Naval Postgraduate School

Littoral Zone Oceanography for Surface/Undersea Warfare

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MOVES Institute

Undersea Warfare Center

ONR Global-London, UK, 19 May 2008

Multi-Agent Support

- CNO-N6M
- NAVO
- ONR
- SPAWAR

Partnership

- Peter Chu and Students (NPS)
- Steven Haeger, Mark Null, and Peter Fleischer (NAVO)
- Michael Carron (SACLANT)
- Daniel N. Fox, Phil Valent (NRL-Stennis)
- CDR Eric Gottshall (SPAWAR)
- Patrick Kelley, David Cwalina (NUWC)
- Ruth E. Keenan (SAIC)

Recent Projects

- Mine Impact Burial Prediction (ONR, NAVO)
- Environment for Navy M&S (CNO-N6M)
- Mine Acoustic Detection (NAVO)
- Environmental Effects on MCM (NAVO)
- Coast Ocean Modeling for MIW (NAVO)
- Value-Aided of Altimetry Data (SPAWAR)

Student Participation

- 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.

Student Participation (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.

Student Participation (Continued)

- Michael Perry, Value-aided satellite altimetry for weapon's acoustic preset, MS in Physical Oceanography, June 2003.

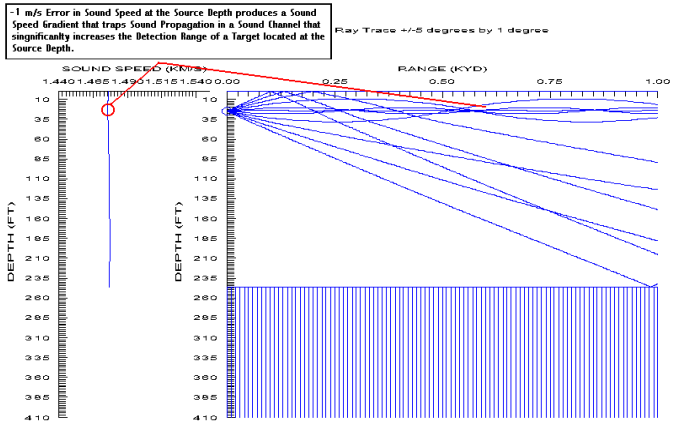
- Sean Yemm, Effect of environmental uncertainty on mine acoustic detection using CASS-GRAB, MS in Meteorology and Oceanography, June 2004.

Mine Acoustic Detection Using Navy's CASS-GRAB Model

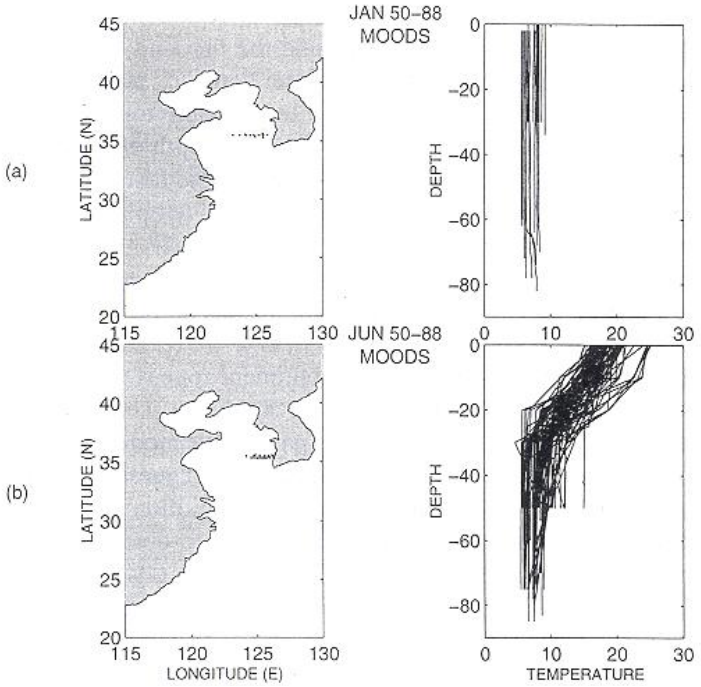
PI: Professor Peter C Chu

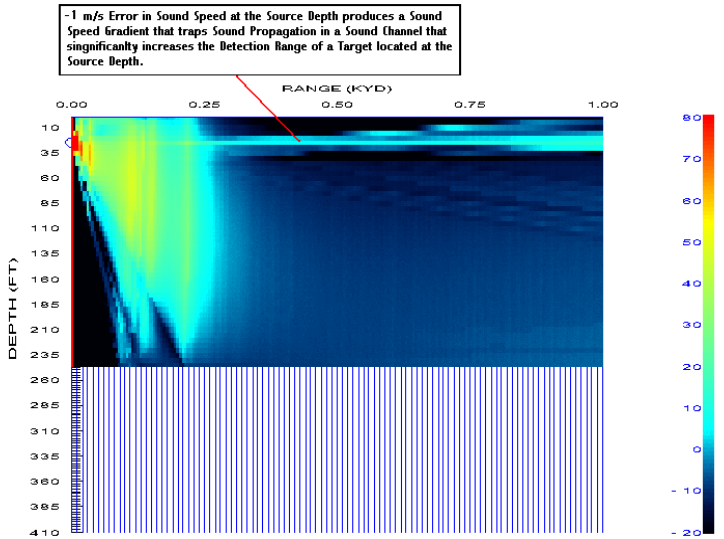
Sponsor: NAVO

METOC Beneficiary: COMMINWARCOM



Environmental Effect
On Acoustic Detection





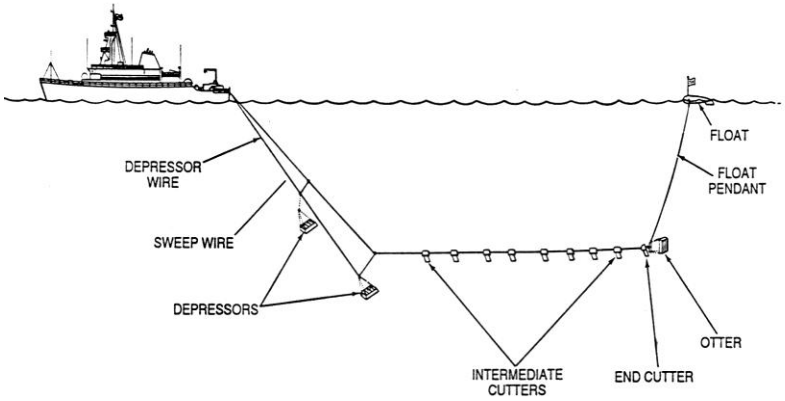
Naval Oceanographic Office's
MOODS (Environmental) Data

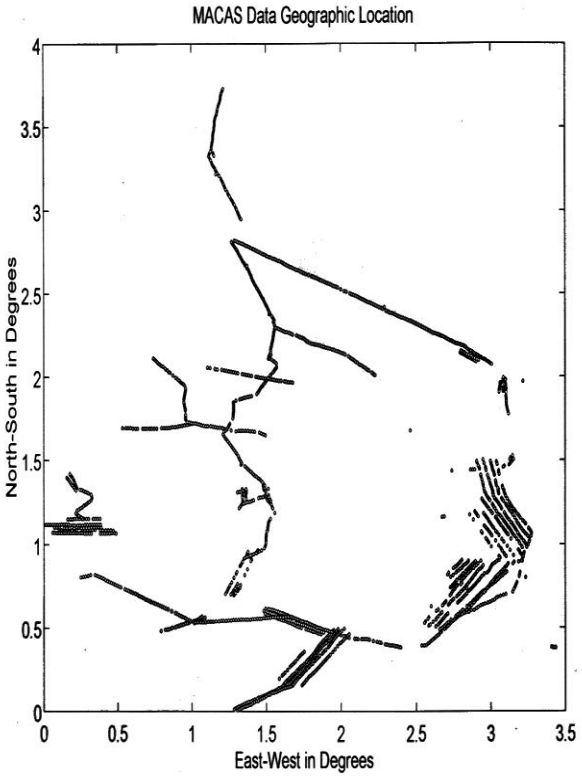
1 m/s error in sound speed enhances acoustic transmission

MODELING & SIMULATION IN OCEAN ENVIRONEMNT

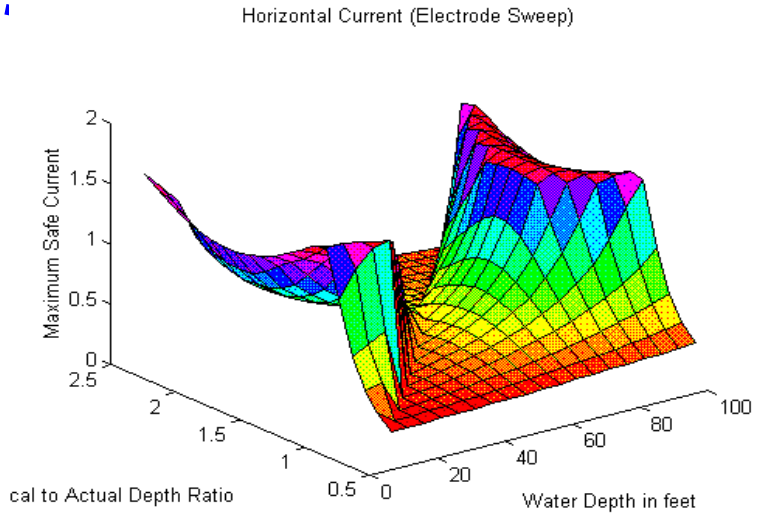
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Sponsor: CNO-N6M, NAVO
METOC Beneficiary: CNO M&S

Mine Sweeping





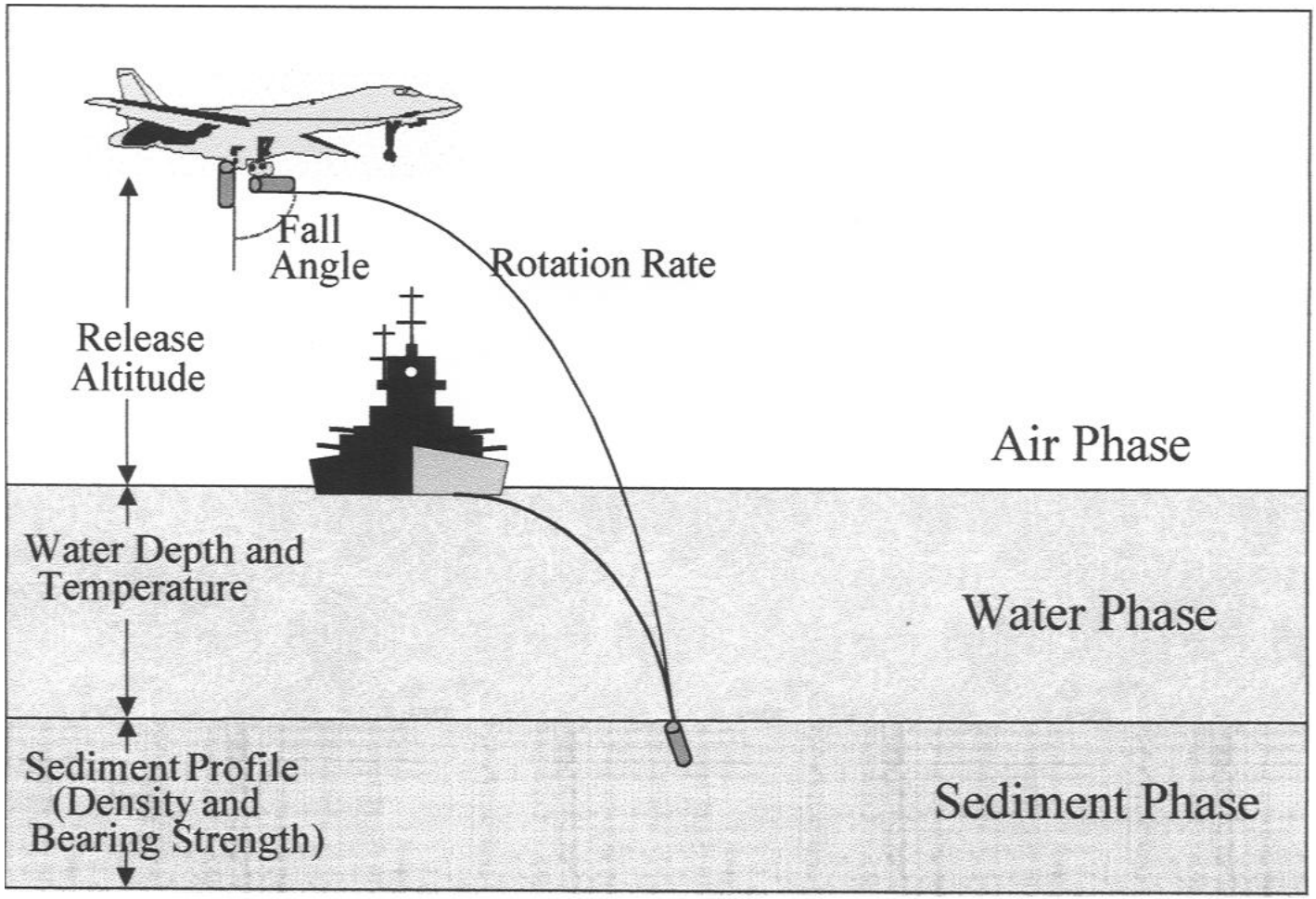
Environmental Effect
On Mine Countermeasure



Naval Oceanographic Office's
MACAS (Environmental) Data

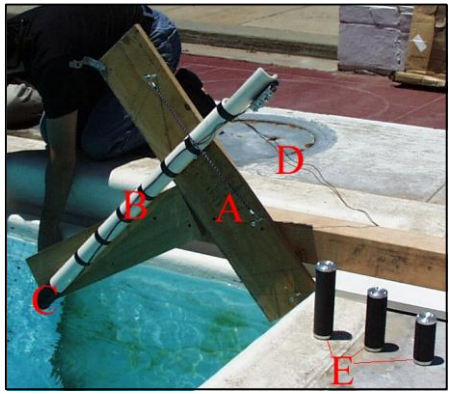
Notice that safe current levels calculated at 60-100 ft depths
are unsafe at some shallower depths, but safe again at depths less than 30ft
for reasonable ED/AD values.

Mine Impact Burial Prediction

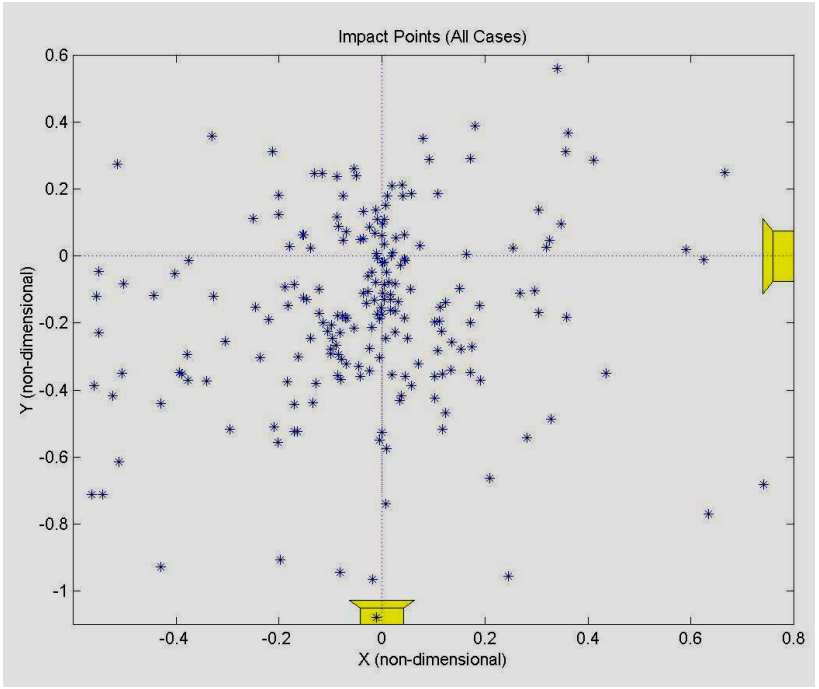


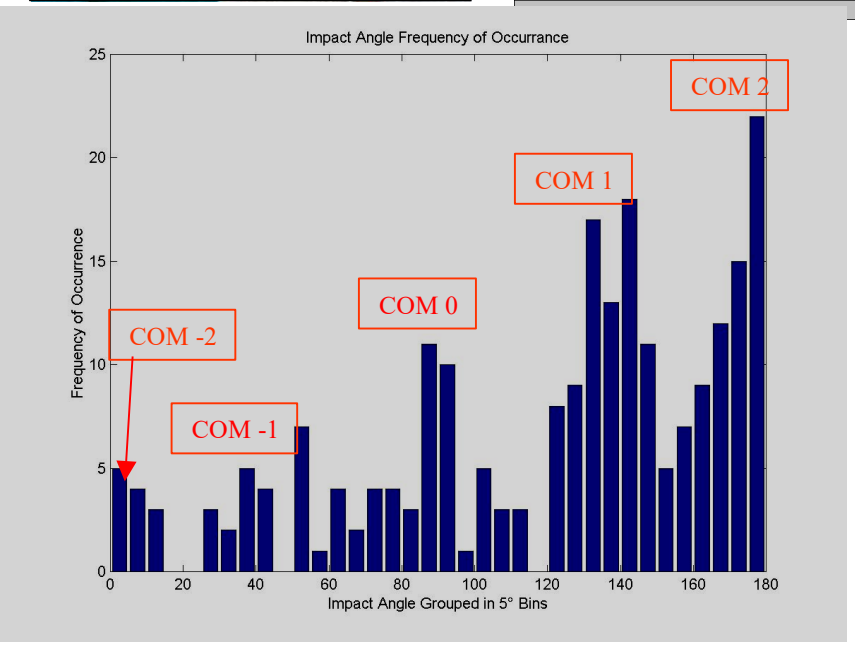
Mine IMPACT BURIAL PREDICTION

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

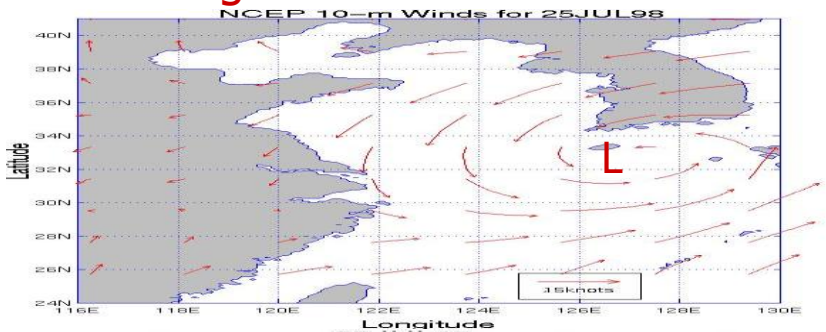
	x_m	y_m	Psi	u	v	w
β_0	-.0746	-.0546	102.5691	.0040	-.0135	-.9481
β_1	.1190	-.0828	-13.3508	-.0075	-.0106	-.1080
β_2	-.0469	-.0798	-.5009	-.0011	.0005	.0295
β_3	.0372	.0622	1.0437	.0025	.0011	-.0221
β_4	.2369	.4330	472.2135	-.0090	.0537	-1.2467

COM Position - Most Influence on Mine Trajectory

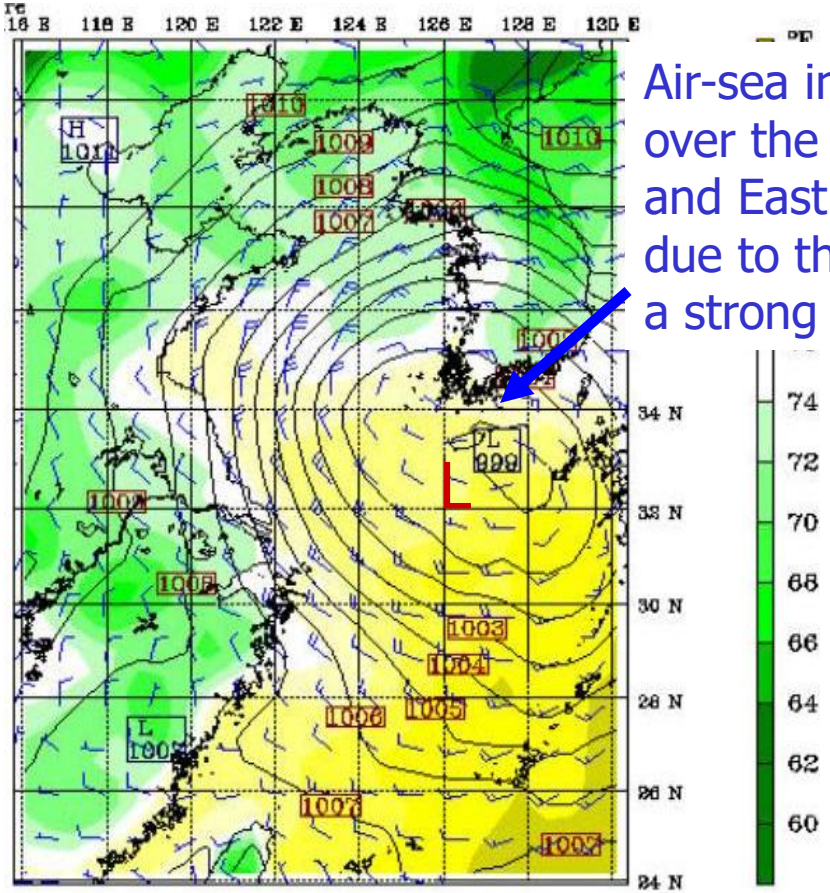
COASTAL AIR-OCEAN COUPLED SYSTEM (CAOCS) FOR THE EAST ASIAN MARGINAL SEAS (EAMS)

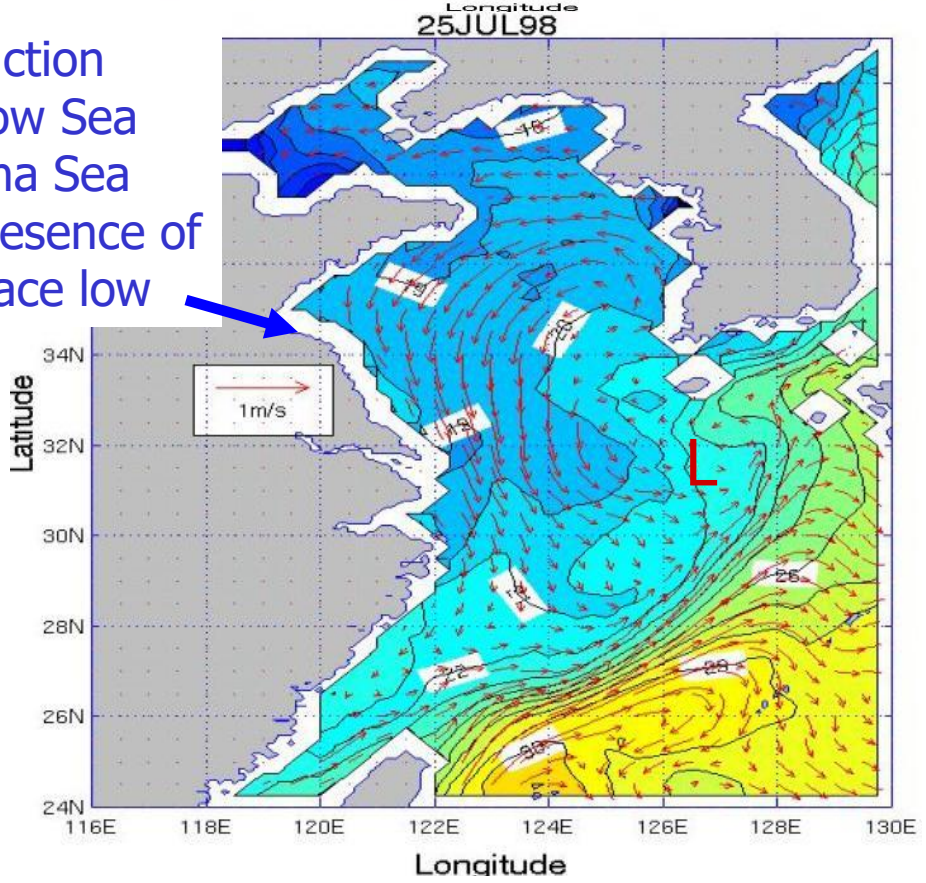
PI: Professor Peter C Chu
Sponsor: NAVO, ONR
METOC Beneficiary: NRL/FNMOC (air-ocean modeling)

VERIFICATION OF 10-M WINDS ON 25JUL98 Against NCEP Data



Air-sea interaction over the Yellow Sea and East China Sea due to the presence of a strong surface low





SLP/SFC WNDS/SAT VALID 12Z 25JUL98
ATMOSPHERE COMPONENT OUTPUT

SFC CURRENTS/SST FOR 25JUL98
OCEAN COMPONENT OUTPUT