USW Thesis Topics

Littoral Zone Oceanography for Undersea Warfare

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If you are shopping around for a thesis topic, please look at the web:

http://www.oc.nps.navy.mil/~chu

Thesis Topics

- Satellite Data Assimilation for USW (SPAWAR, NUWC)
- Mine Impact Burial Prediction (ONR, NAVO)
- Acoustic Mine Detection (NAVO)
- Littoral Zone Modeling for MIW (NAVO)
- Prediction of Bomb Striking for MCM (ONR)

Partnership

- Peter Chu and Students (NPS)
- CDR Eric Gottshall (SPAWAR)
- David Cwalina (NUWC)
- Steven Haeger, Mark Null, Mel Wagstaff, and Peter Fleischer (NAVO)
- Michael Carron (SACLANT)
- Daniel N. Fox, Phil Valent (NRL-Stennis)
- Dick Yue, Y. Liu, and Y. Kim (MIT)
- Ruth E. Keenan (SAIC)

Infrastructure
Naval Ocean Analysis & Prediction Laboratory

- Near 10 research scientists and students
- SGI-Origin 2000 Mainframe (32P)
- About 20 Unix workstations and PCs

Recent Projects

- Satellite Data Assimilation for USW (SPAWAR)
- Modeling of Bomb Strike for Mine Clearance (ONR)*
- Mine Impact Burial Prediction System (ONR, NAVO)
- Littoral Prediction System for MIW (ONR, NAVO)
- Mine Acoustic Detection (NAVO)
- Environment for Navy M&S (CNO-N6M)

Recent Theses

- Gottshall, Eric, "Environmental Effects on Naval warfare simulations," MS in Physical Oceanography, December 1997.
- Taber, Vicky, “Environmental sensitivity study on mine impact burial prediction model”, MS in Meteorology and Oceanography, March 1999.
- Timothy Smith, “Effect of bottom shear strength on the mine burial”, MS in Meteorology and Oceanography, September 2000.
- Carlos Cintron, “Verification of an operational acoustic model (CASS-GRAB) in mine hunting application”, MS in Physical Oceanography, March 2001.
- Anthony Gilles, “Hydrodynamics of mine movements,” MS in Meteorology and Oceanography, September 2001.
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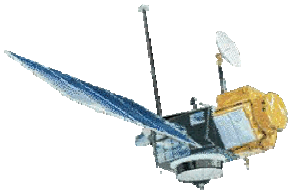
Recent Theses (Continued)

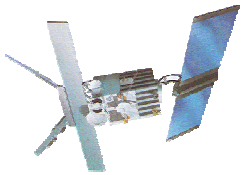
- Michael Roth, Yellow Sea acoustic transmission using coupled CASS-GRAB and POM model, MS in Meteorology and Oceanography, September 2001.
- Nick Vares, Range dependent mine detection using CASS-GRAB, MS in Physical Oceanography, June 2002.
- Ashely Evans, Hydrodynamics of mine impact burial, MS in Meteorology and Oceanography, September 2002.
- Ahchuan Ong (Singapore Navy), Improvement of coastal prediction system, MS in Physical Oceanography, March 2003.
- Michael Perry, "Value-added of satellite altimetry data for undersea acoustic preset", MS in Physical Oceanography, June 2003.
- Chin-Lung Fang (Taiwan Navy), South China Sea prediction system using GIS, MS in Physical Oceanography, September 2003.

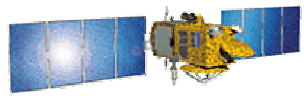
Recent Theses (Continued)

- Al Armstrong, Prediction of instantaneous currents in San Diego Bay for Naval applications, MS in Meteorology and Oceanography, June 2004.
- Michael Cornelius, Effect of nephloid layer for acoustic mine detection, MS in Meteorology and Oceanography, June 2004.
- Steven Mancini, Satellite data assimilation for undersea warfare, MS in Meteorology and Oceanography, June 2004.

Satellite Data Assimilation for USW







Altimetry Data Archive

Data Processing

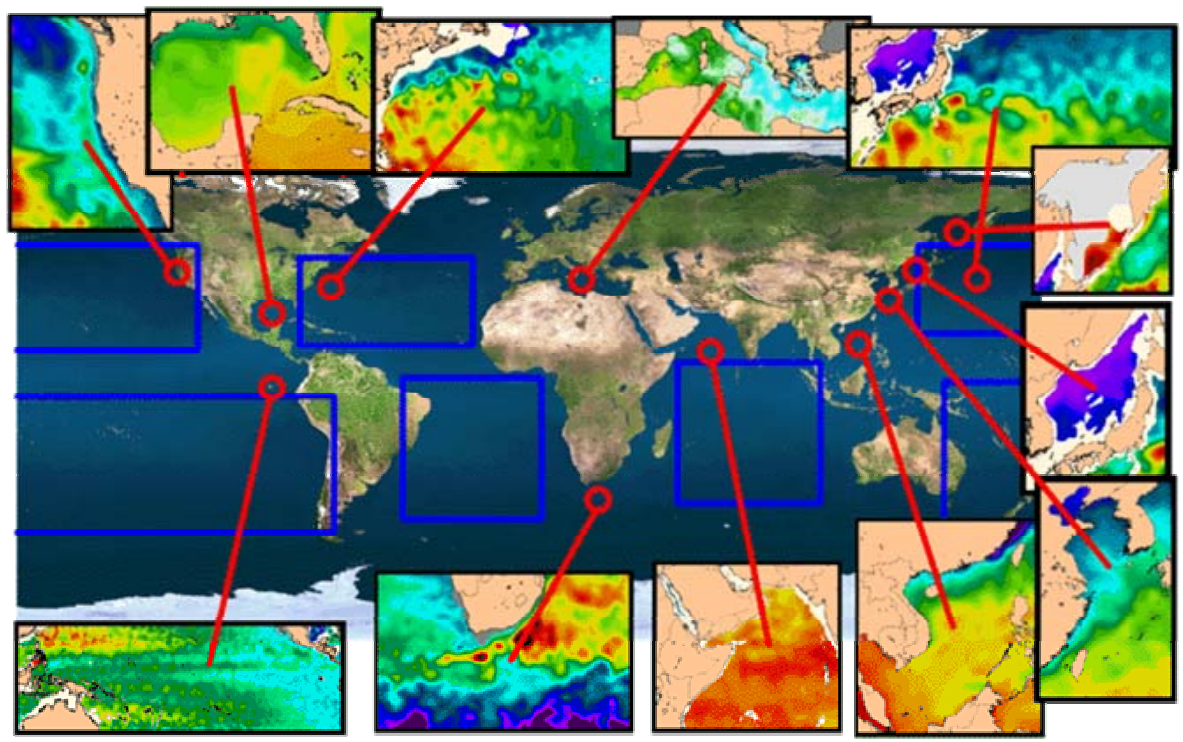
Data Sources

Applied Orbit Error Corrections

Altimetry Drop Plots

Percent of Data Utilized

Altimeter Intercomparisons



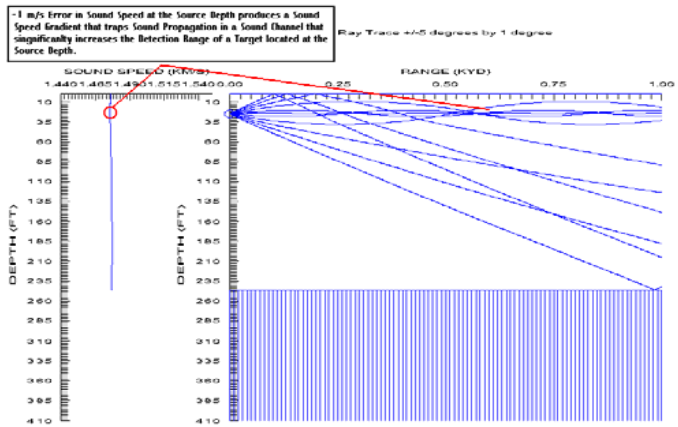
Mine Acoustic Detection Using Navy's CASS-GRAB Model

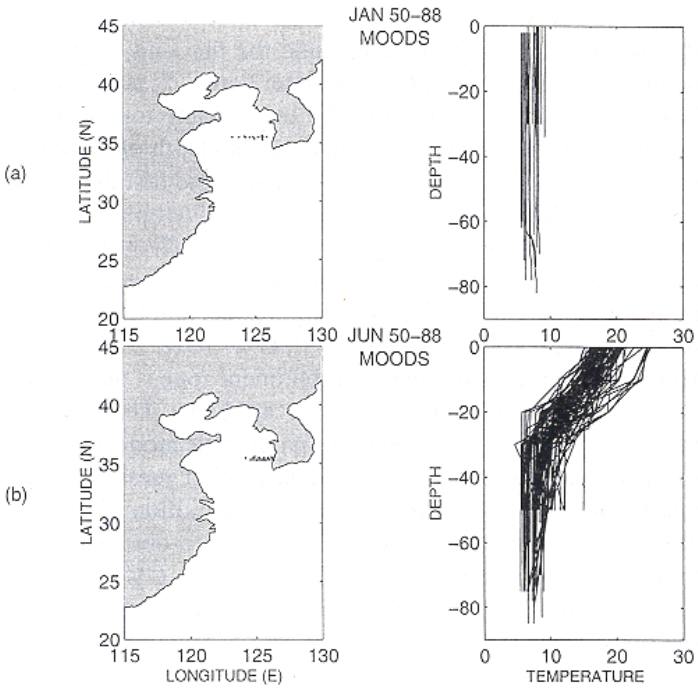
PI: Professor Peter C Chu

Sponsor: NAVO

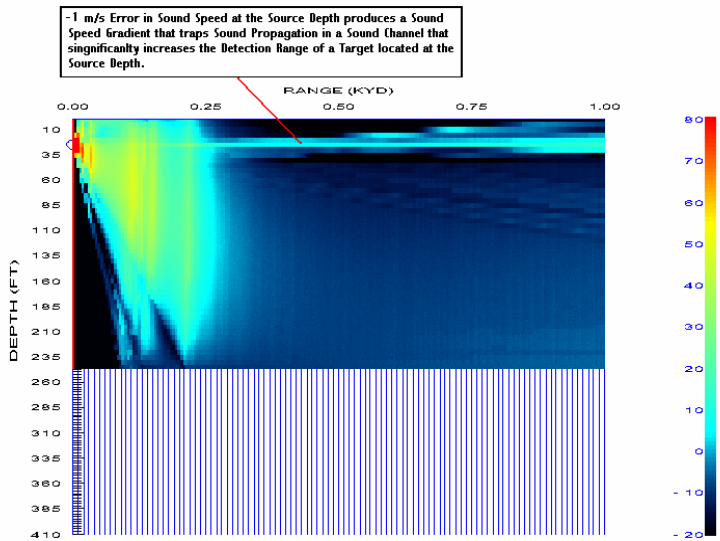
METOC Beneficiary: COMMINWARCOM

will be published in Journal of Undersea Acoustics





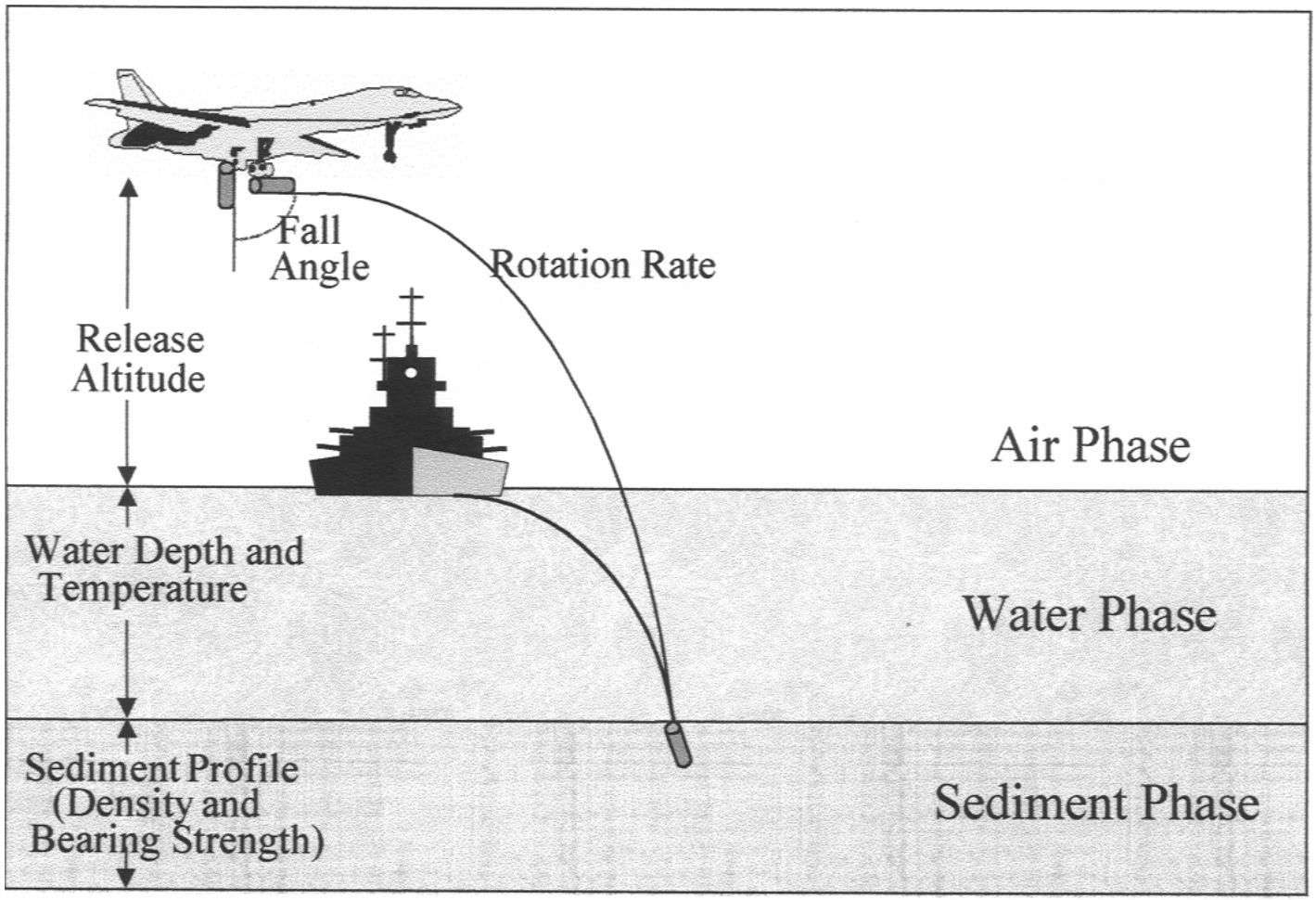
Environmental Effect
On Acoustic Detection



Naval Oceanographic Office's
MOODS (Environmental) Data

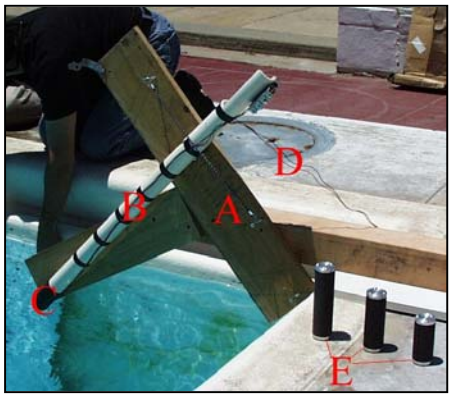
1 m/s error in sound speed enhances
acoustic transmission

Mine Impact Burial Prediction

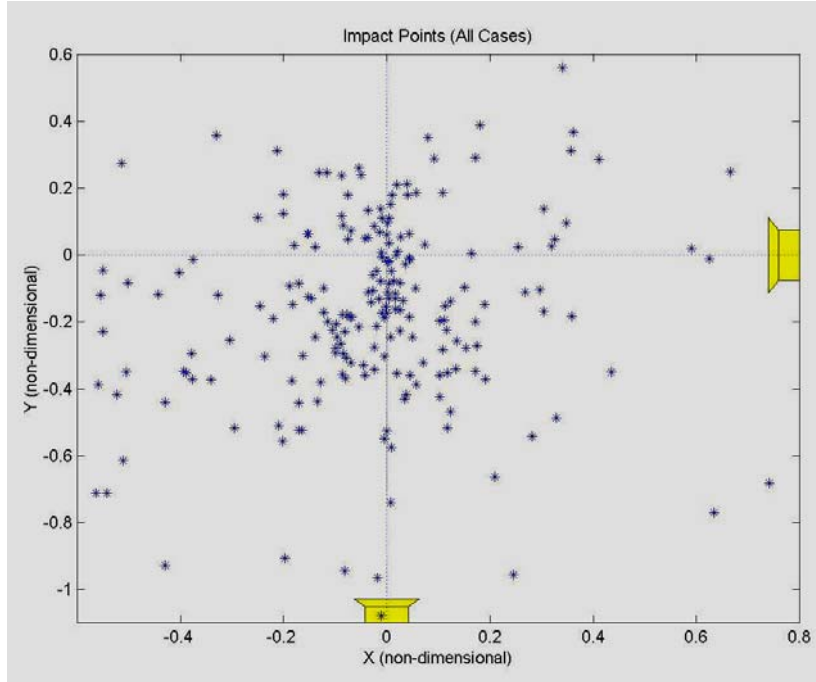


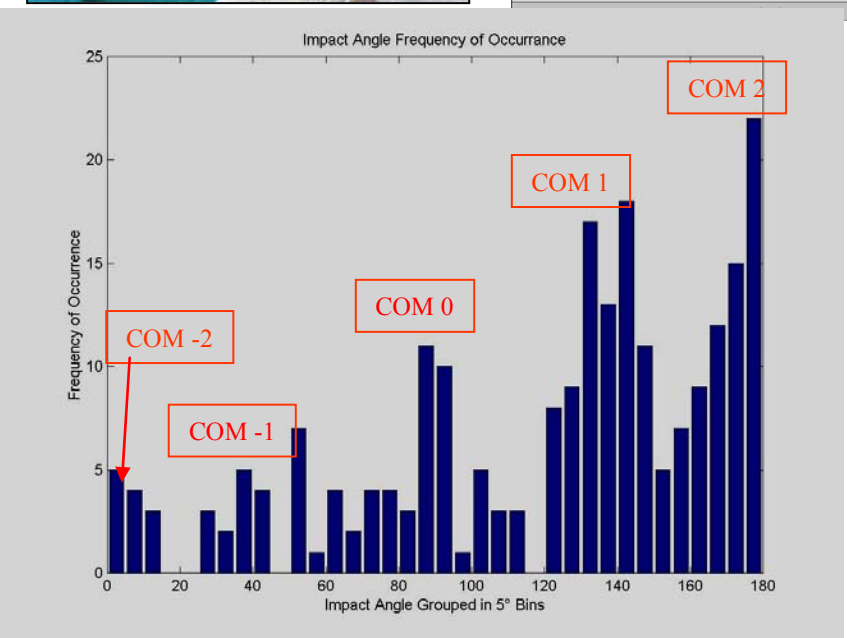
Mine IMPACT BURIAL PREDICTION

PI: Professor Peter C Chu
Sponsor: ONR Code 322 GG and NAVO
METOC Beneficiary: COMINEWARCOM



Drop Angle: 45°
L = 15 cm
Vinit = 2.9 m/s

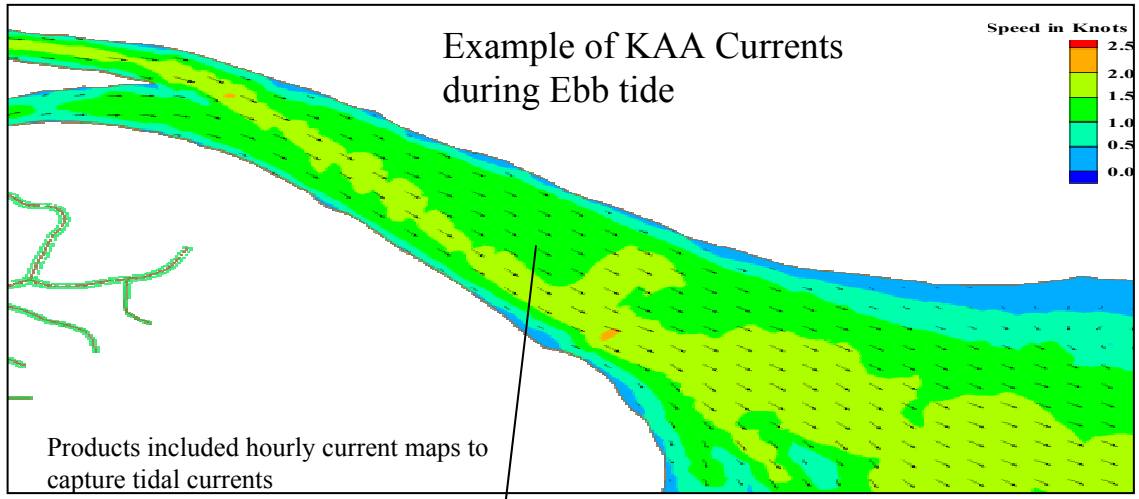


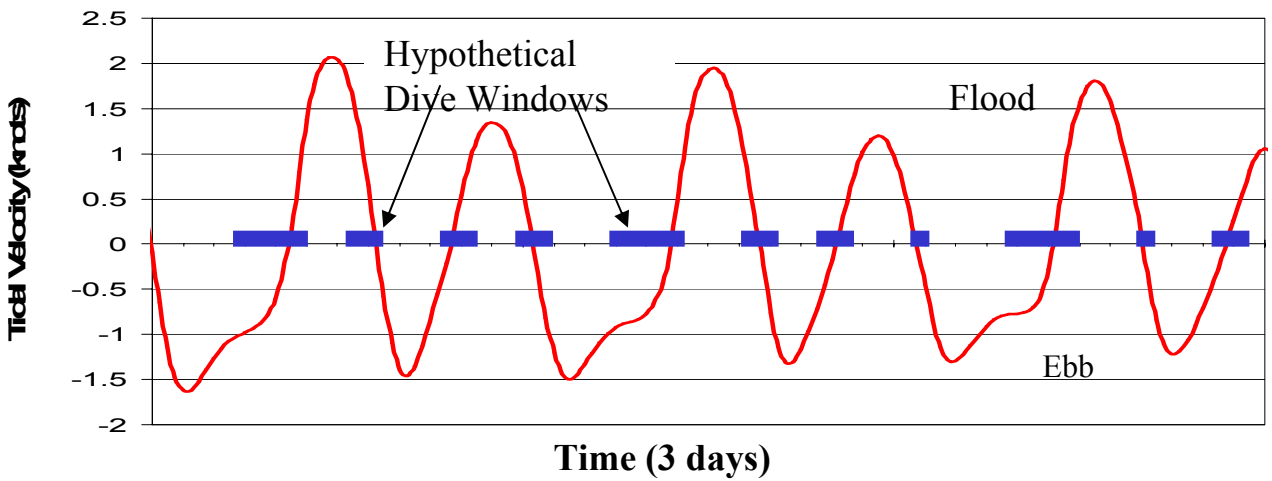


Multiple Linear Regression Results

	x_m	y_m	Psi	u	v	w
β_0	-.0746	-.0546	102.5691	.0040	-.0135	-.9481
β_1	.1190	-.0828	-13.3508	-.0075	-.0106	-.1080
β_2	-.0469	-.0798	-.5009	-.0011	.0005	.0295
β_3	.0372	.0622	1.0437	.0025	.0011	-.0221
β_4	.2369	.4330	472.2135	-.0090	.0537	-1.2467

COM Position - Most Influence on Mine Trajectory





Littoral Ocean Prediction System for Dive Windows (NAVO)