

Trustee Council Use Only

Project No: _____

Date Received: _____

GEM PROPOSAL SUMMARY PAGE

(To be filled in by proposer)

Project Title: A monitoring program for near-surface temperature, salinity, and fluorescence fields in the Northeast Pacific Ocean: Transition to an operational program

Project Period: 1 October 2003 to 30 September 2006

Proposer(s): Stephen R. Okkonen, University of Alaska School of Fisheries & Ocean Sciences

Study Location: Northern Gulf of Alaska

Abstract: This proposed project responds to the Gulf Ecosystem Monitoring and Research Program invitation category **F.2. (Alaska Coastal Current / Collecting physical and biological observations from non-AMHS ships-of-opportunity)**. Funds are requested to continue (1) the maintenance and operation of a thermosalinograph (TSG) that was installed on the tanker vessel *Polar Alaska* in July 2002 and (2) the analyses of the collected data. The TSG was originally funded as a pilot project by the EVOS Trustee Council in FY02.

Funding:	EVOS Funding Requested:	FY 04	\$ 25,036	TOTAL: \$81,753
		FY 05	\$ 27,859	
		FY 06	\$ 28,858	
	Non-EVOS Funds to be Used:	FY 04	\$	TOTAL:
		FY 05	\$	
		FY 06	\$	

Date: 6/12/03

(NOT TO EXCEED ONE PAGE)

A monitoring program for near-surface temperature, salinity, and fluorescence fields in the Northeast Pacific Ocean: Transition to an operational program

Stephen R. Okkonen
Institute of Marine Science
University of Alaska Fairbanks
Fairbanks, Alaska 99775

INTRODUCTION

This proposed project responds to the Gulf Ecosystem Monitoring and Research Program invitation category **F.2. (Alaska Coastal Current / Collecting physical and biological observations from non-AMHS ships-of-opportunity)**. Funds are requested to continue (1) the maintenance and operation of a thermosalinograph (TSG) that was installed on the tanker vessel *Polar Alaska* in July 2002 and (2) the analyses of the collected data. The TSG was originally funded as a pilot project by the EVOS Trustee Council in FY02.

I. NEED FOR THE PROJECT

A. Statement of Problem

In order to assess the long-term recovery of marine resources impacted by the Exxon Valdez Oil Spill against the background of climate-driven variability of those resources, long-term measurements of oceanographic conditions are required.

B. Rationale / Relevance to GEM program

In recent years there has been increasing awareness of large-scale, multi-decadal changes in the climate of the world ocean. However, translating awareness of long-term climate variability into understanding the regional and local physical and biological consequences of a changing environment has been hampered by the dearth of long-term oceanographic measurements in the Northeast Pacific. Presently, the only multi-decadal time series of oceanographic conditions (temperature and salinity) in the region are for Ocean Station P/Line P and station GAK-1 near Seward, Alaska (Figure 1).

Commercial cargo vessels operating within established shipping corridors in the Northeast Pacific are potential ships-of-opportunity from which high-resolution measurements of oceanographic conditions can be acquired at regular intervals. Crude oil tankers, travelling between Valdez, Alaska and California (Figure 1) are particularly well suited for this purpose as individual tankers cross shelf, slope, and open ocean regimes roughly every two weeks and will continue to do so for many years to come.

A thermosalinograph (TSG) was installed on the T/V *Polar Alaska* (Figure 2) in July 2002 as a pilot project funded by the EVOS Trustee Council. Except for a period between August and October 2002 when the T/V *Polar Alaska* was in dry dock, high-resolution measurements of near-surface temperature and salinity between Valdez, Alaska and California (San Francisco and Long Beach) have been continuously recorded. These measurements are posted on the TSG web page (<http://www.ims.uaf.edu/tsg/>) and are updated every few months.

II. PROJECT DESIGN

A. Objectives

The objectives for this project are to:

1. Maintain the working relationship with the management of Polar Tankers and the crew of the T/V *Polar Alaska* to continue acquisition of long-term measurements of oceanographic field variables (e.g. temperature, salinity, fluorescence) along the shipping corridor between Valdez, Alaska and California.
2. Identify the seasonal migration and evolution of frontal features associated with the Alaska Coastal Current (ACC), shelf break, and mesoscale eddies.
3. Identify the dominant length scales of variability (and seasonal modulation of those length scales) characterizing the near-surface temperature, salinity, and fluorescence fields along the shipping corridor. These scales of variability will likely differ between shelf and the open ocean.
4. Compare TSG/fluorometer measurements with TOPEX and Jason-1 altimeter observations of the Gulf of Alaska eddy field.
5. Compare TSG/fluorometer data with contemporaneous NEP GLOBEC field data.
6. Provide temperature, salinity, and fluorescence field data to David Welch (Pacific Biological Station, Nanaimo, British Columbia) and Sonia Batten (Proudman Marine Laboratory, United Kingdom) for comparison with coincident continuous plankton recorder (CPR) observations.

B. Procedural Methods

Methods to be used to meet objectives listed above

1. Service and maintain the TSG and fluorometer instruments aboard the T/V *Polar Alaska*. When subcontractor Dave Cutchin boards the T/V *Polar Alaska* (5-6 times year) to service the instruments and download data he meets with the Chief Engineer and Second Engineer (and occasionally the Captain) to address any concerns that they might have. A fluorometer, purchased with pilot project funds, was accidentally damaged during preparation for installation on the T/V *Polar Alaska*. The fluorometer has been repaired by the manufacturer and will be installed on the T/V *Polar Alaska* during its next port call in Long Beach.
2. Frontal features associated with the ACC and eddies are readily identified in plots of salinity and, to a lesser extent, in temperature (Figure 3)
3. Spectral methods will be used to identify characteristic length scales of periodic variations in the near-surface temperature, salinity, and fluorescence fields along the shipping corridor. Simple geometric measures are more appropriate for large scale, seasonal variability (Figure 4) and for frontal features associated with the ACC, shelf-break jet, and mesoscale eddies (see also Figure 3).
4. The TOPEX altimeter was moved to a new orbital ground track pattern in August 2002 and the Jason-1 altimeter occupies the original TOPEX orbital pattern. As the altimeter data become available, they will be compared with the TSG data to correlate the eddy azimuthal velocity gradients with the temperature, salinity, and fluorescence gradients.
5. TSG data will be provided to GLOBEC collaborators (see below).
6. Data from the TSG are periodically sent to Welch and Batten.

C. Data Analysis

TSG (and fluorometer, after installation) measurements are acquired once every five minutes. In the open ocean, this translates to a sample spacing of ~1.5 km (0.8 nautical mile). This data stream is merged with concurrent GPS navigation data and stored on the hard drive of a dedicated PC. Repeat measurements along the shipping corridor allow time-space matrices of temperature and salinity (fluorescence after installation of fluorometer) to be constructed (See Figure 4). After a yearlong record of measurements is acquired (October 2002 - October 2003), characteristic spatial scales of variability and their seasonal modulation will be determined from spectral and geometric analyses of the data matrices.

The seasonal evolution of frontal features associated with the ACC, the shelf break, and mesoscale eddies will also be monitored. Because of secondary circulation associated with

frontal features, they tend also to be zones in which there are population aggregations across many trophic levels.

D. Study area

Measurements of temperature, salinity, and fluorescence are being acquired along the tanker corridor between Valdez, Alaska and California (see Figure 1).

E. Coordination and collaboration with other efforts

Data acquired for this project will be posted on the UAF/Institute of Marine Science web page at <http://www.ims.uaf.edu/tsg/>.

Okkonen has an ongoing project in which Jason-1 and TOPEX altimeter observations of the mesoscale eddy field in the Gulf of Alaska are shared with collaborating NEP GLOBEC researchers (Tom Weingartner, UAF; Tom Royer, ODU)

Royer is a funded researcher with the NEP GLOBEC project.

Existing collaborative relationships with NEP GLOBEC researchers will be exploited to (1) compare TSG surface field observations (this proposal) with contemporaneous subsurface temperature and salinity measurements from within Prince William Sound and from the nearby shelf and (2) use retrospective studies of historical VOS (XBT and XCTD) and GAK1 data to provide a historical context for consideration of the TSG data.

The opportunity also exists to make similar comparisons of the TSG data with historical and contemporaneous Ocean Station P/Line P data.

We periodically send the TSG data to David Welch (Pacific Biological Station, Nanaimo, British Columbia) and Sonia Batten (Proudman Marine Laboratory, UK). They will request funding from EVOS Trustee Council to continue their current project in which they have a continuous plankton recorder (CPR) deployed five times per year on the T/V *Polar Alaska*. The TSG/fluorometer/CPR data sets would be highly complementary in that temperature, salinity, and fluorescence gradients could be directly compared with plankton distributions along the tanker route.

III. SCHEDULE

A. Project Milestones

The overall goal of this project is to transition to a long-term operational program. The value of the project and, more importantly, the value of the collected data increases as the data record length increases. Consequently, the project objectives have no particular end points but are ongoing operational objectives.

Oct 2003 - ongoing Project Design Objective 1-6

B. Measurable Project Tasks

FY04

01 October 03 - 30 September 04	Data acquisition/analyses
31 December 04	Quarterly report
January 04	GEM workshop
31 March 04	Quarterly report
30 June 04	Quarterly report
30 September 04	Quarterly/Annual report

FY05

01 October 04 - 30 September 05	Data acquisition/analyses
31 December 04	Quarterly report
January 05	GEM workshop
Spring 05	Publication
31 March 05	Quarterly report
30 June 05	Quarterly report
30 September 05	Quarterly/Annual report

FY06

01 October 05 - 30 September 06	Data acquisition/analyses
31 December 05	Quarterly report
January 06	GEM workshop
Spring 06	Publication
31 March 06	Quarterly report
30 June 06	Quarterly report
30 September 06	Quarterly/Annual report

C. Completion Date

30 September 2006	Completion of final report
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IV. RESPONSIVENESS TO KEY TRUSTEE COUNCIL STRATEGIES

A. Community Involvement

There is not a direct community involvement component for this project.

B. Resource Management Applications

The most significant spill-related impacts upon the marine environment occurred in coastal and near-shore domains, the long-term health of those marine ecosystems depends, in part, upon biophysical linkages to the shelf, slope, and open-ocean domains. Consequently, multi-decadal records of oceanic conditions within each of these domains is necessary to develop an understanding of natural and anthropogenic variability in the marine environment of the northern Gulf of Alaska.

V. PUBLICATIONS AND REPORTS

Potential publications: Seasonal evolution of frontal features in northern Gulf of Alaska; Comparison of TSG, fluorescence, and altimeter observations of Gulf of Alaska eddies; Comparison of TSG, fluorescence and continuous plankton recorder observations in the Northeast Pacific Ocean (with David Welch and Sonia Batten).

Target journals: Journal of Geophysical Research-Oceans, Continental Shelf Research, Geophysical Research Letters

VI. PROFESSIONAL CONFERENCES

Attend GEM annual workshop in Anchorage January 2004, 2005, and 2006.

PRINCIPAL INVESTIGATOR

Stephen R. Okkonen
Institute of Marine Science
University of Alaska Fairbanks
Fairbanks, Alaska 99775
(907) 283-3234
okkonen@alaska.net

Okkonen will have primary responsibility for initial data processing, length scale analyses, frontal feature analyses, and comparison with TOPEX data.

CO-PRINCIPAL INVESTIGATOR

Thomas C. Royer
Center for Coastal Physical Oceanography
Department of Ocean, Earth and Atmospheric Sciences
Old Dominion University
768 W. 52nd St.
Norfolk, VA 23529
(757) 683-5547
(757) 683-5550 (FAX)
royer@ccpo.odu.edu

Royer will have primary responsibility for comparison of TSG data with GLOBEC data and with historical data. Royer will

OTHER KEY PERSONNEL

Dave Cutchin
San Diego, California
dcutchi1@san.rr.com

Dave Cutchin will be issued a sub-contract to service and maintain the thermosalinograph, fluorometer, and ancillary hardware on the tanker.

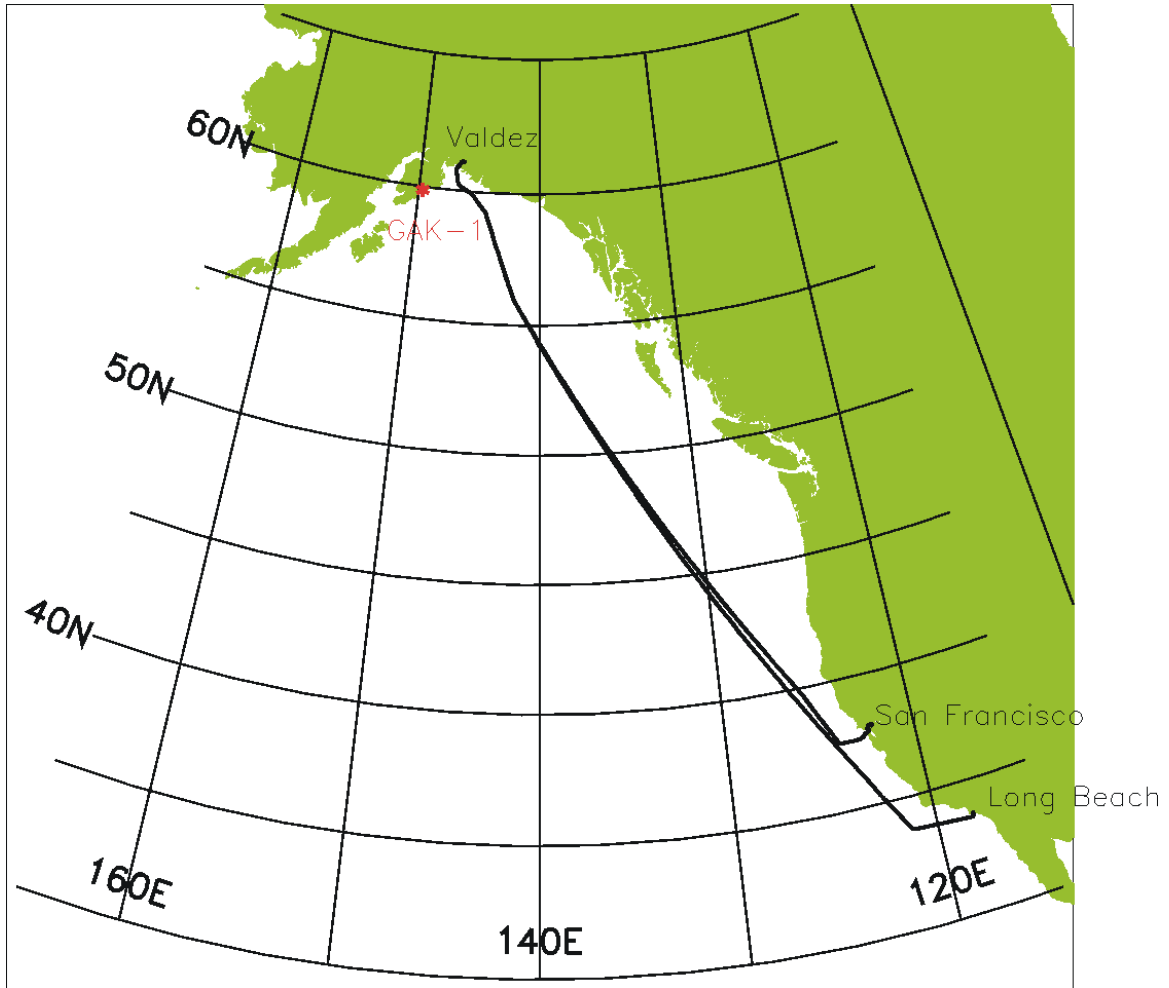


Figure 1 Map of northeast Pacific Ocean showing nominal tanker routes between Valdez, Alaska and California. Long-term monitoring station GAK-1 is identified with a red dot.

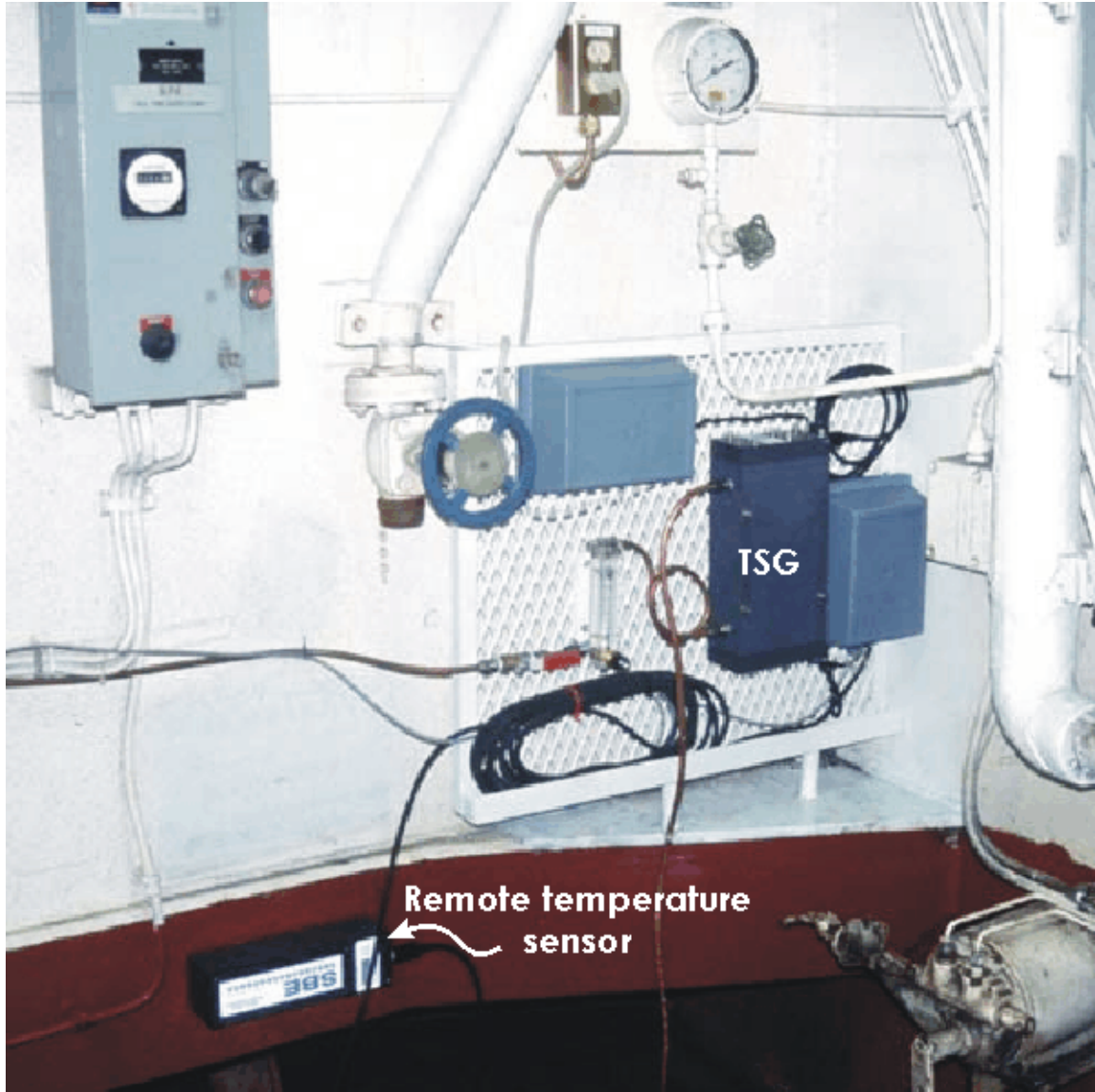


Figure 2 Photo of the thermosalinograph and remote temperature sensor as installed on the T/V *Polar Alaska*

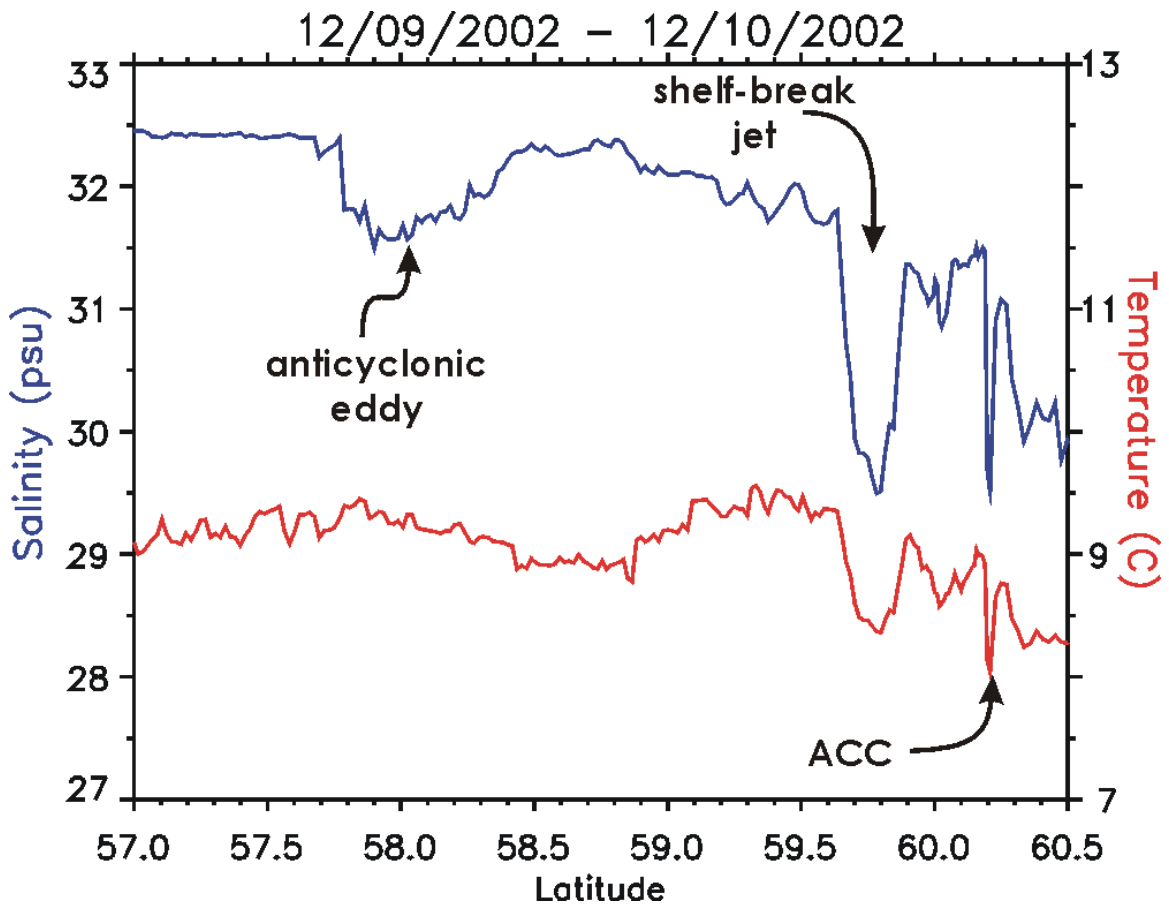


Figure 3 Line plot of temperature (red) and salinity (blue) showing representative circulation features in the northern Gulf of Alaska.

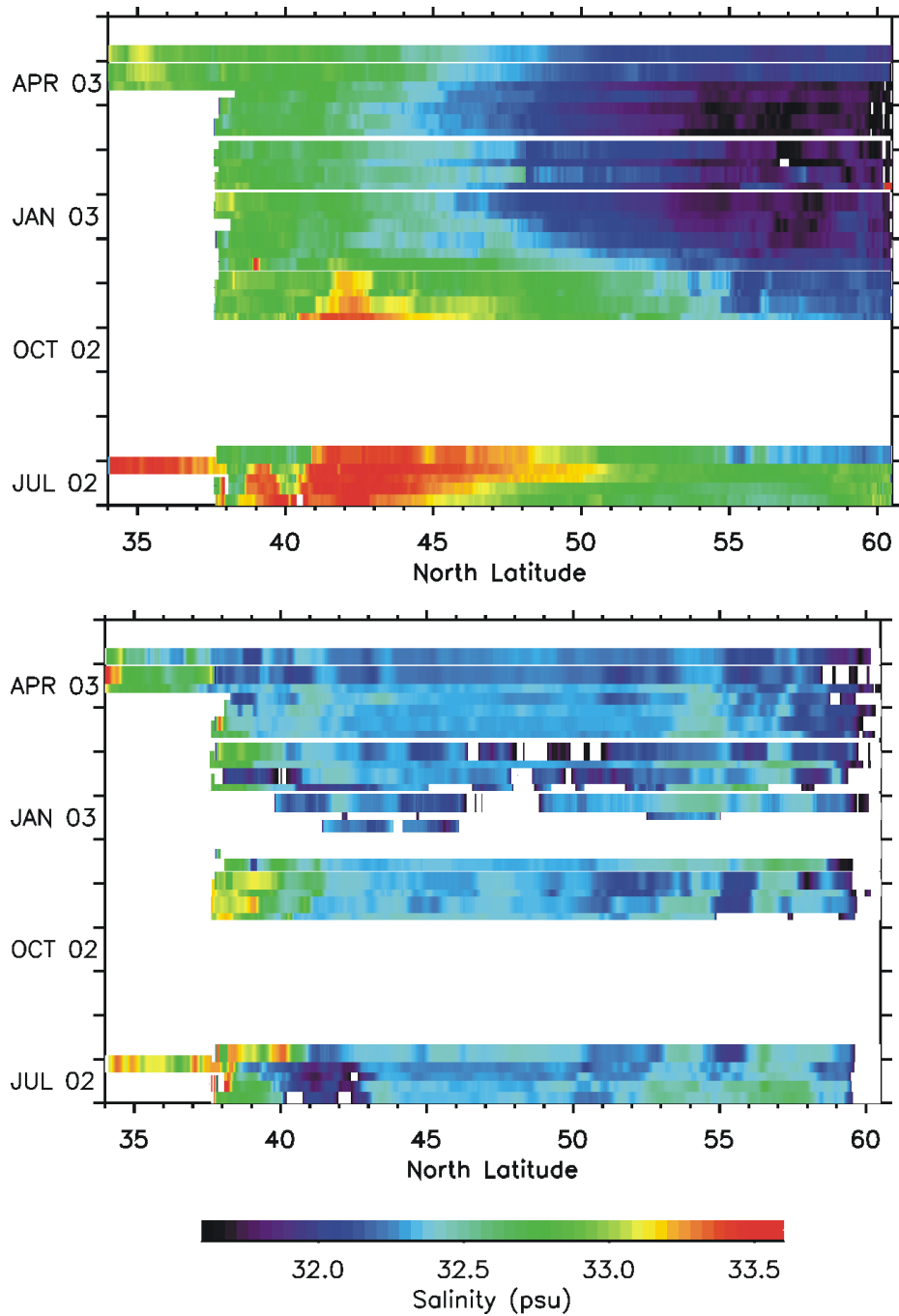


Figure 4 Color plots of a) temperature and b) salinity along the shipping track. During the period between August 2002 and October 2002 no data were acquired because the *Polar Alaska* was in dry dock. Other white areas indicate invalid data.

Stephen R. Okkonen

Box 1025, Kasilof, Alaska 99610

Phone/FAX: 907.283.3234

Email: okkonen@alaska.net

Education: PhD. December 1993, Physical Oceanography
University of Alaska Fairbanks

B.S. May 1976, Environmental Sciences Engineering
University of Michigan

Research
experience: Research Assistant Professor of Marine Science
School of Fisheries and Ocean Sciences, University of Alaska Fairbanks
January 1997 – present

Postdoctoral Fellow – Physical Oceanography
Naval Research Laboratory - Stennis Space Center, Mississippi
October 1994 - May 1996

Memberships: American Geophysical Union, American Meteorological Society
The Oceanography Society

Research
Interests: Mesoscale eddies, shelf-slope exchange, polar/sub-polar oceanography, remote sensing,
frontal dynamics

Recent
Publications: Okkonen, S.R., T.J. Weingartner, S.L. Danielson, G.M. Schmidt and D.L. Musgrave.
2003. Satellite and hydrographic observations of eddy-induced shelf-slope exchange in
the northwestern Gulf of Alaska. *J. Geophys. Res.*, 108(C2), 3033, doi:10.1029/
2002JC001342.

Okkonen, S.R. 2001. Altimeter observations of the Bering Slope Current eddy field, *J.
Geophys. Res.*, **106**:2465-2476.

Okkonen, S.R., G.A. Jacobs, E.J. Metzger, H.E. Hurlburt, and J.F. Shriver. 2001.
Mesoscale variability in the boundary currents of the Alaska Gyre, *Cont. Shelf Res.*,
21:1219-1236.

Weingartner T.J., and S.R. Okkonen. 2001. Beaufort Sea nearshore under-ice currents:
Science, analysis and logistics. Final Report. OCS Study MMS 2001-068, University of
Alaska Coastal Marine Institute, University of Alaska Fairbanks and USDOJ, MMS,
Alaska OCS Region, 22 p

Okkonen, S.R. 1996. The influence of an Alaskan Stream eddy on flow through
Amchitka Pass, *J. Geophys. Res.*, **101**:8839-8851.

Other

- Publications: Okkonen, S.R. and G.A. Jacobs. 1996. Aliased propagating mesoscale features in altimeter data, *J. Atmos. Ocean. Tech.*, **13**:1311-1316.
- Okkonen, S.R. and H.J. Niebauer. 1995. Ice edge circulation in the Bering Sea from Acoustic Doppler Current Profiler observations, *Cont. Shelf Res.*, **15**:1879-1902.
- Okkonen, S.R. 1993. Observations of topographic planetary waves in the Bering Slope Current using the Geosat altimeter, *J. Geophys. Res.*, **98**:22603-22613.
- Okkonen, S.R. 1992. The shedding of an anticyclonic eddy from the Alaskan Stream as observed by the Geosat altimeter, *Geophys. Res. Lett.*, **19**:2397-2400.

Reviewer

- 2001-2003: Deep-Sea Research, Journal of Oceanography, Progress in Oceanography, Journal of Geophysical Research - Oceans

UAF

- Collaborators: Seth Danielson
Mark Johnson
Dave Musgrave
Tom Weingartner
Terry Whittedge

Non-UAF

- Collaborators: Ned Cokelet, NOAA/PMEL, Seattle, WA
Steve Howell, Cook Inlet Regional Citizens Advisory Council, Kenai, AK
Harley Hurlburt, Naval Research Laboratory – Stennis Space Center, MS
Gregg Jacobs, Naval Research Laboratory – Stennis Space Center, MS
Wieslaw Maslowski, Naval Postgraduate School, Monterey, CA
Joe Metzger, Naval Research Laboratory – Stennis Space Center, MS
Andrey Proshutinsky, Woods Hole Oceanographic Institution, MA
Mike Schmidt, SAIC/NASA/GSFC, Greenbelt, MD
Jay Shriver, Naval Research Laboratory – Stennis Space Center, MS
Phyllis Stabeno, NOAA/PMEL, Seattle, WA

**EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06**

Budget Category:	Proposed FY 04	Proposed FY 05	Proposed FY 06	TOTAL PROPOSED
Personnel	\$9,709.0	\$10,197.0	\$10,706.0	\$30,612.0
Travel	\$320.0	\$340.0	\$360.0	\$1,020.0
Contractual	\$9,800.0	\$11,550.0	\$11,820.0	\$33,170.0
Commodities	\$200.0	\$200.0	\$200.0	\$600.0
Equipment	\$0.0	\$0.0	\$0.0	\$0.0
Subtotal	\$20,029.0	\$22,287.0	\$23,086.0	\$65,402.0
Indirect (rate will vary by proposer)	\$5,007.0	\$5,572.0	\$5,772.0	\$16,351.0
Project Total	\$25,036.0	\$27,859.0	\$28,858.0	\$81,753.0
Trustee Agency GA (9% of Project Total)	\$2,253.2	\$2,507.3	\$2,597.2	\$7,357.8
Total Cost	\$27,289.2	\$30,366.3	\$31,455.2	\$89,110.8

Cost-share Funds:

In this box, identify non-EVOS funds or in-kind contributions used as cost-share for the work in this proposal. List the amount of funds, the source of funds, and the purpose for which the funds will be used. Do not include funds that are not directly and specifically related to the work being proposed in this proposal.

**FY 04-
06**

Date Prepared:

6/11/2003

Project Number:

Project Title: A monitoring program for near-surface temperature, salinity, and fluorescence fields in the Northeast Pacific Ocean: Transition to an operational program

Proposer: Stephen R. Okkonen

**FORM 4A
NON-
TRUSTEE
SUMMARY**

**EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
 DETAILED BUDGET FORM FY 04 - FY 06**

Personnel Costs:			Months	Monthly		Personnel
Name	Description		Budgeted	Costs	Overtime	Sum
Okkonen, S.	PI		1.3	5345.4		6,949.0
Partee, D.	Web Page Technician		0.5	5520.0		2,760.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
Subtotal			1.8	10865.4	0.0	
Personnel Total						\$9,709.0

Travel Costs:		Ticket	Round	Total	Daily	Travel
Description		Price	Trips	Days	Per Diem	Sum
Trustee Council workshop (RT Kenai/Anchorage,Taxi included)		150.0	1	1	170.0	320.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
Travel Total						\$320.0

FY 04

Project Number:
Project Title: A monitoring program for near-surface temperature, salinity, and fluorescence fields in the Northeast Pacific Ocean: Transition to an operational program
Proposer: Stephen R. Okkonen

**FORM 4B
 Personnel
 & Travel
 DETAIL**

**EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
 DETAILED BUDGET FORM FY 04 - FY 06**

Contractual Costs:		Contract
Description		Sum
Phone/FAX/Internet		150.0
Software maintenance		150.0
Instrument calibrations + shipping		1,500.0
Subcontract: D. Cutchins (instrument servicing)		8,000.0
If a component of the project will be performed under contract, the 4A and 4B forms are required.		Contractual Total
		\$9,800.0
Commodities Costs:		Commodity
Description		Sum
Project supplies/postage		200.0
		Commodities Total
		\$200.0

FY 04

Project Number:
Project Title: A monitoring program for near-surface temperature, salinity, and fluorescence fields in the Northeast Pacific Ocean: Transition to an operational program
Name: Stephen R. Okkonen

**FORM 4B
 Contractual &
 Commodities
 DETAIL**

**EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06**

New Equipment Purchases:		Number of Units	Unit Price	Equipment
Description				Sum
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
			New Equipment Total	\$0.0
Existing Equipment Usage:		Number of Units	Inventory Agency	
Description				

FY 04

Project Number:
Project Title: A monitoring program for near-surface temperature, salinity, and fluorescence fields in the Northeast Pacific Ocean: Transition to an operational program
Proposer: Stephen R. Okkonen

**FORM 4B
Equipment
DETAIL**

**EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
 DETAILED BUDGET FORM FY 04 - FY 06**

Personnel Costs:			Months	Monthly		Personnel
Name	Description		Budgeted	Costs	Overtime	Sum
Okkonen, S.	PI		1.3	5613.1		7,297.0
Partee, D.	Web Page Technician		0.5	5800.0		2,900.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
Subtotal			1.8	11413.1	0.0	
Personnel Total						\$10,197.0
Travel Costs:		Ticket	Round	Total	Daily	Travel
Description		Price	Trips	Days	Per Diem	Sum
Trustee Council meeting (RT Kenai/Anchorage, Taxi included)		160.0	1	1	180.0	340.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
Travel Total						\$340.0

FY 05

Project Number:
Project Title: A monitoring program for near-surface temperature, salinity, and fluorescence fields in the Northeast Pacific Ocean: Transition to an operational program
Proposer: Stephen R. Okkonen

**FORM 4B
 Personnel
 & Travel
 DETAIL**

**EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
 DETAILED BUDGET FORM FY 04 - FY 06**

Contractual Costs:		Contract
Description		Sum
Phone/FAX/Internet		150.0
Software maintenance		150.0
Instrument calibrations + shipping		1,500.0
Subcontract: D. Cutchins (instrument servicing)		8,250.0
Publication		1,500.0
If a component of the project will be performed under contract, the 4A and 4B forms are required.		
Contractual Total		\$11,550.0
Commodities Costs:		Commodity
Description		Sum
Project supplies/postage		200.0
Commodities Total		\$200.0

FY 05

Project Number:
Project Title: A monitoring program for near-surface temperature, salinity, and fluorescence fields in the Northeast Pacific Ocean: Transition to an operational program
Proposer: Stephen R. Okkonen

**FORM 4B
 Contractual &
 Commodities
 DETAIL**

**EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06**

Personnel Costs:			Months Budgeted	Monthly Costs	Overtime	Personnel Sum
Name	Description					
Okkonen, S.			1.3	5901.5		7,672.0
Partee, D.			0.5	6068.0		3,034.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
		Subtotal	1.8	11969.5	0.0	
Personnel Total						\$10,706.0
Travel Costs:		Ticket Price	Round Trips	Total Days	Daily Per Diem	Travel Sum
Description						
Trustee Council workshop (RT Kenai/Anchorage, Taxi included)		170.0	1	1	190.0	360.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
						0.0
Travel Total						\$360.0

FY 06

Project Number:
Project Title: A monitoring program for near-surface temperature, salinity, and fluorescence fields in the Northeast Pacific Ocean: Transition to an operational program
Proposer: Stephen R. Okkonen

**FORM 4B
Personnel
& Travel
DETAIL**

**EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
DETAILED BUDGET FORM FY 04 - FY 06**

Contractual Costs:		Contract
Description		Sum
Phone/FAX/Internet		160.0
Software maintenance		160.0
Instrument calibrations + shipping		1,500.0
Subcontract: D. Cutchins (instrument servicing)		8,500.0
Publication		1,500.0
	Contractual Total	\$11,820.0
Commodities Costs:		Commodity
Description		Sum
Project supplies/postage		200.0
	Commodities Total	\$200.0

FY 06

Project Number:
Project Title: A monitoring program for near-surface temperature, salinity, and fluorescence fields in the Northeast Pacific Ocean: Transition to an operational program
Proposer: Stephen R. Okkonen

**FORM 4B
Contractual &
Commodities
DETAIL**

**EXXON VALDEZ OILSPILL TRUSTEE COUNCIL
 DETAILED BUDGET FORM FY 04 - FY 06**

New Equipment Purchases:		Number of Units	Unit Price	Equipment
Description				Sum
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
				0.0
New Equipment Total				\$0.0

Existing Equipment Usage:		Number of Units	Inventory
Description			Agency

FY 06

Project Number:
Project Title: A monitoring program for near-surface
 temperature, salinity, and fluorescence fields in the Northeast
 Pacific Ocean: Transition to an operational program
Proposer: Stephen R. Okkonen

**FORM 4B
 Equipment
 DETAIL**

Budget justification

Included in the budget are salaries and benefits for 1.25 months per year for the PI, Dr. Stephen Okkonen; and one-half month per year for Web Designer, David Partee.

Funds are requested to subcontract Dr. Dave Cutchin to continue to provide periodic maintenance of the instruments and download data. Dr. Cutchin has maintained the TSG since its installation on the T/V Polar Alaska.

Travel is included in the budget for the PI to travel from Kenai to Anchorage to attend the Trustee Council workshop each year. He will fly from Kenai to Anchorage and take a taxi to the EVOS offices.

The rest of the budget is taken up with the usual services, supplies, and maintenance and calibration services.