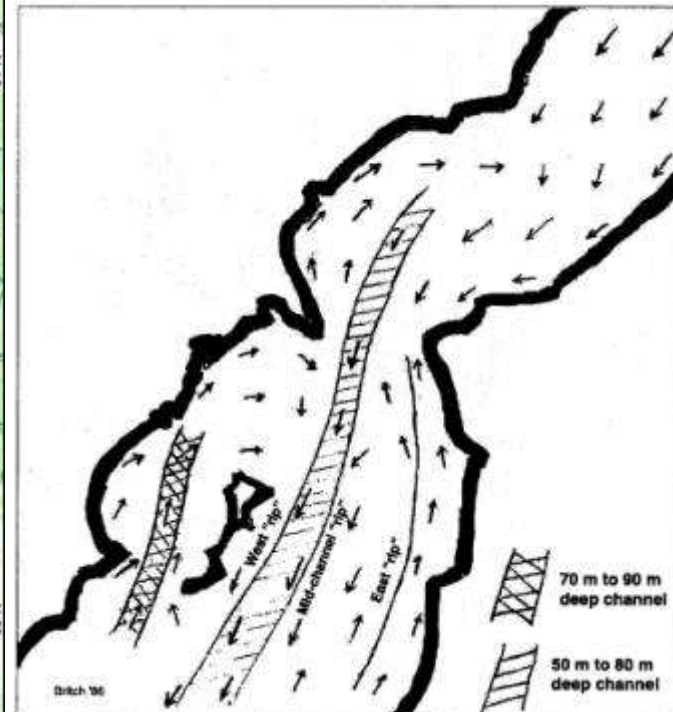
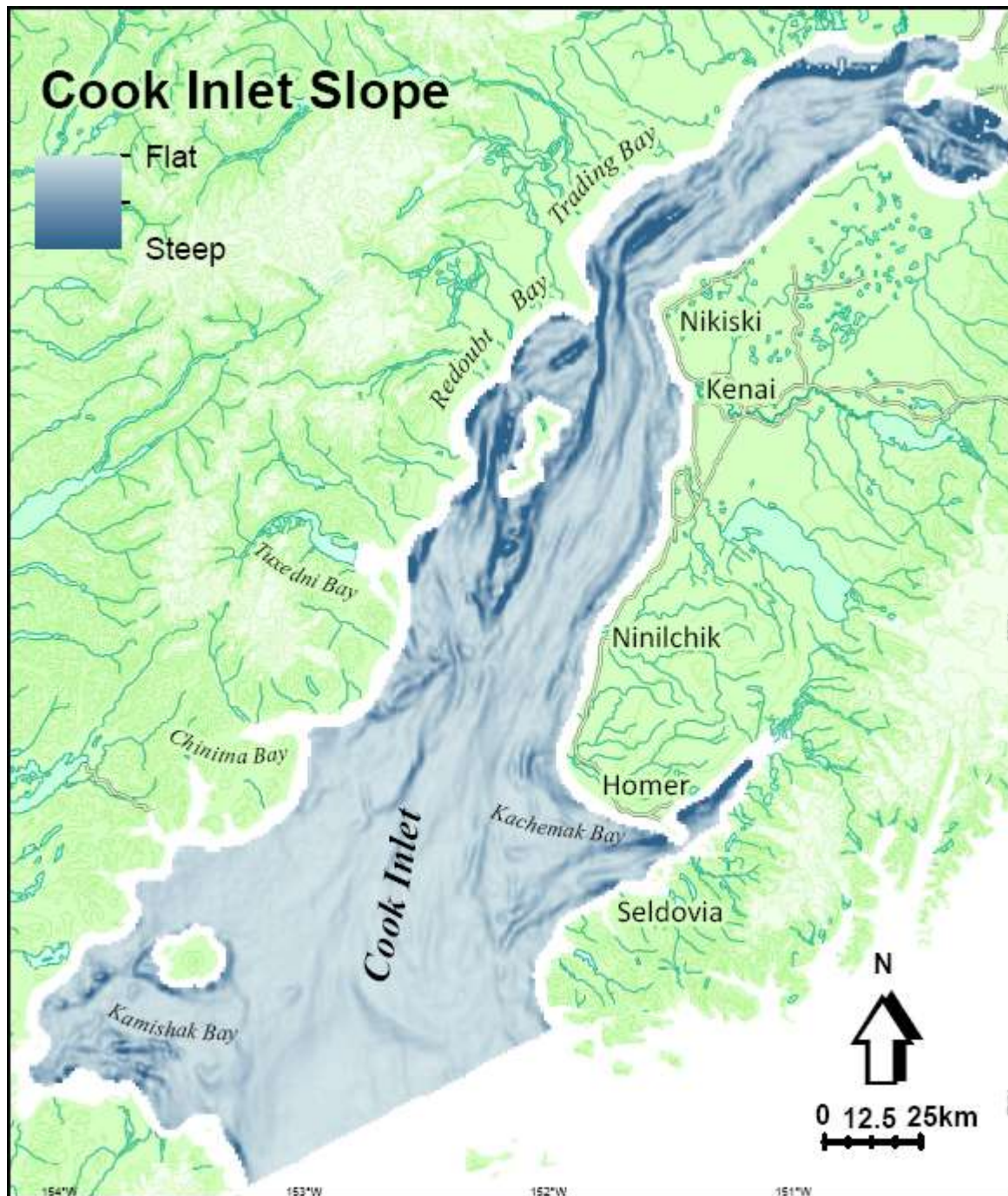


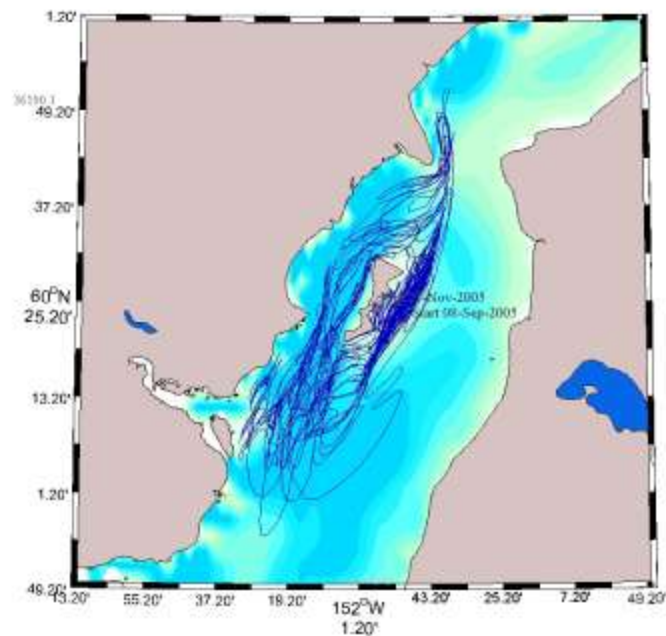
0 12.5 25 km

A horizontal scale bar with three segments, labeled 0, 12.5, and 25 km.

Date: 08/12/2010
Lim, E., B.W. Eakins, and R. Wigley,
Coastal Relief Model of Southern Alaska,
National Geophysical Data Center,
NESDIS, NOAA, 2009.



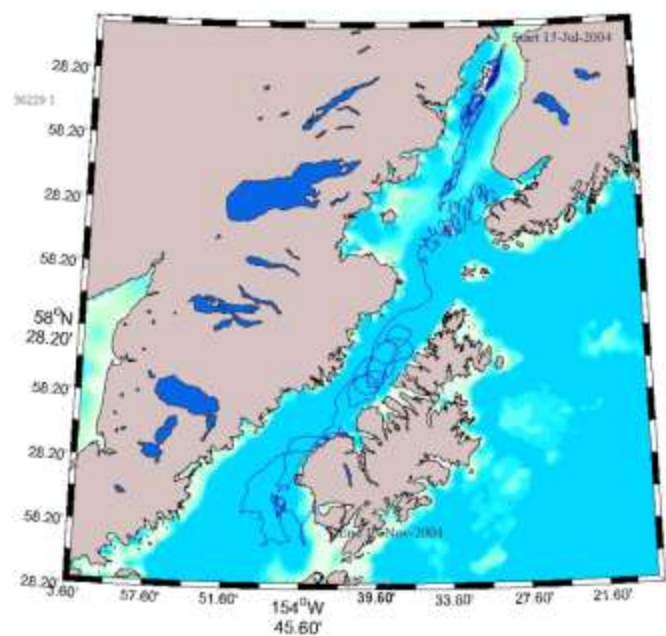
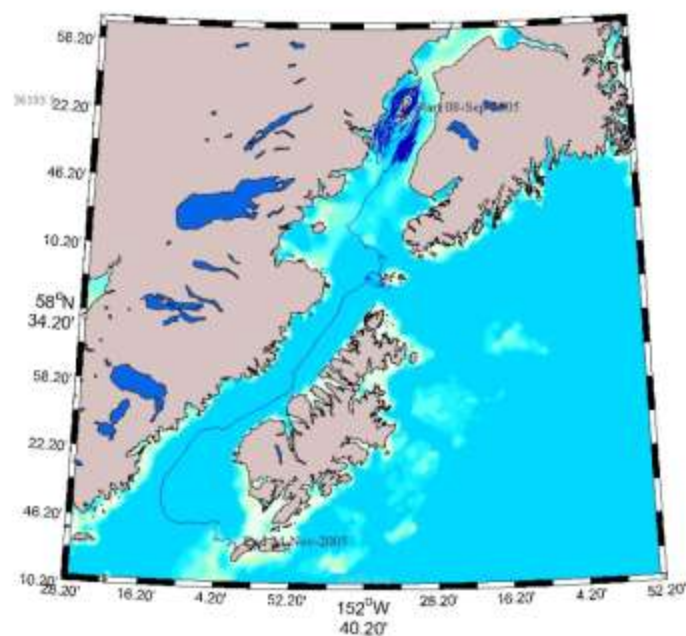




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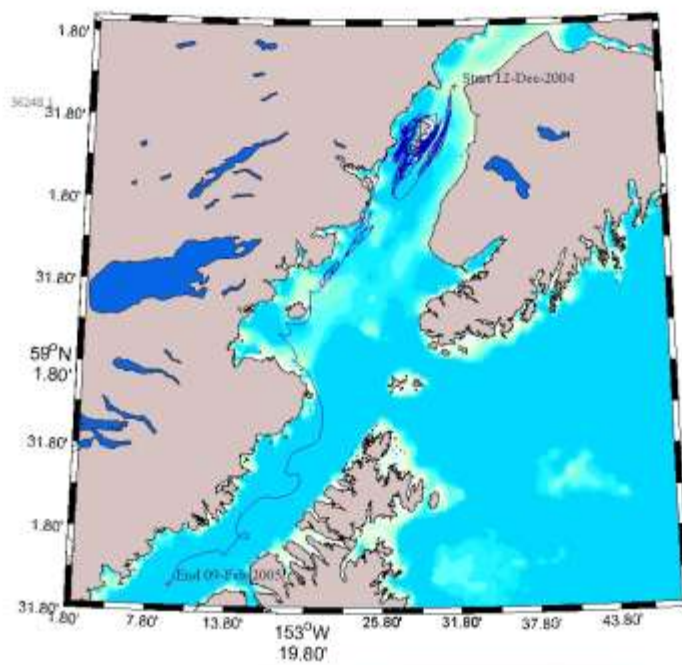
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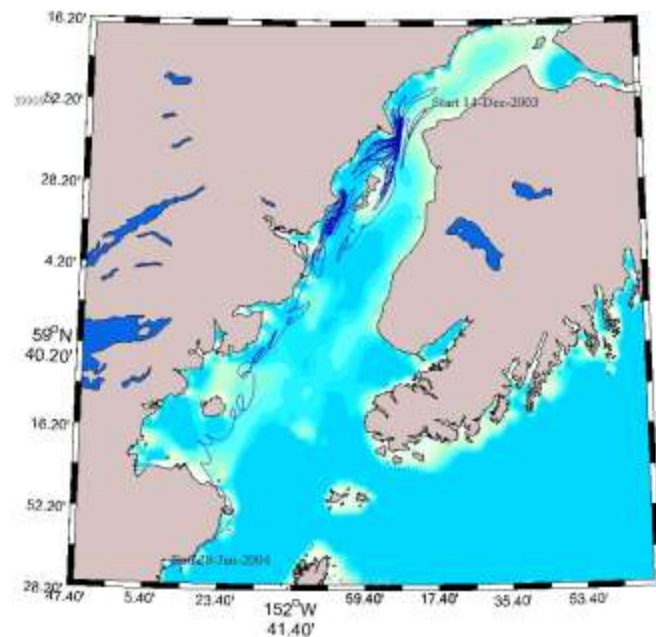
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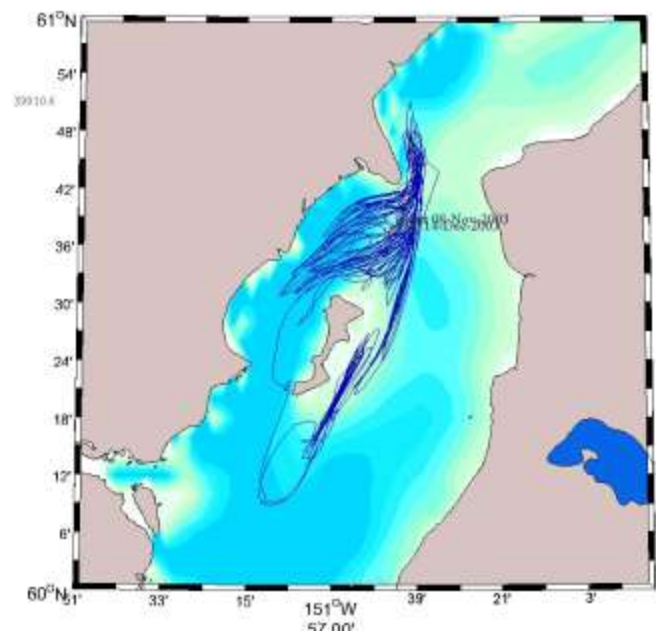
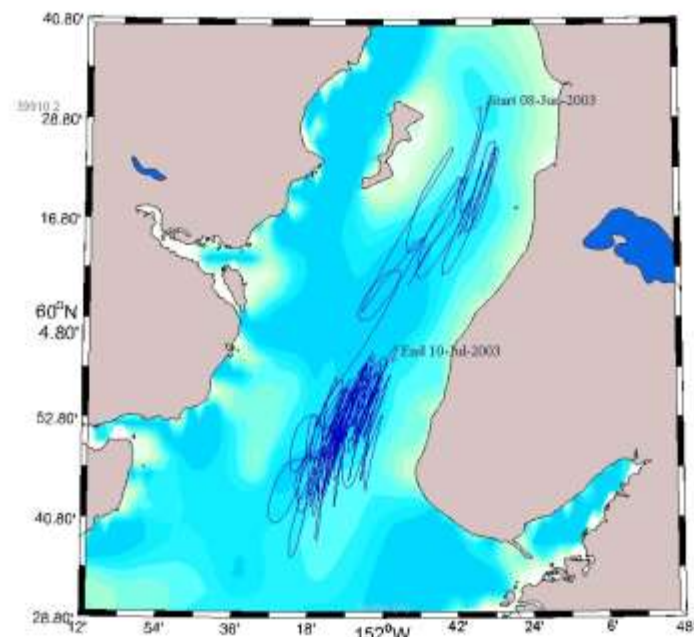
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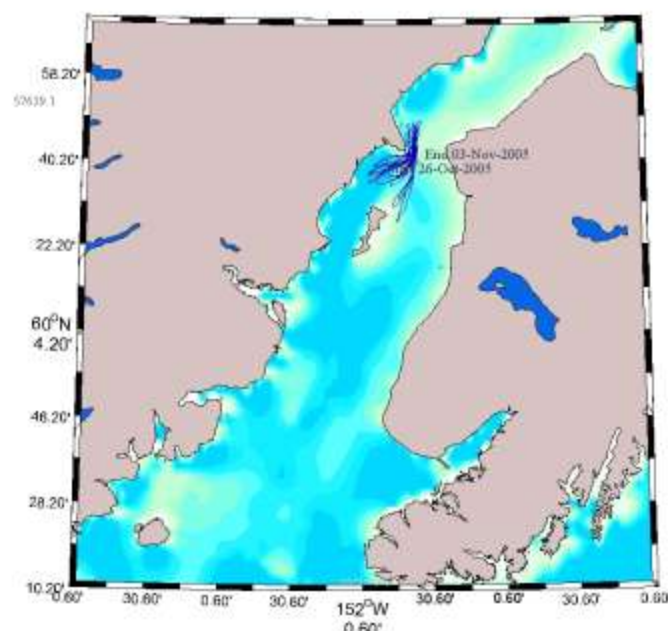


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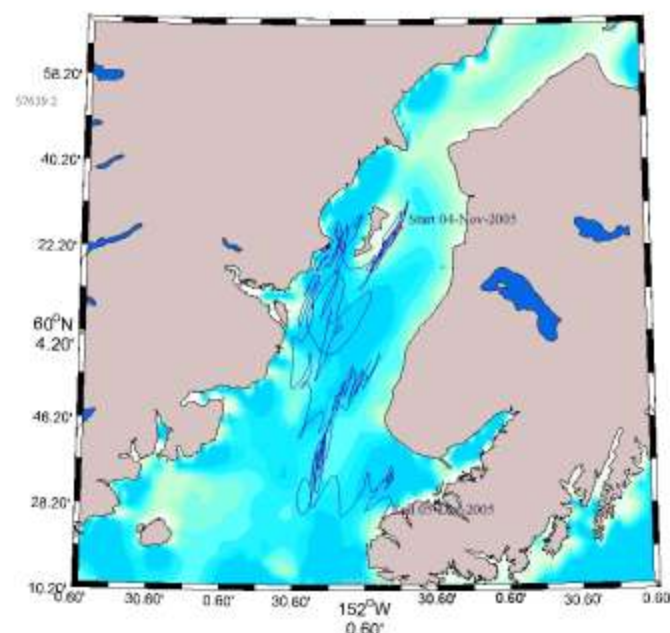
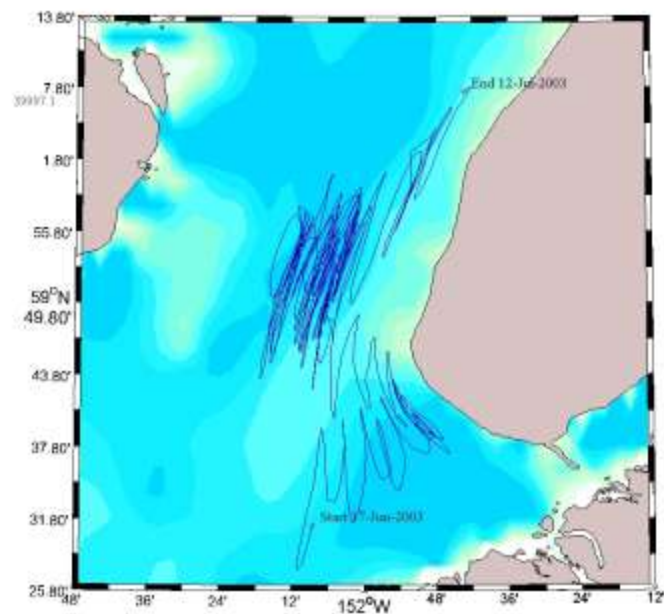
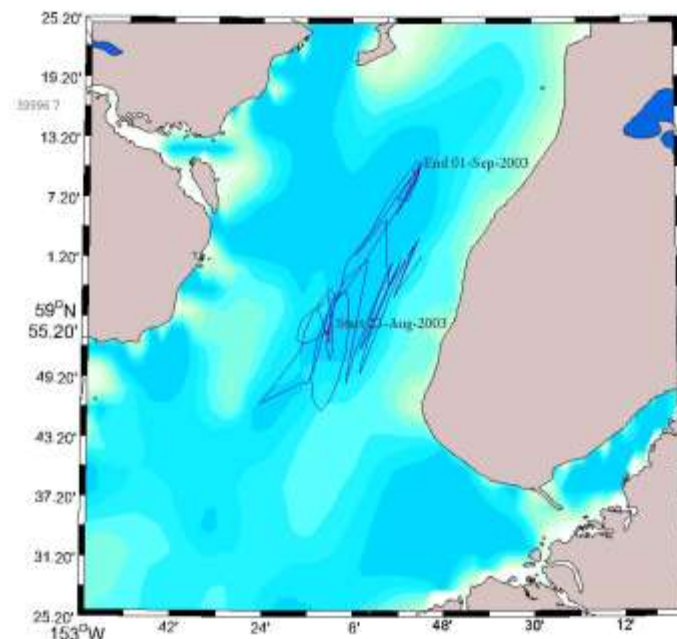
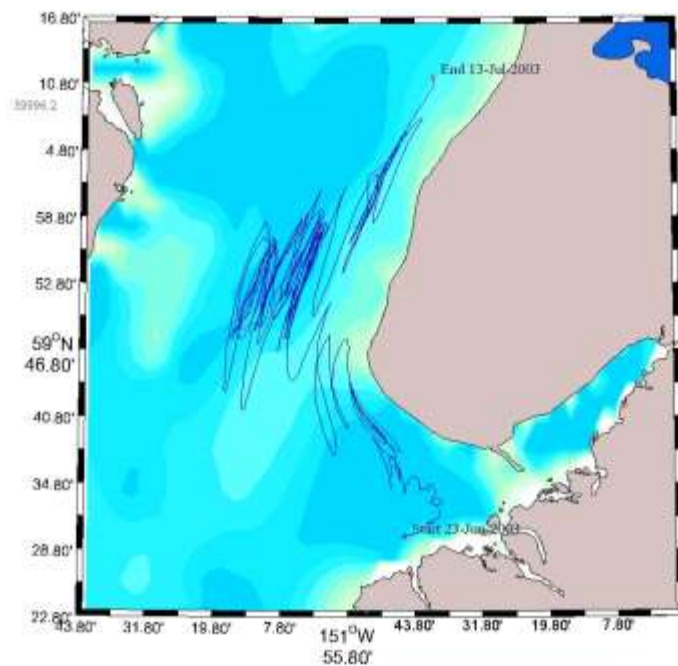
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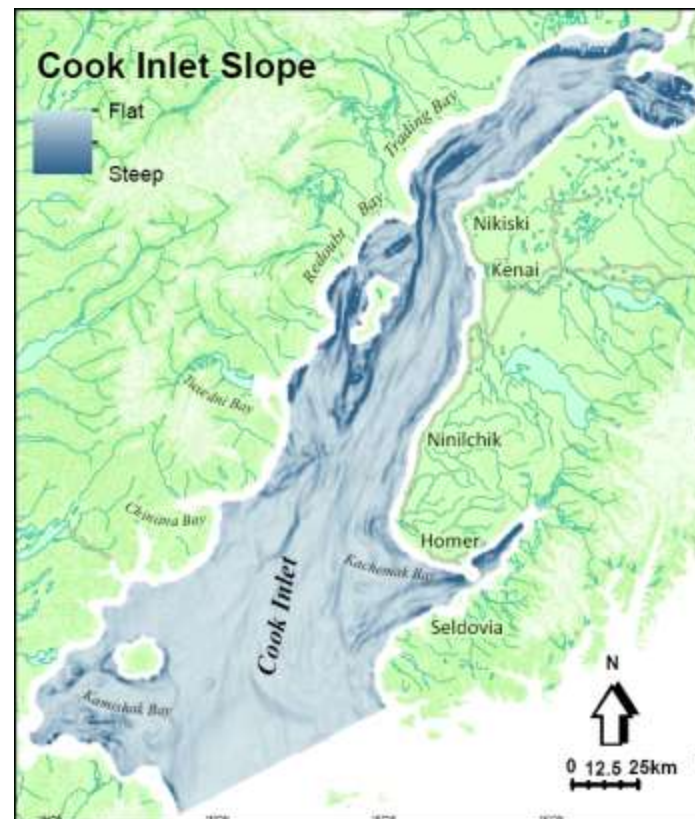
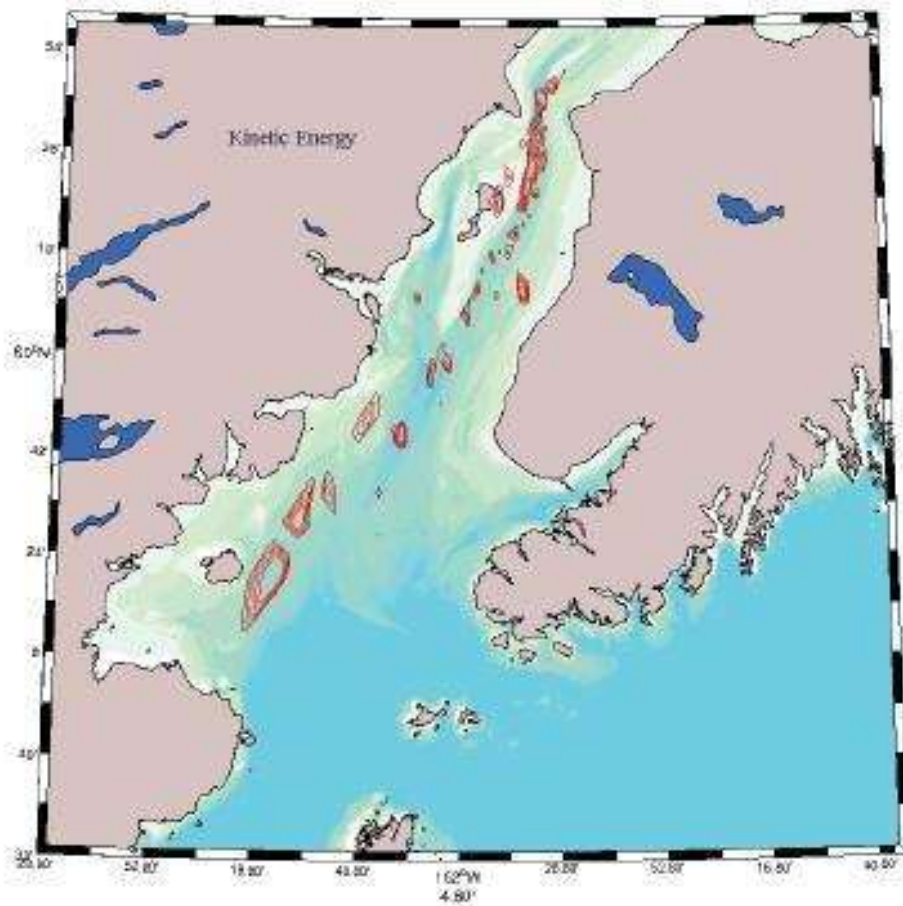
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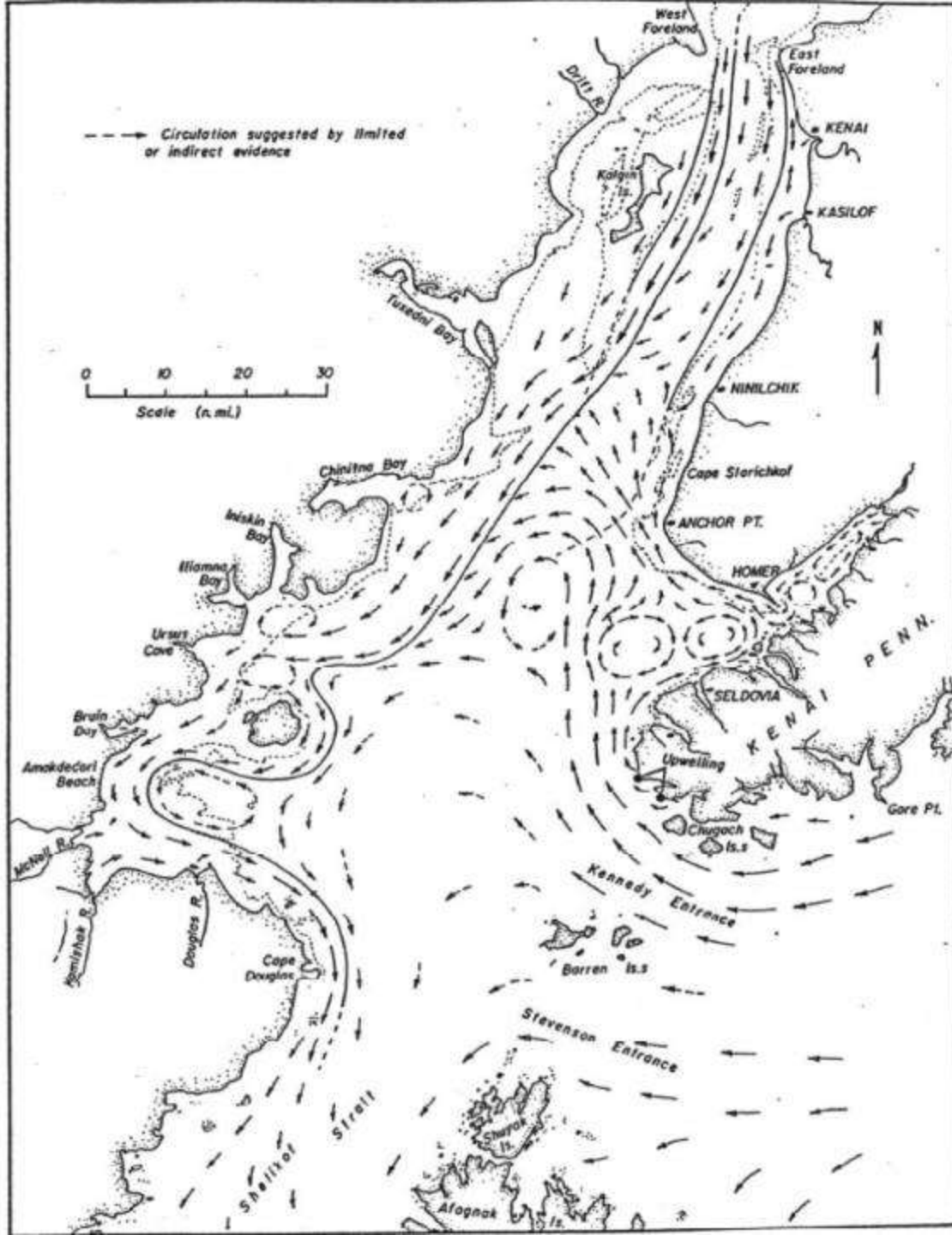


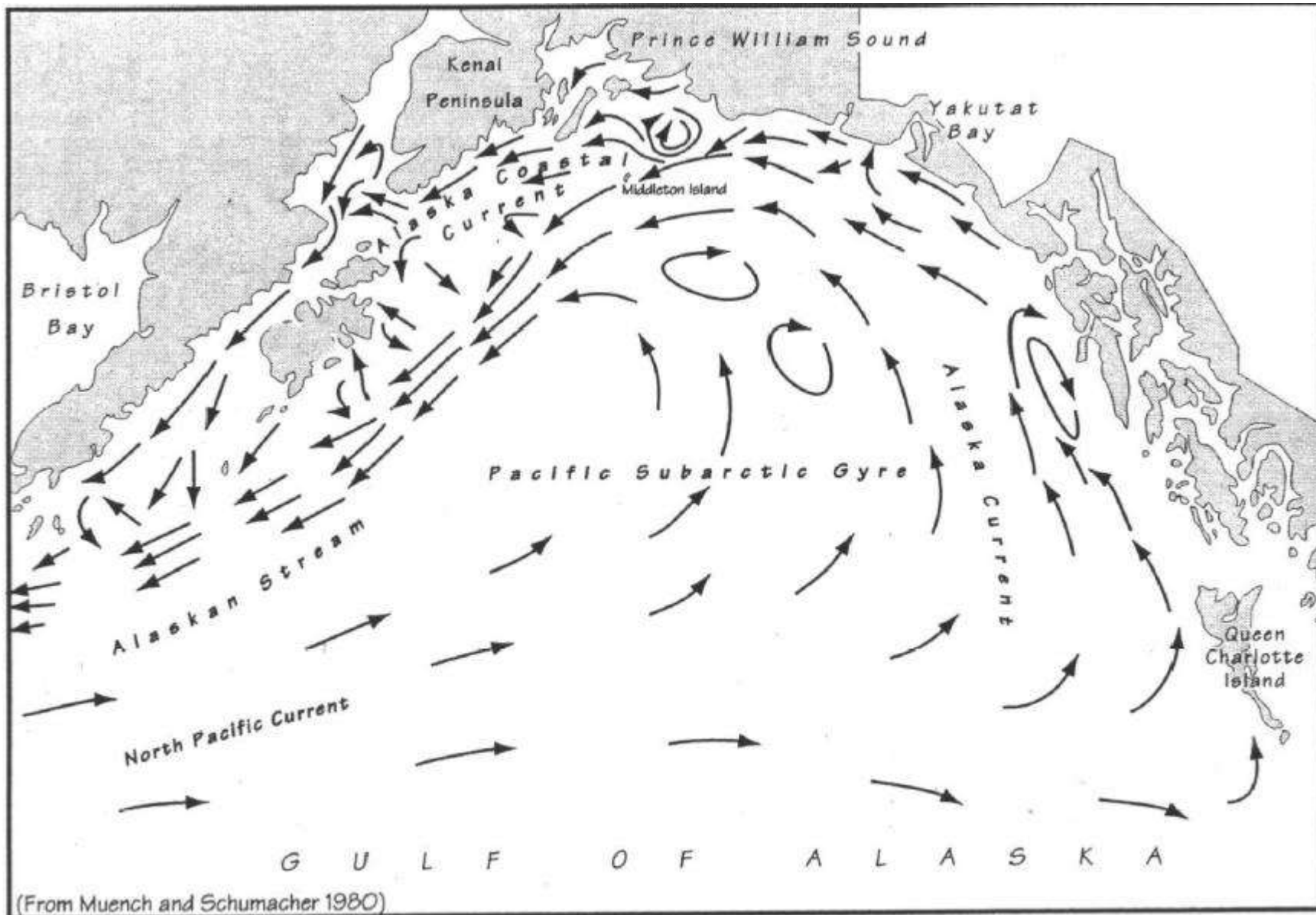
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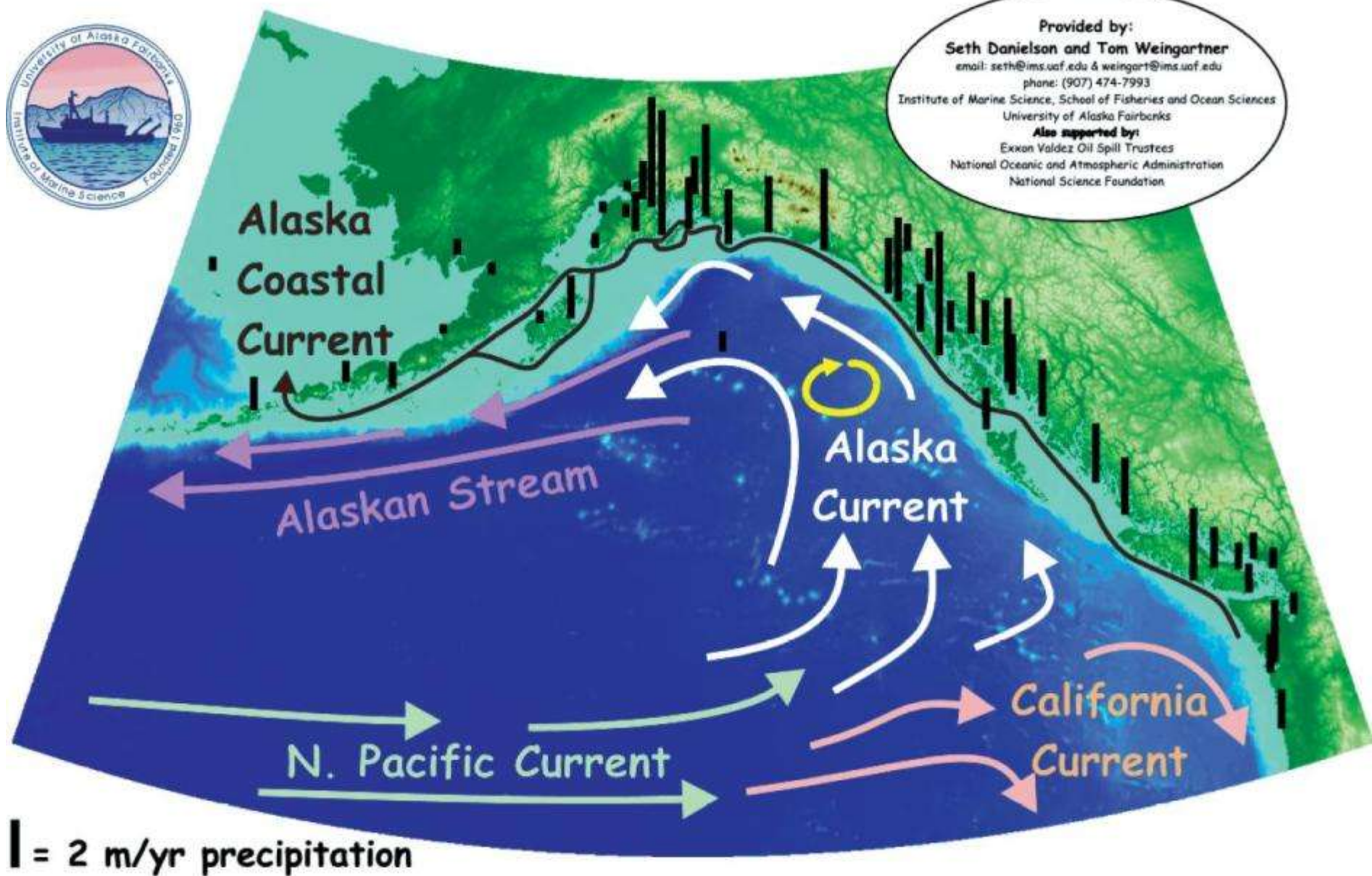


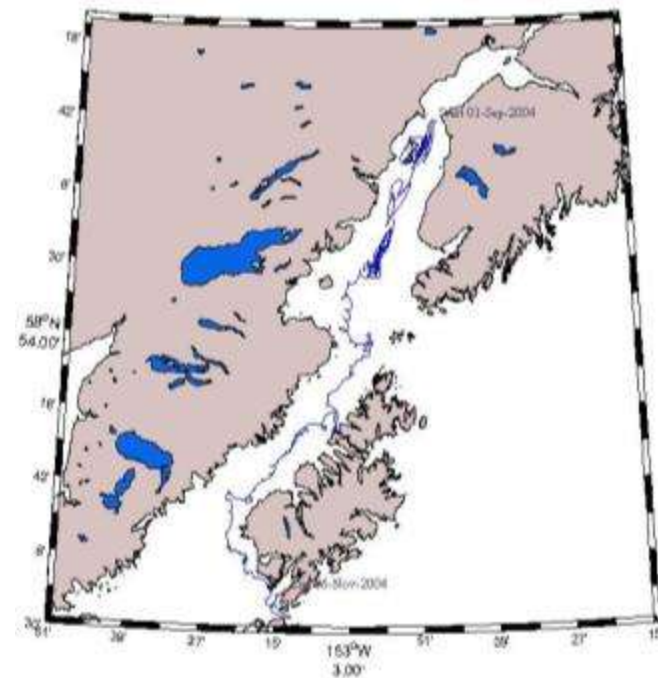
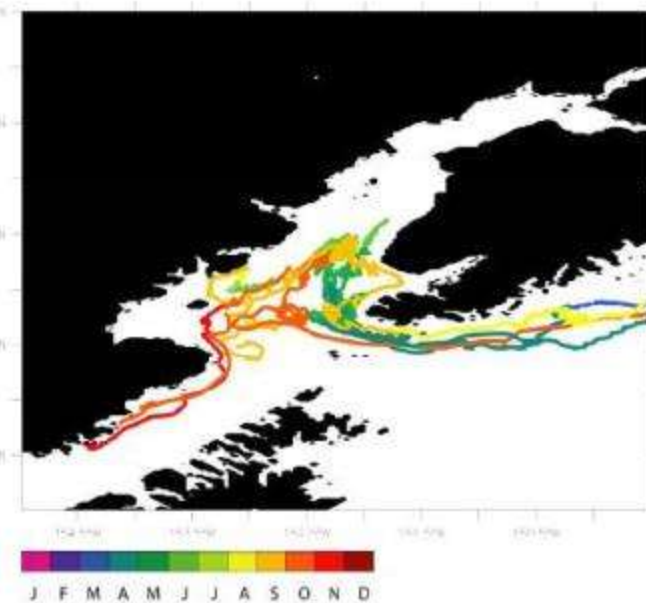
Net surface currents in the Gulf of Alaska

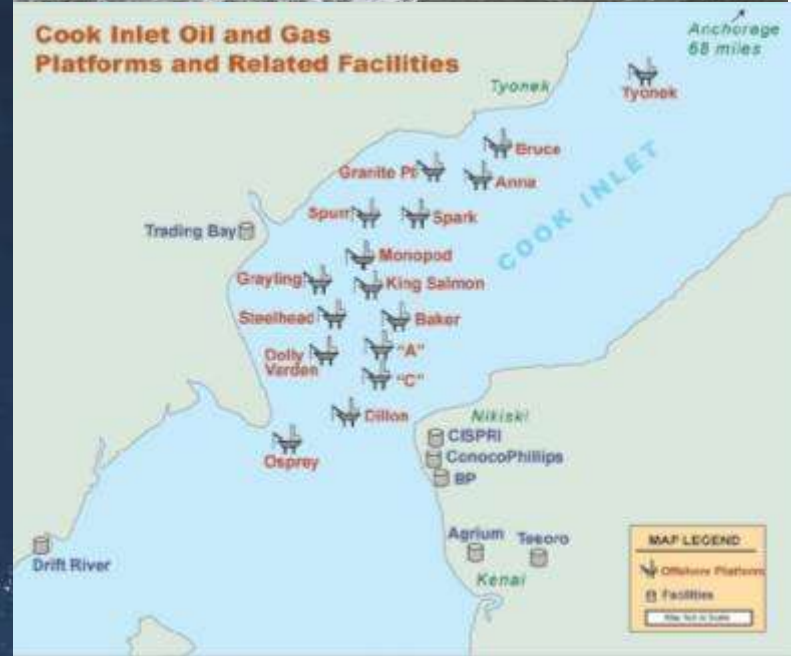
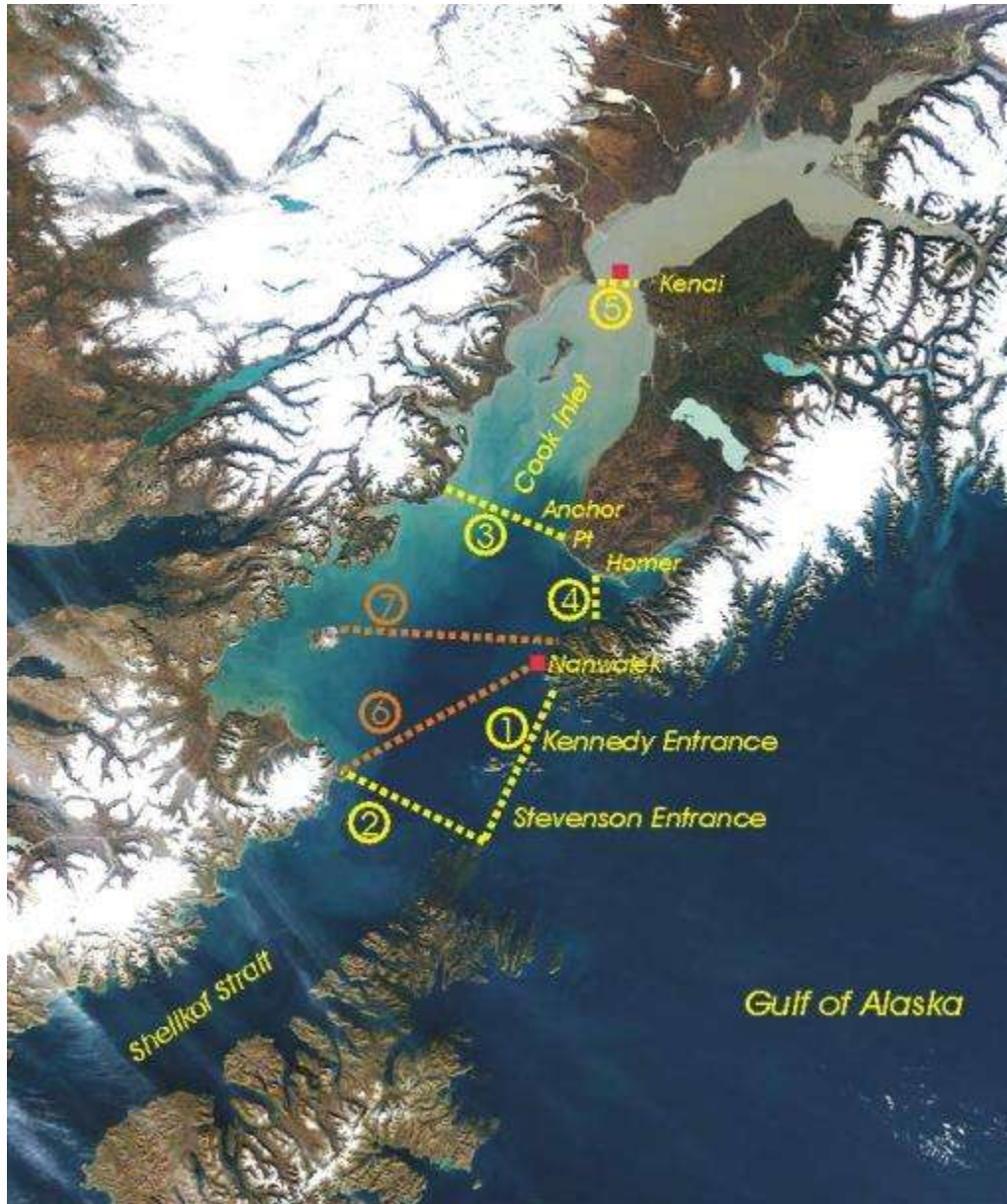
Muench, R.D. and J.D. Schumacher; 1980, Physical oceanographic and meteorological conditions in the Northwest Gulf of Alaska, NOAA Technical Memorandum ERL PMEL-22: Seattle: Pacific Marine Environmental Laboratory. National Oceanic and Atmospheric Administration.

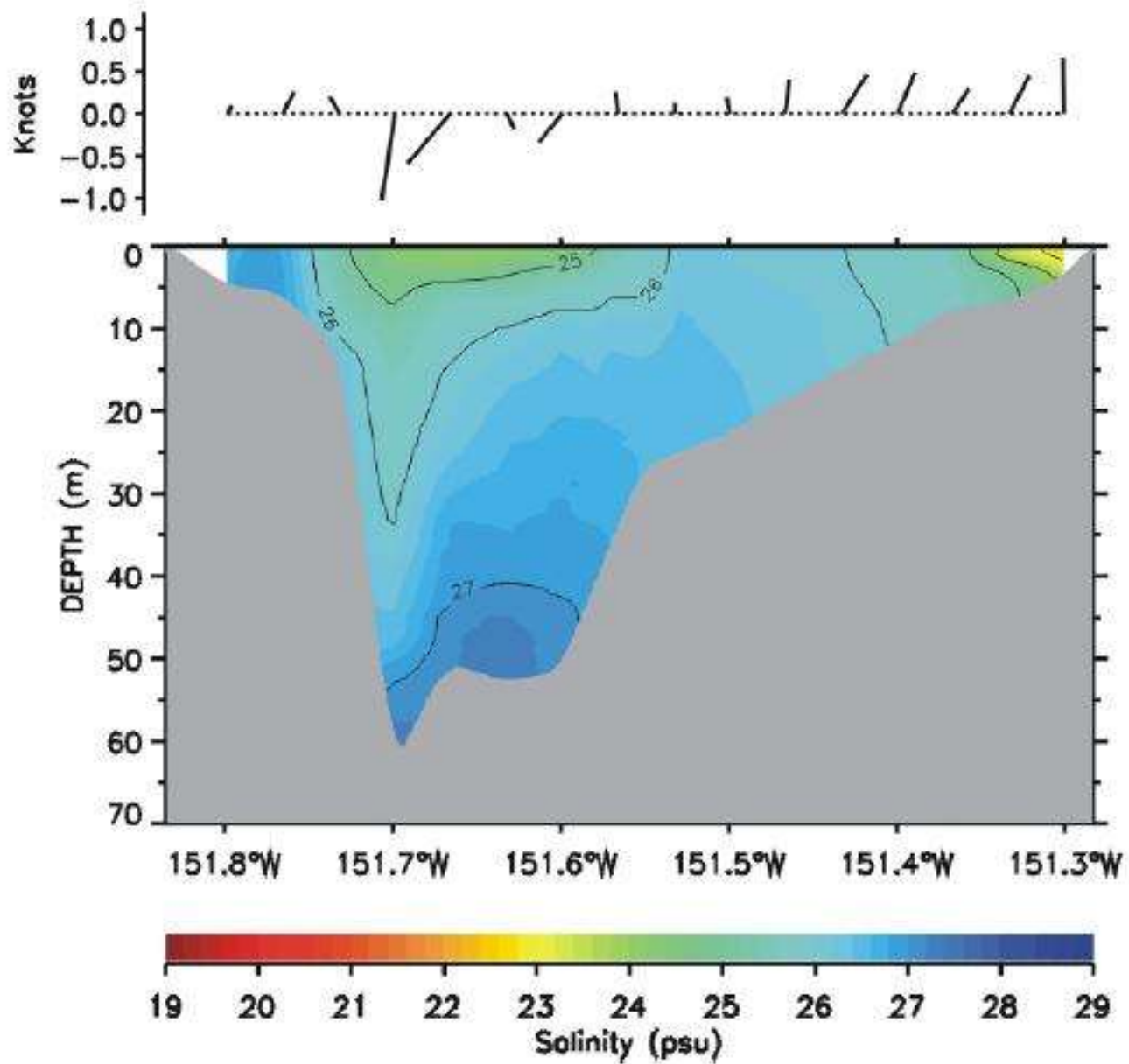
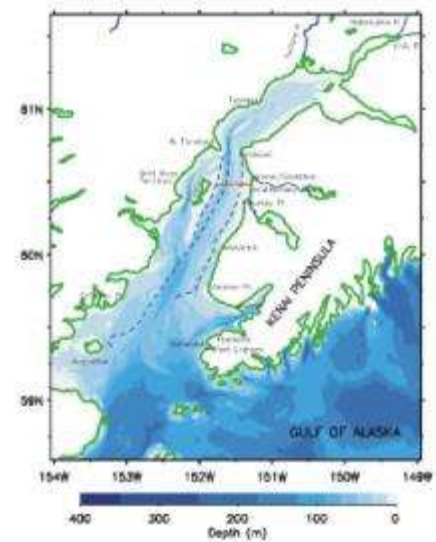


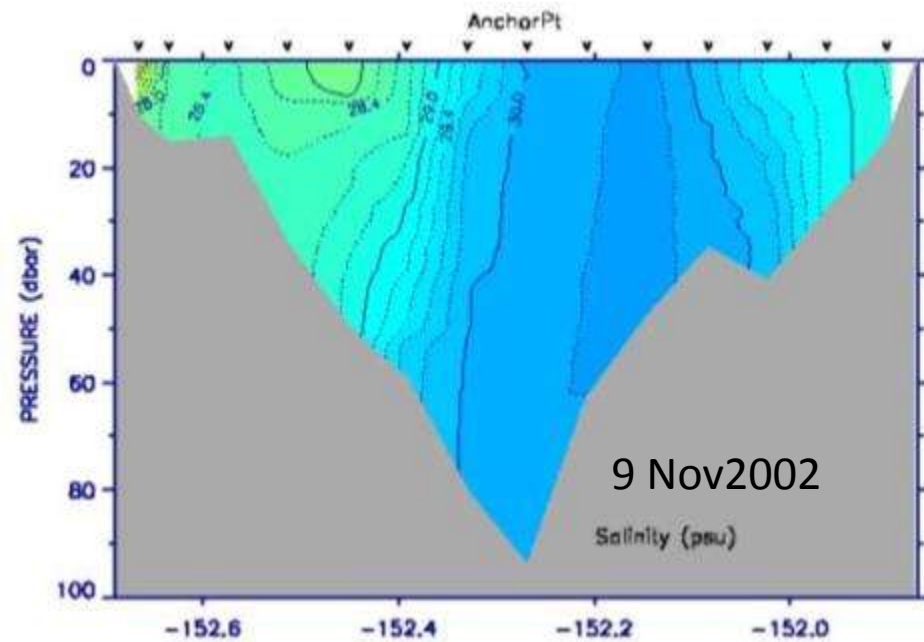
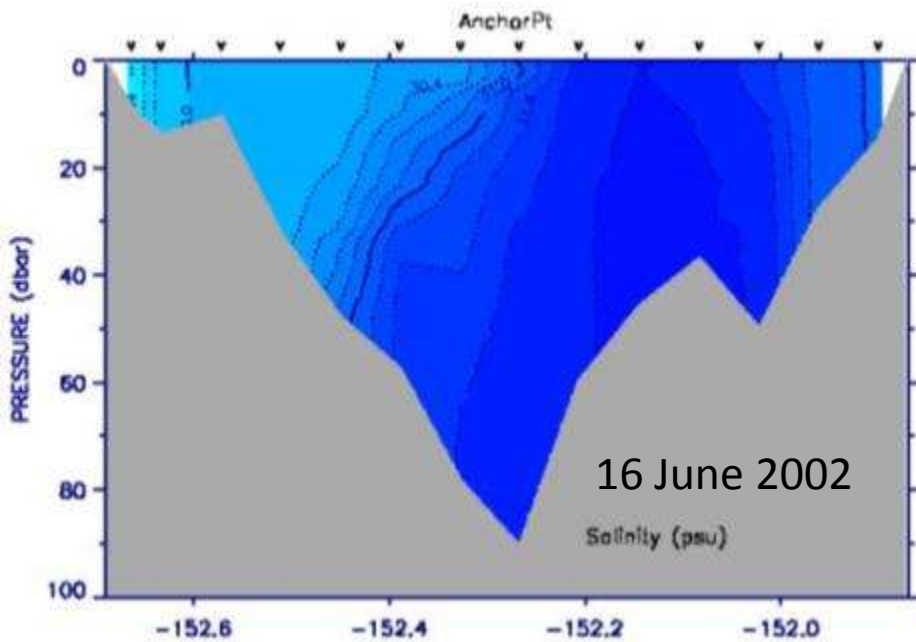
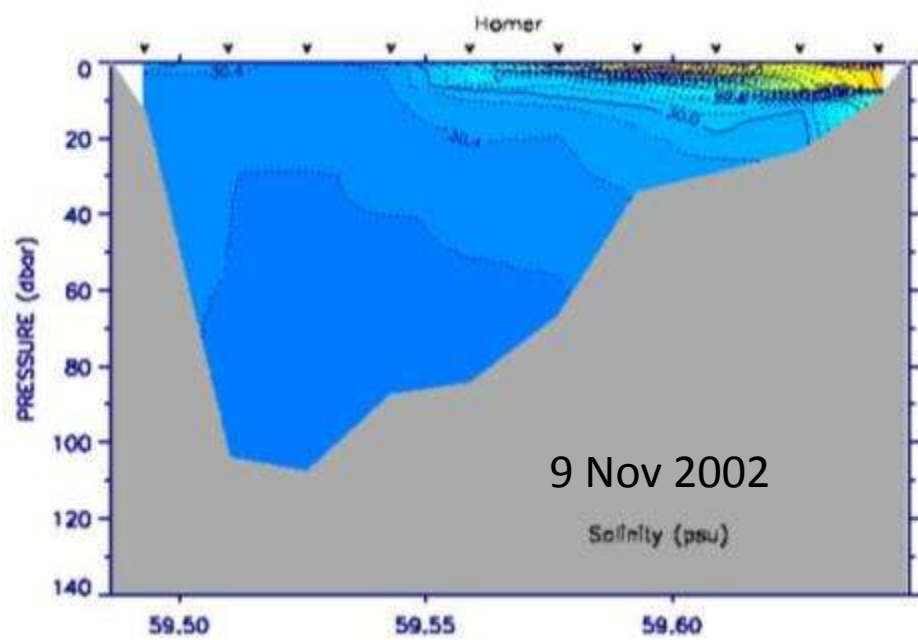
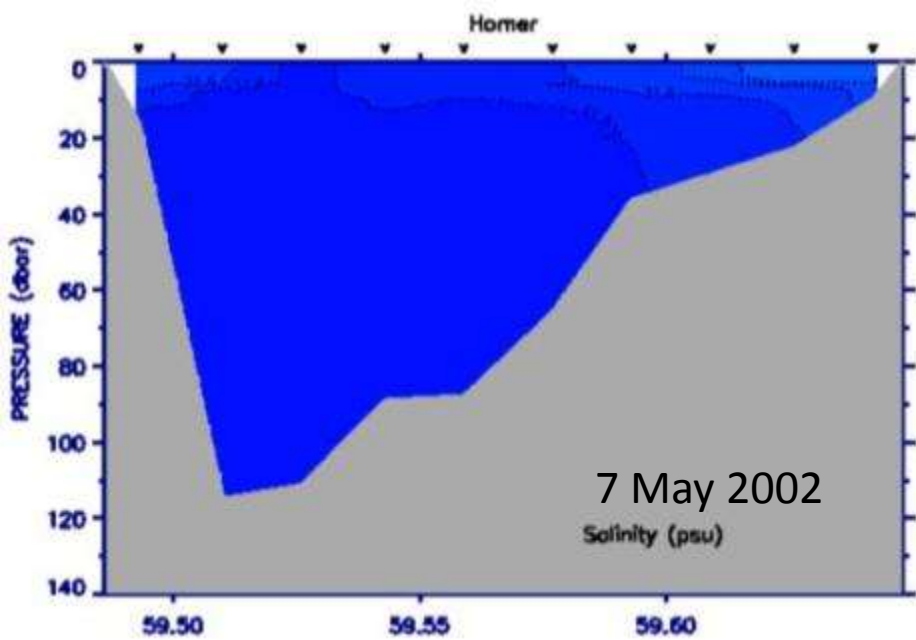
Provided by:
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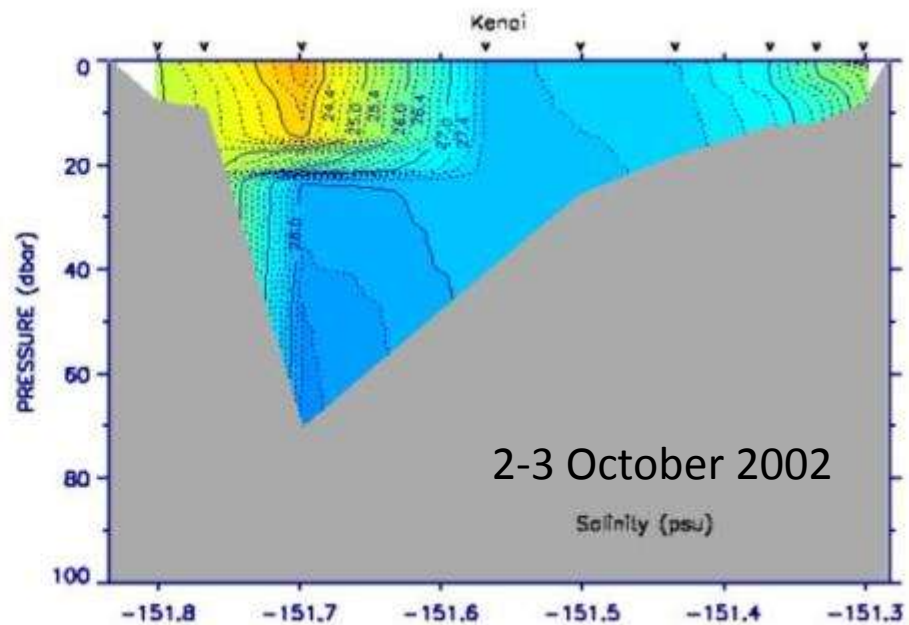
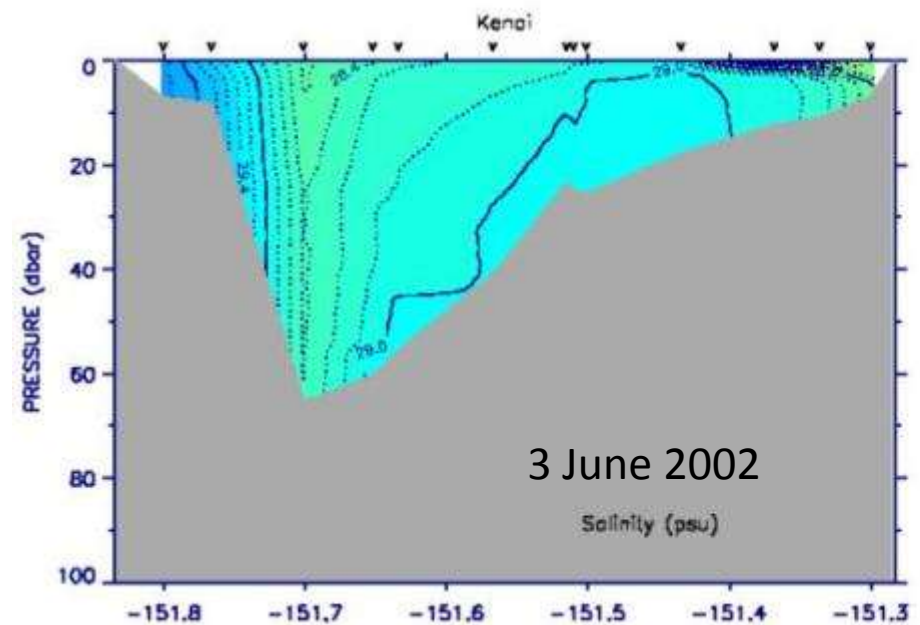
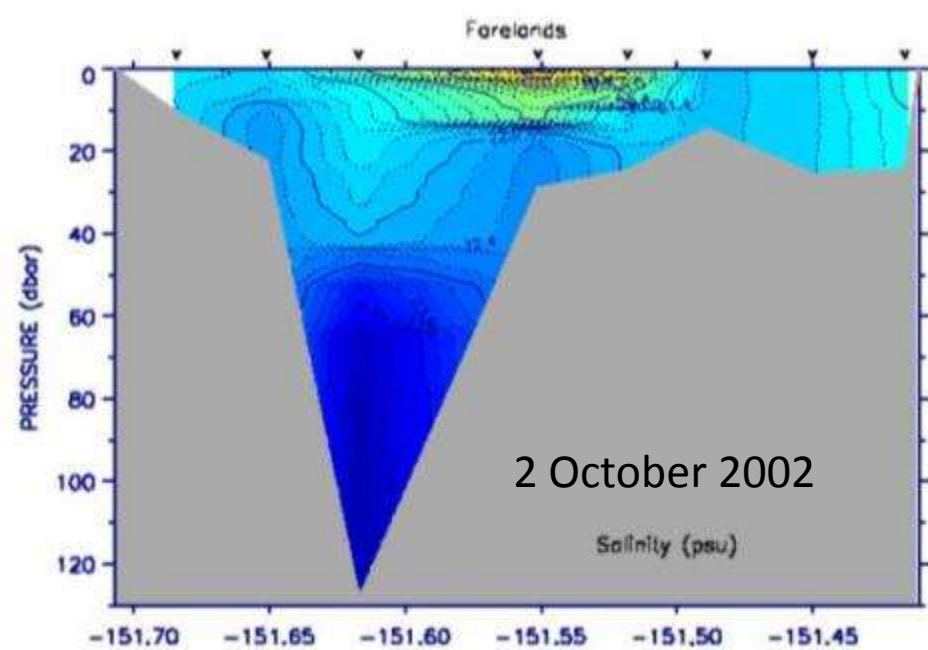
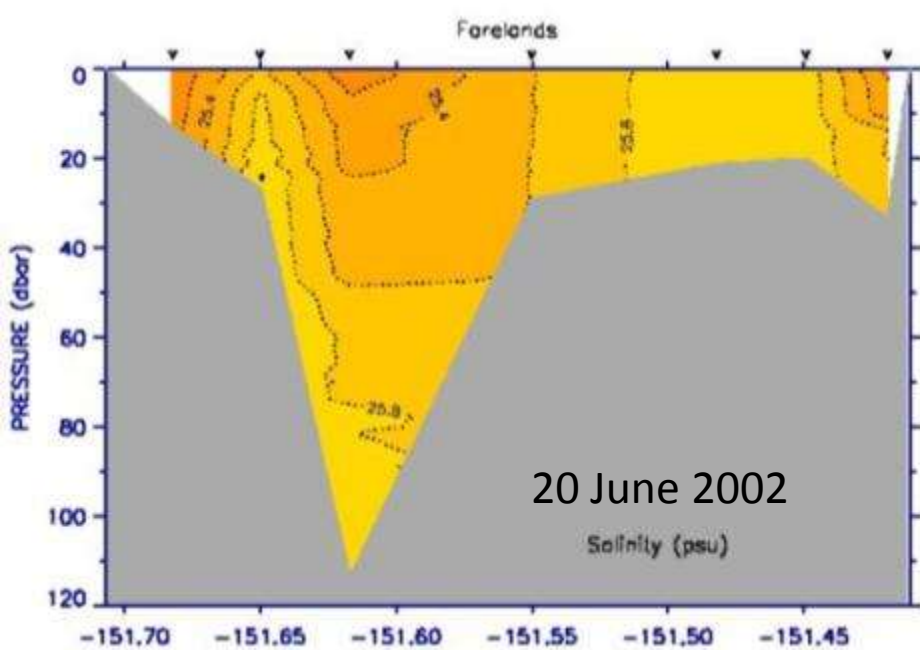


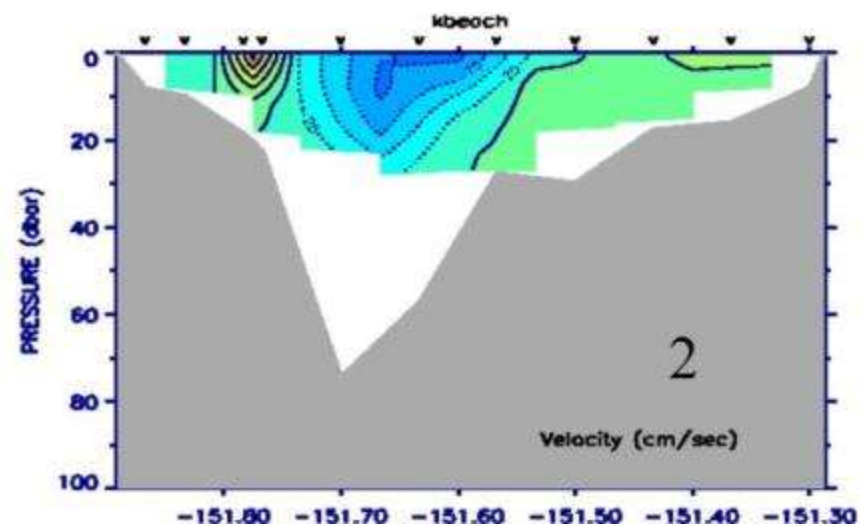
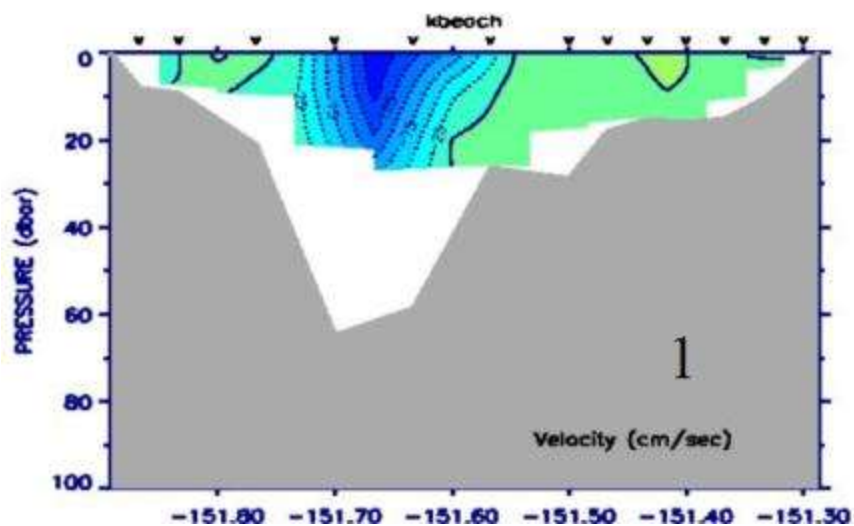
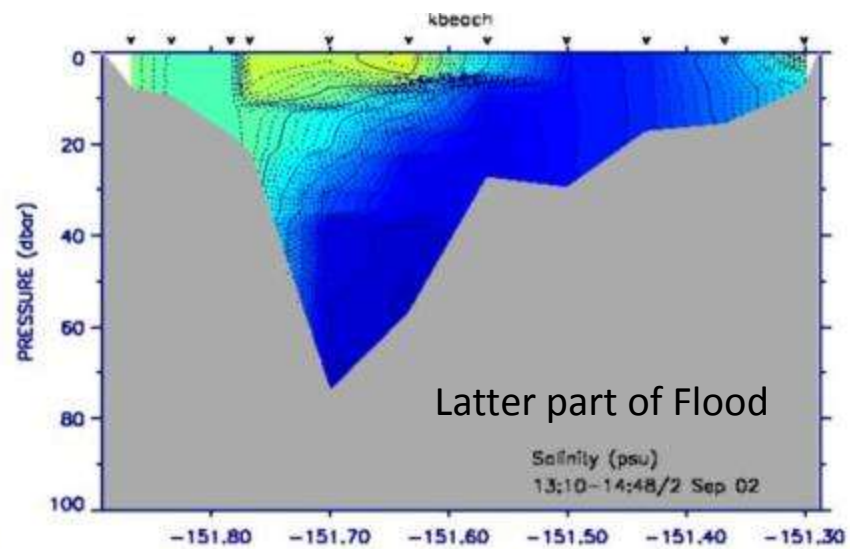
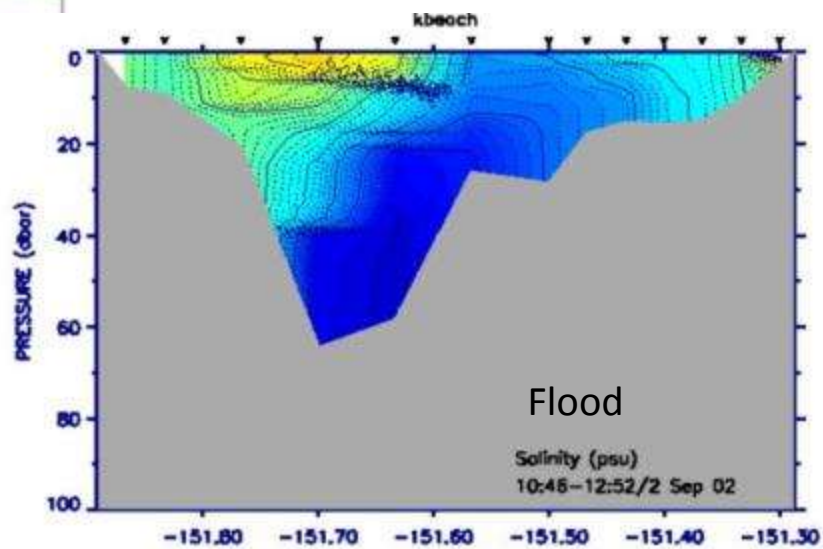


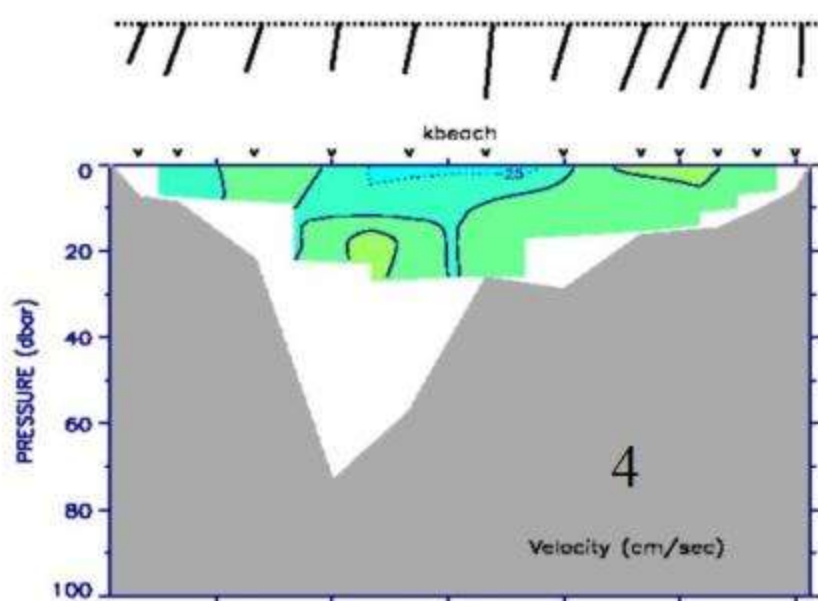
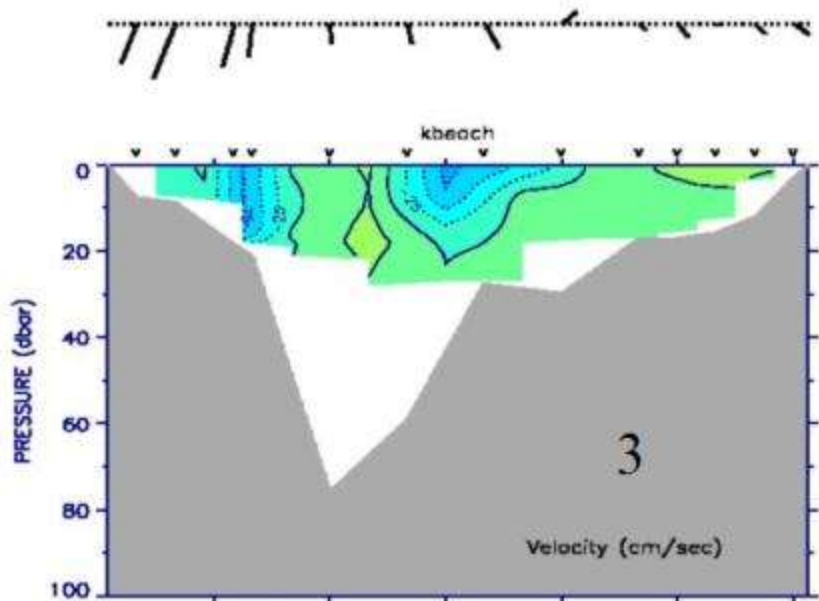
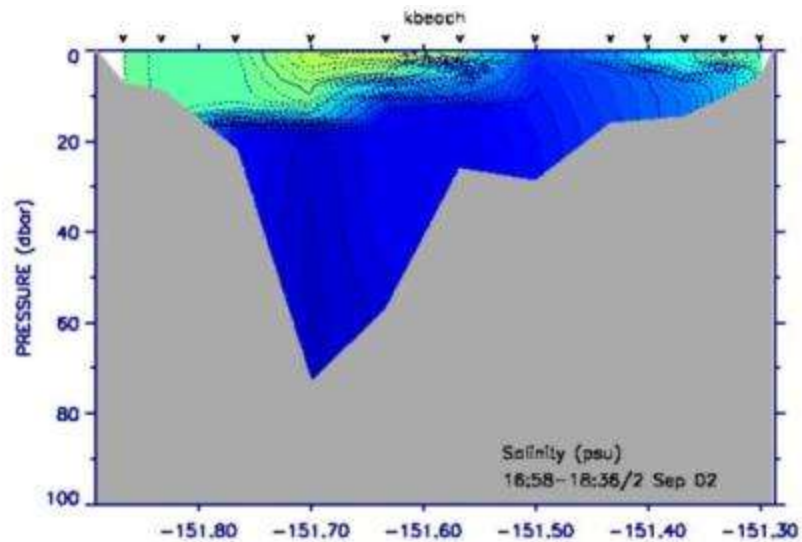
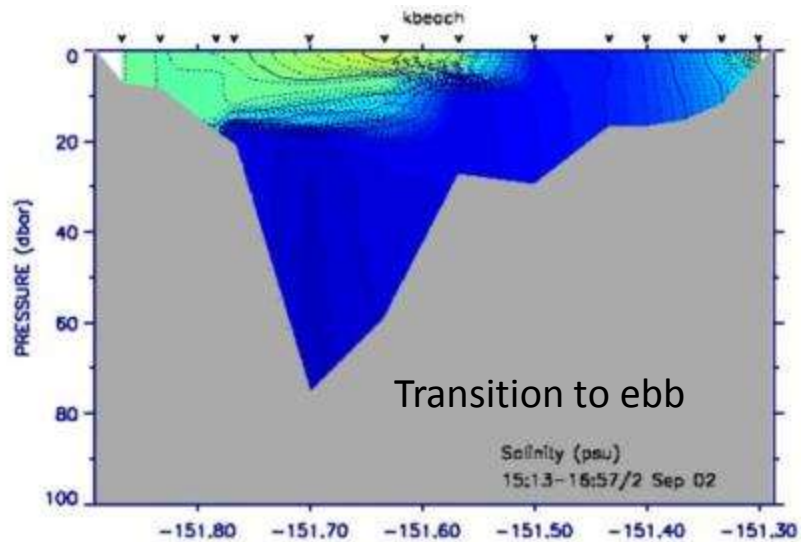


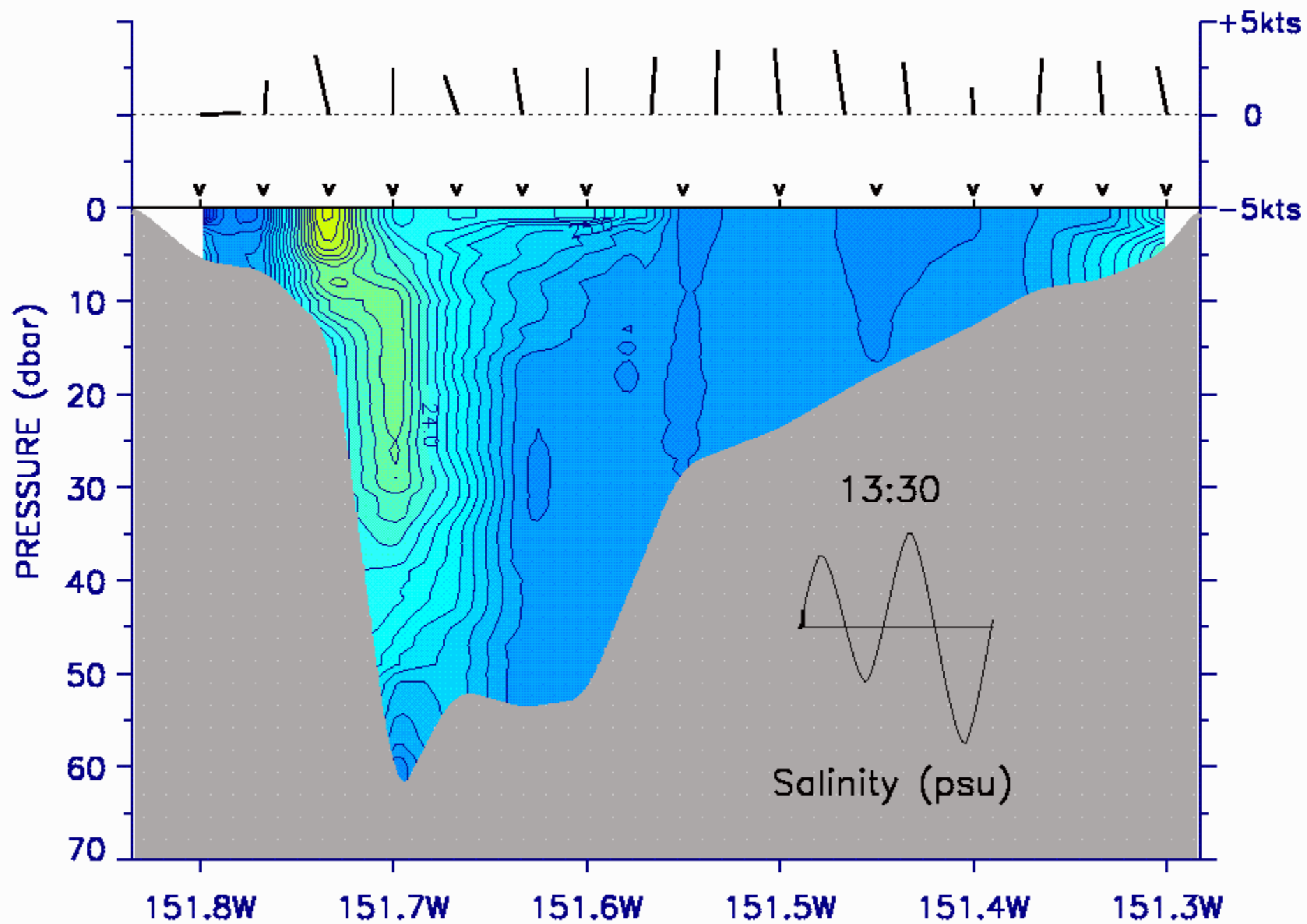




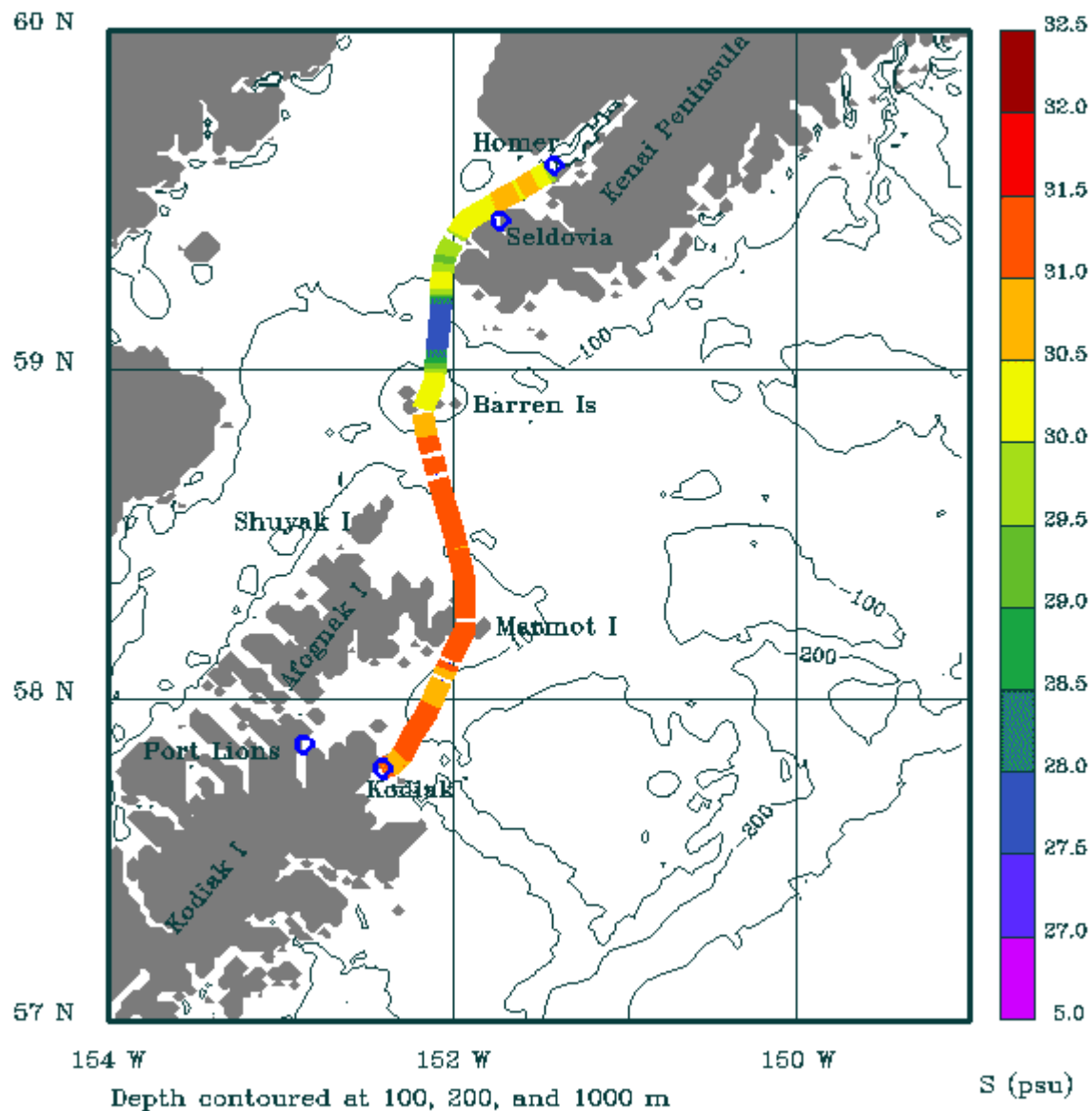




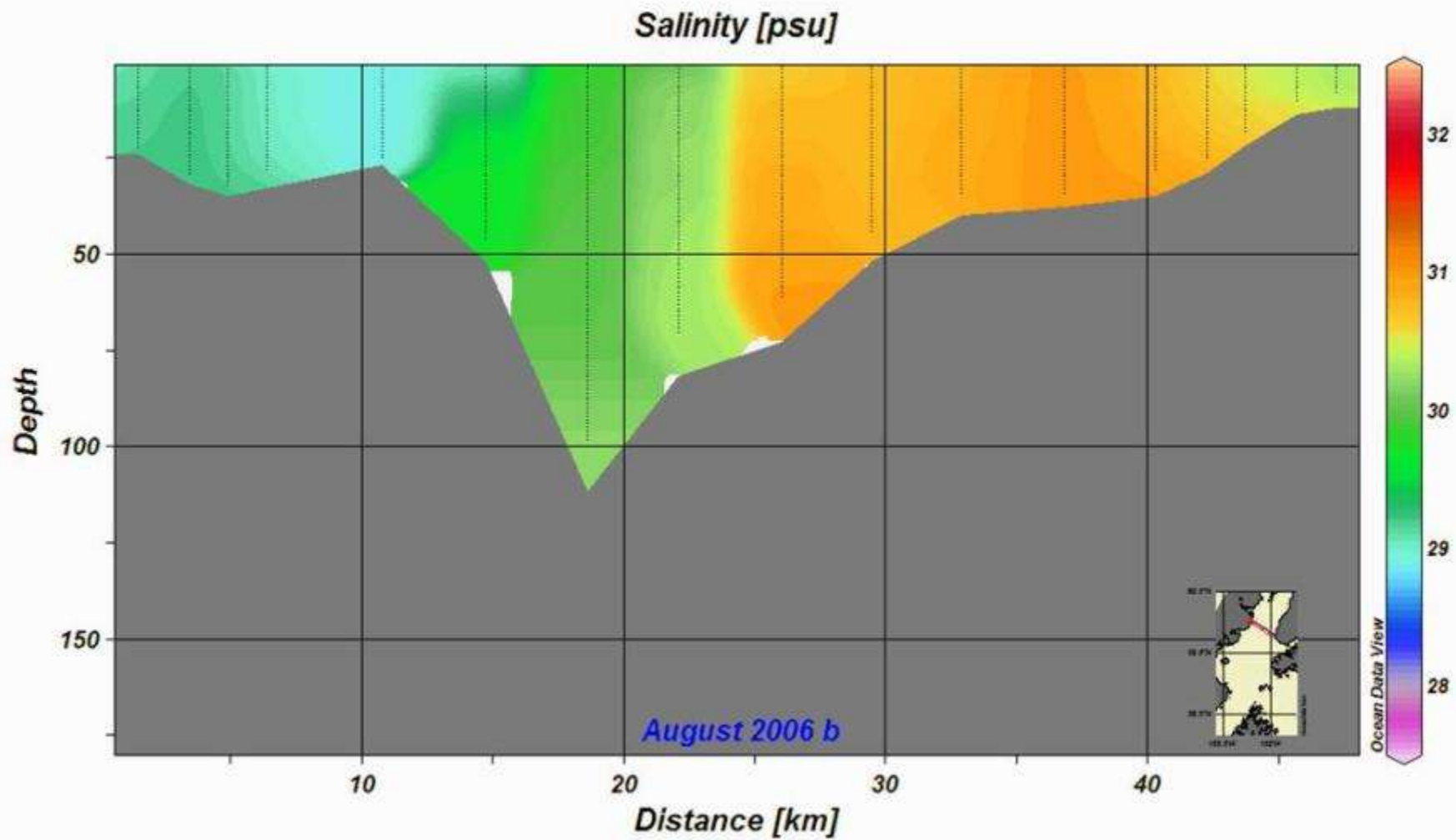




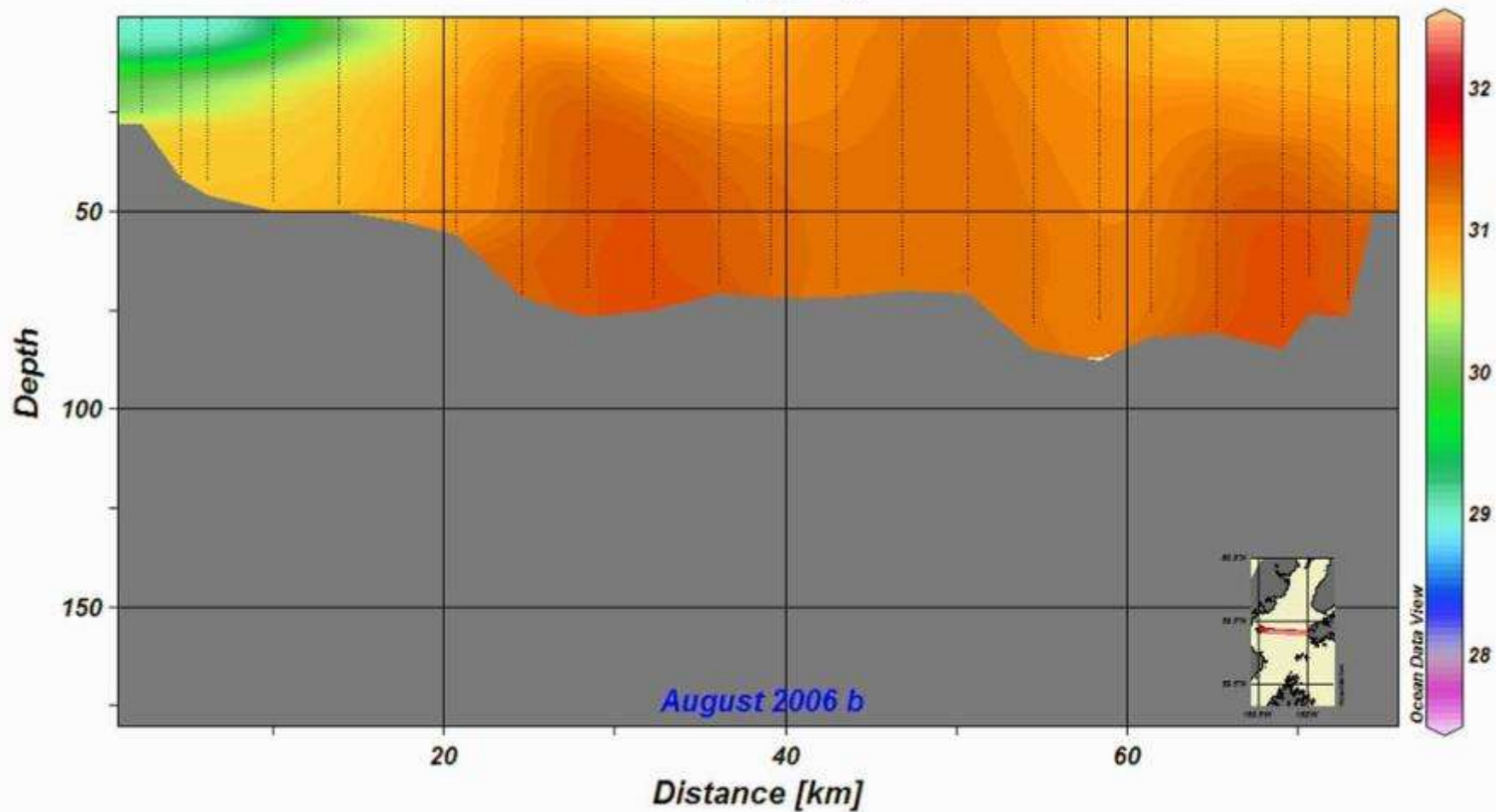
Salinity at 4 m, M/V *Tustumena*
 11-OCT-2005 05:17 to 11-OCT-2005 16:13 GMT



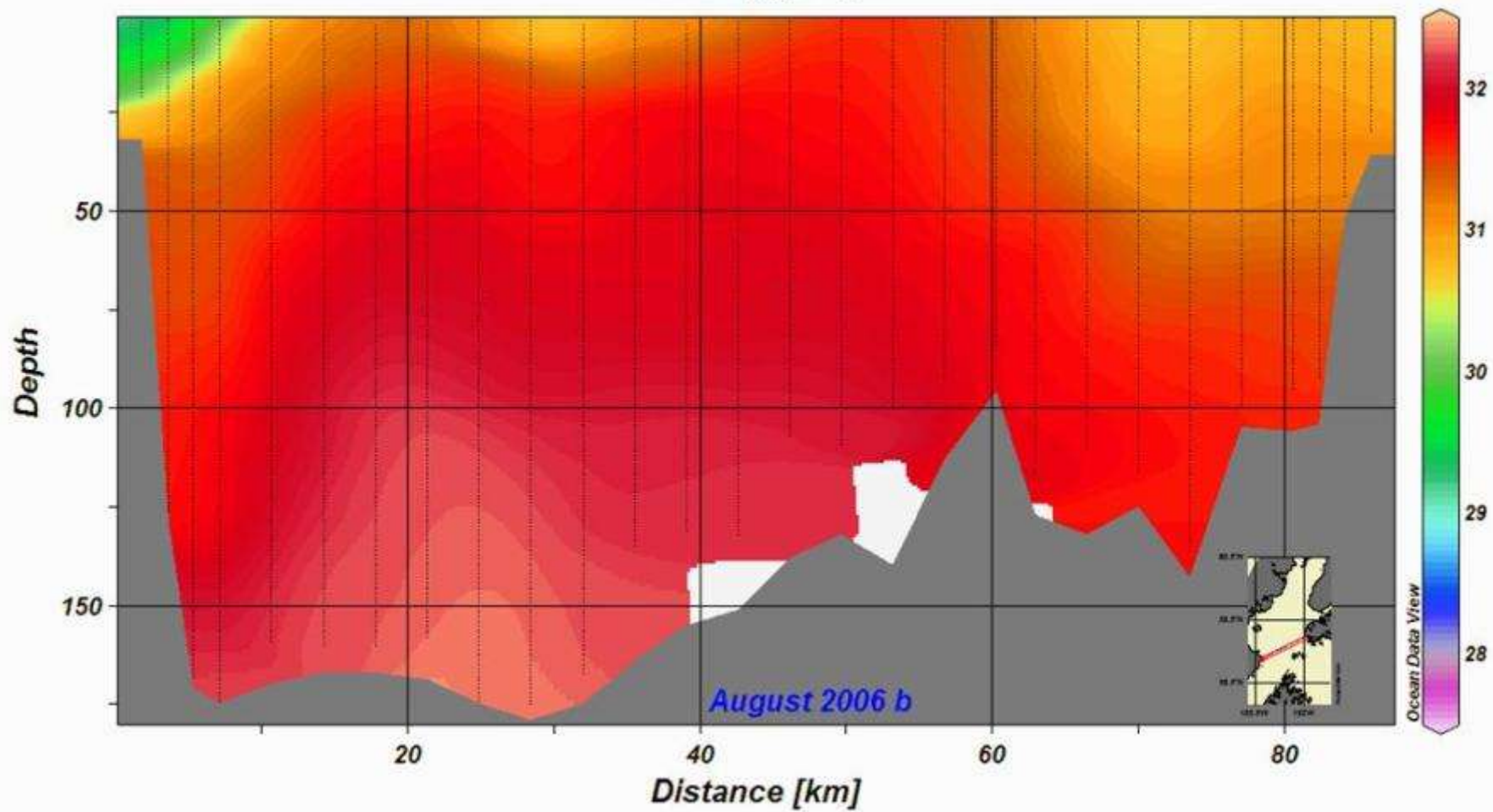
Pegau (ADFG/KBRR), Cokelet (NOAA/PMEL),
 Jenkins & Mordy (UW/JISAO)



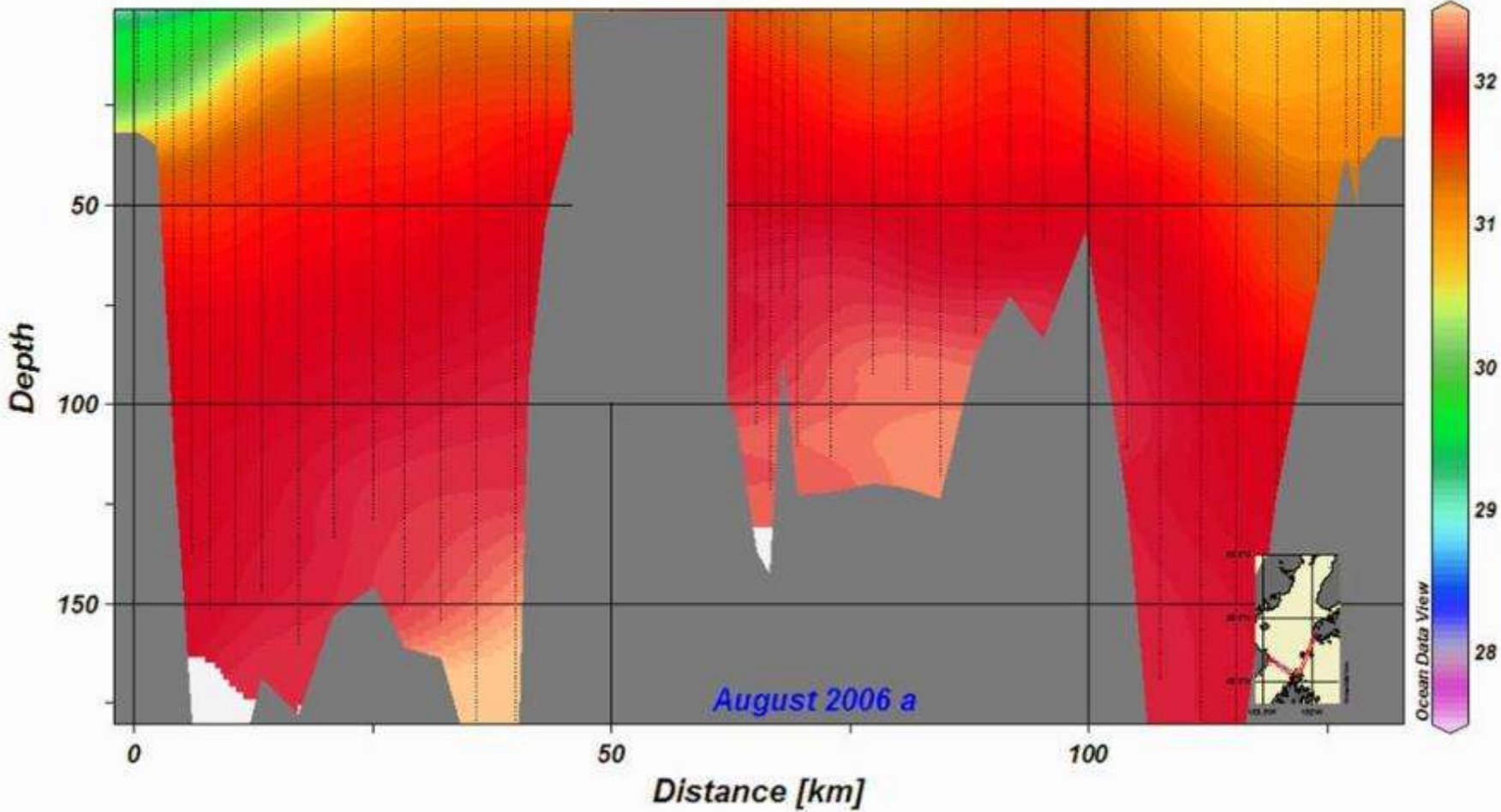
Salinity [psu]

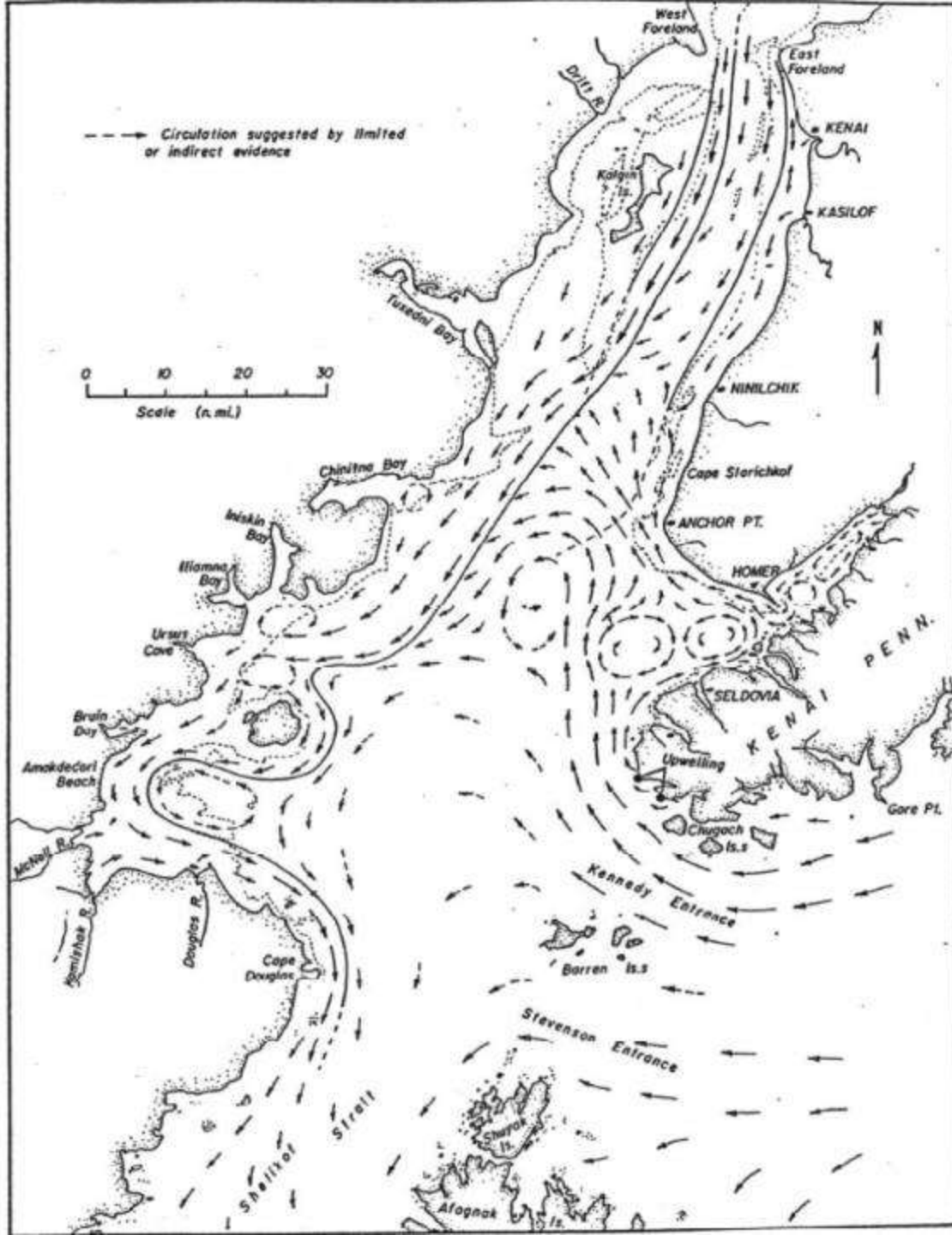


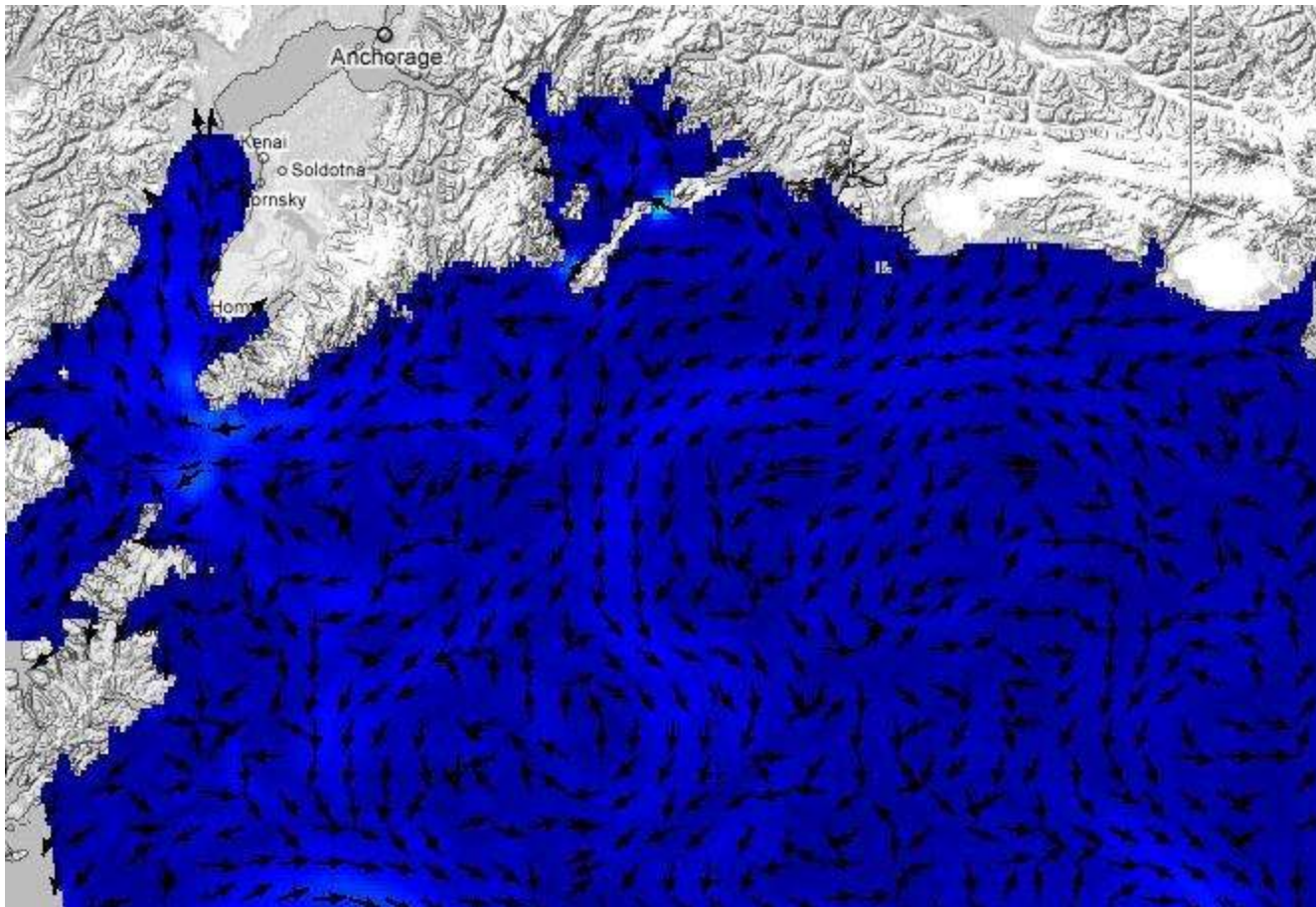
Salinity [psu]



Salinity [psu]







We need models

