

Littoral Oceanography for Mine Warfare



Mine Warfare

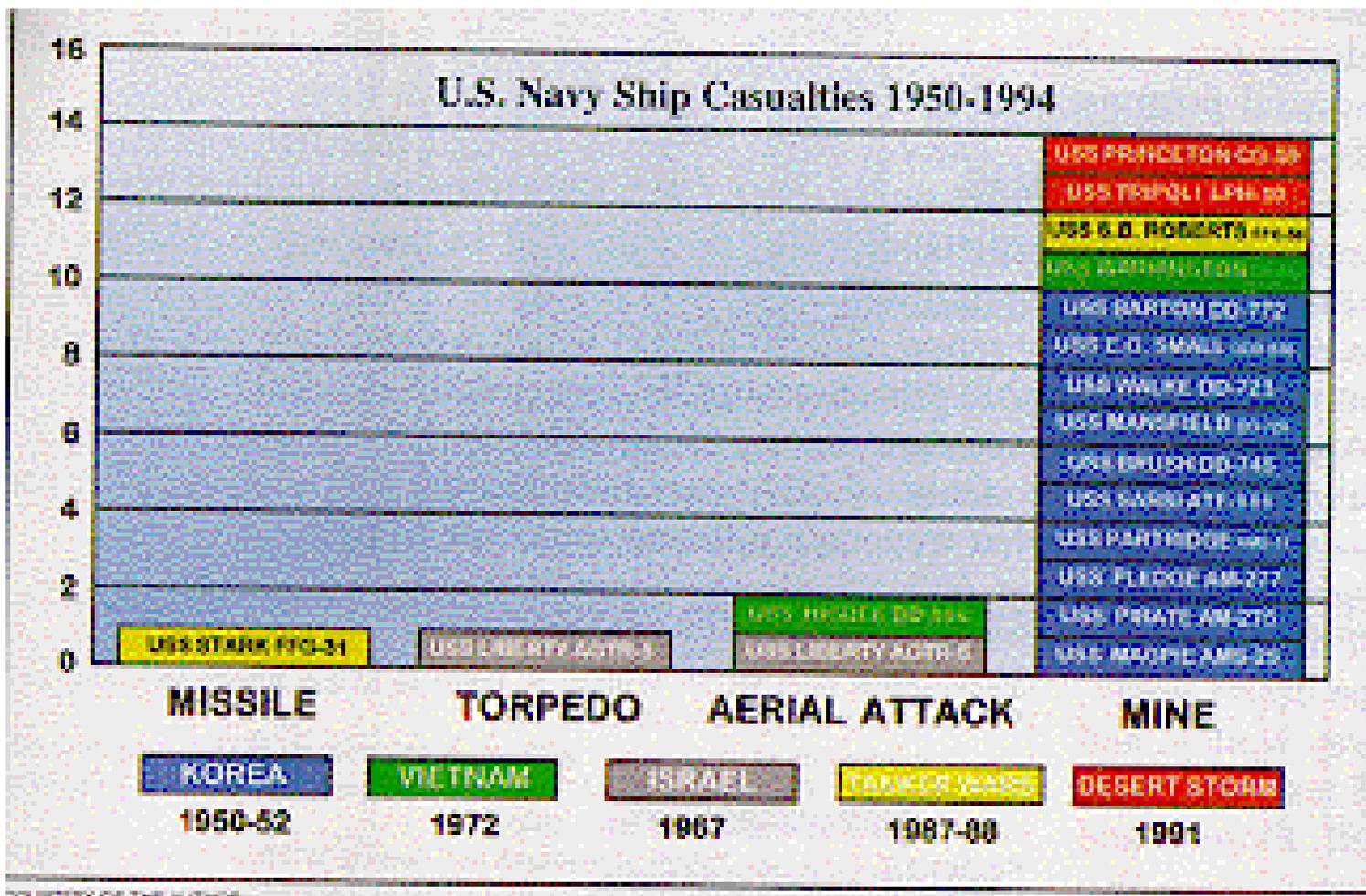
Different than other weapons systems

- ⊕ Target comes to the weapon
- ⊕ Weapons system activated (planted) without a specific target detected.
- ⊕ Don't have to be there for it to work.
- ⊕ Can be crude and still be VERY effective
- ⊕ Requires advanced planning

US vs Mines

- Of the 18 US Navy ships that have suffered battle damage in the last 50 years, 78 per cent was as a result of mines

U.S. vs. MINES



What It Takes To Go "Anytime, Anywhere" by Rear Adm. Horne, Proceedings, Jan 1998

USS Tripoli (LPH-11)



“Bad Day at Sea”



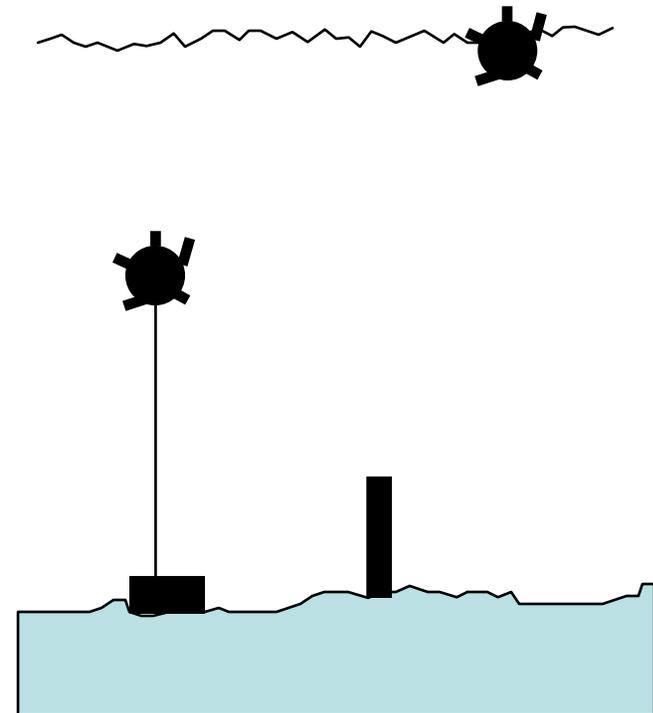
The Mission Of Mine Warfare

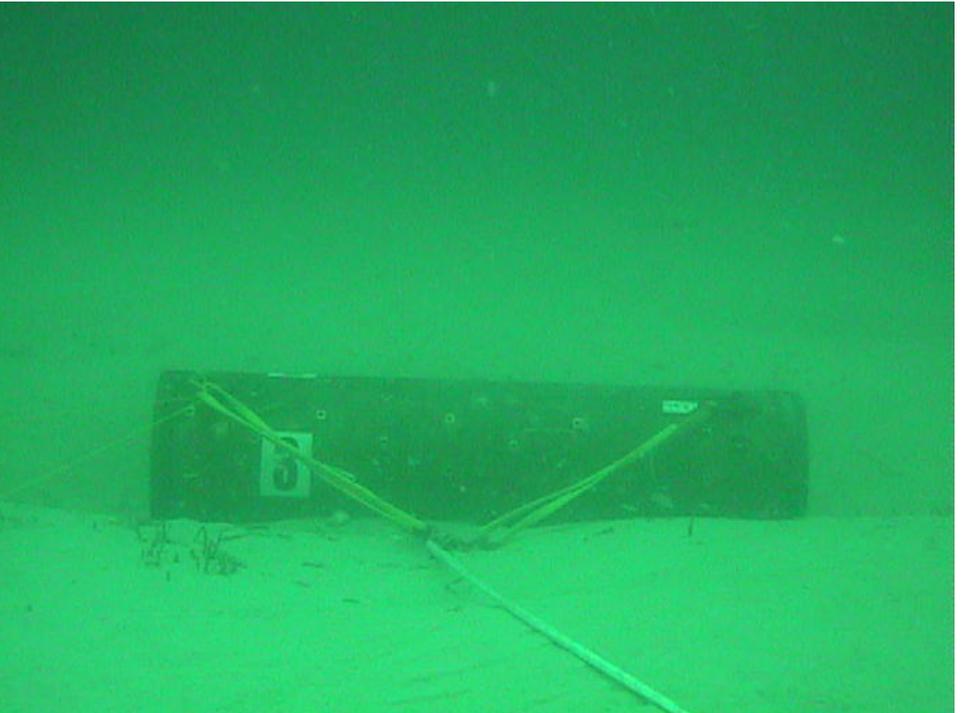
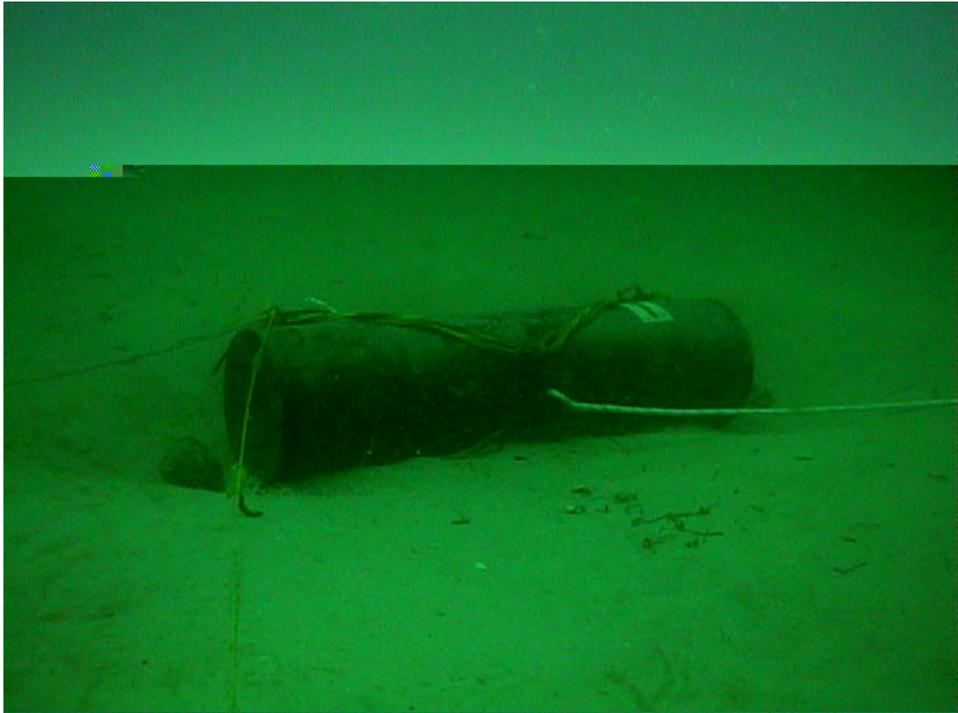
- ⊕ Detect and Avoid or Eliminate mine threat (Mine Countermeasures (MCM))
- ⊕ “Mining is also a force multiplier in today’s and tomorrow’s conflict scenarios....”

- Force 2001

Classification of Mines

- By position in the water after delivery
 - Moored mines
 - Bottom mines
 - Drifting mines
- By method of delivery
 - Air-delivered mines
 - Surface-delivered mines
 - Submarine-delivered mines
- By method of activation
 - Contact Mines
 - Magnetic
 - Acoustic
 - Pressure
 - Combination
 - Influence Mines





Mine Countermeasures (MCM)

- Clearing/Removing Mines
 - Mine sweeping
 - Cut cables then activate to destroy (moored mines)
 - Use acoustic/magnetic noisemakers to activate
 - Mine hunting
 - Search and neutralize individual mines
 - Use sonar then investigate every possible target.



Sediment Conditions for MIW



NAVOCEANO MIW Databases:

SEDIMENT TYPE

MINE CASE BURIAL

ROUGHNESS

CLUTTER DENSITY

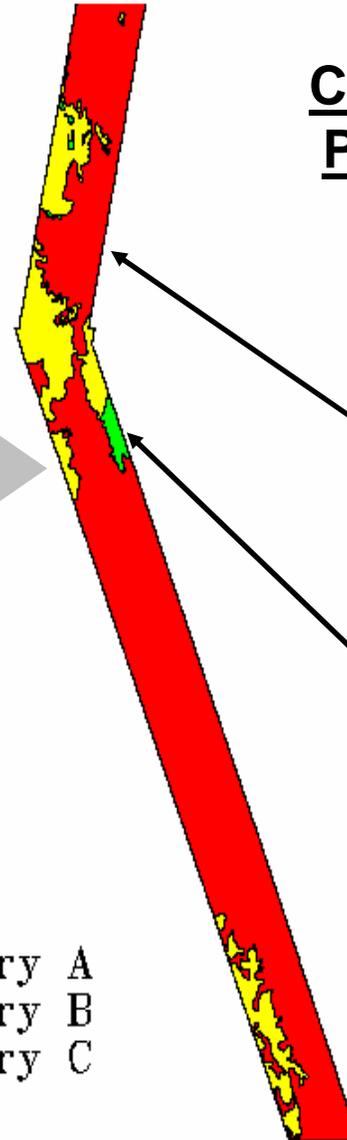
DOCTRINE

COMINEWARCOM Planning, Tactics

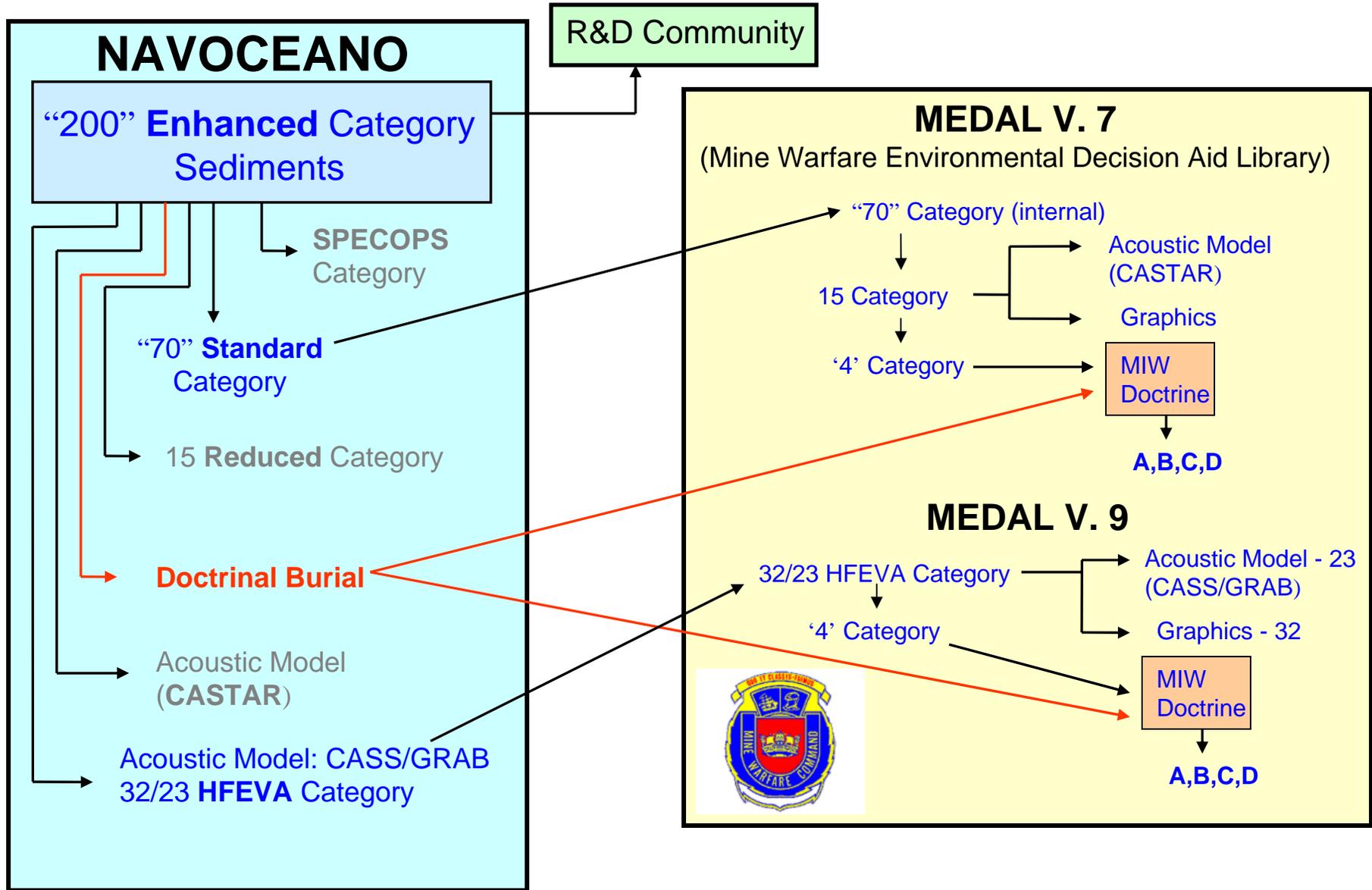
(MEDAL)

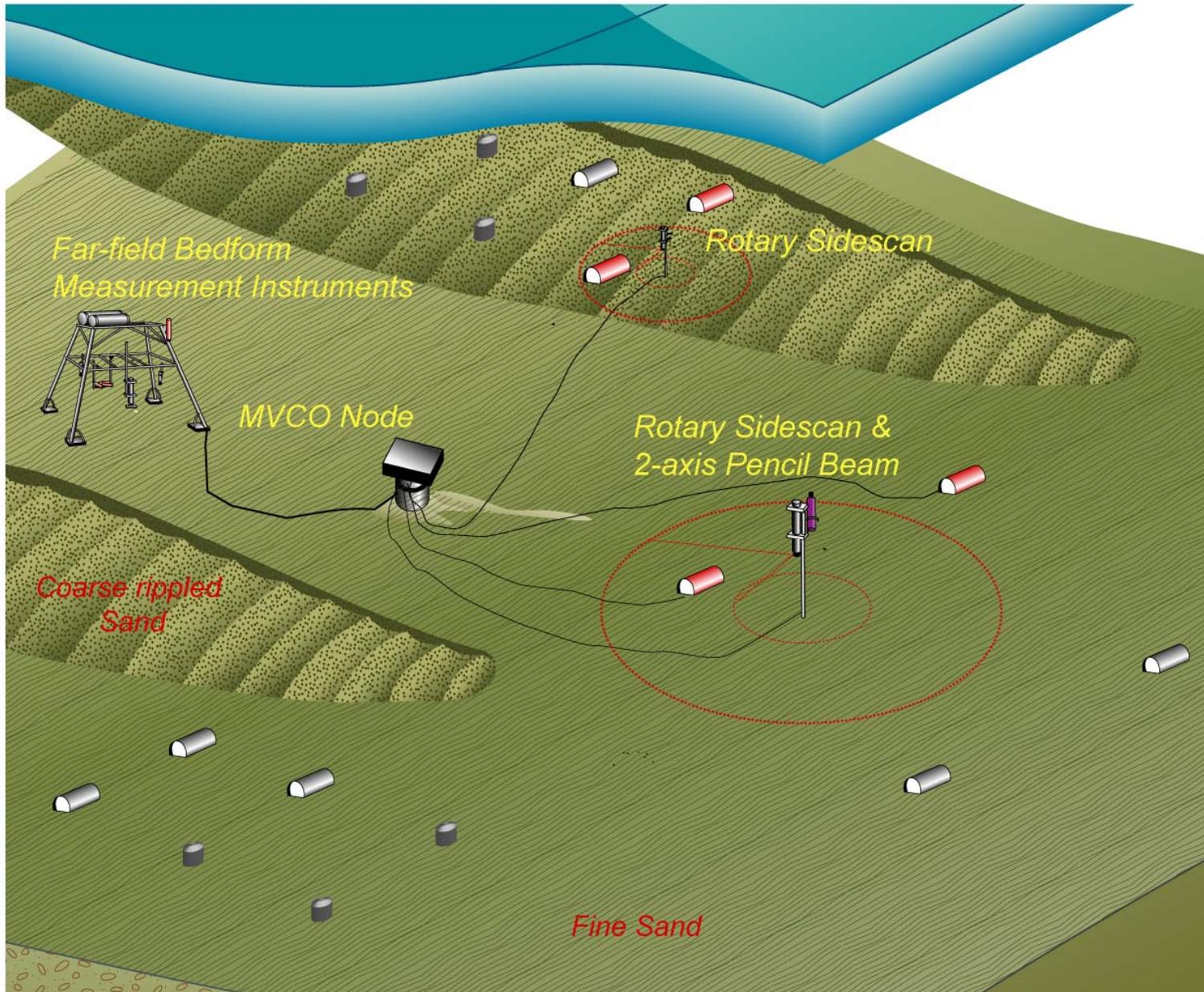
A track in the red area takes 3.5 times longer (per unit area) to clear than a track in the green area.

 Category A
 Category B
 Category C



DOCTRINAL MINE BURIAL CATEGORIES AND MEDAL



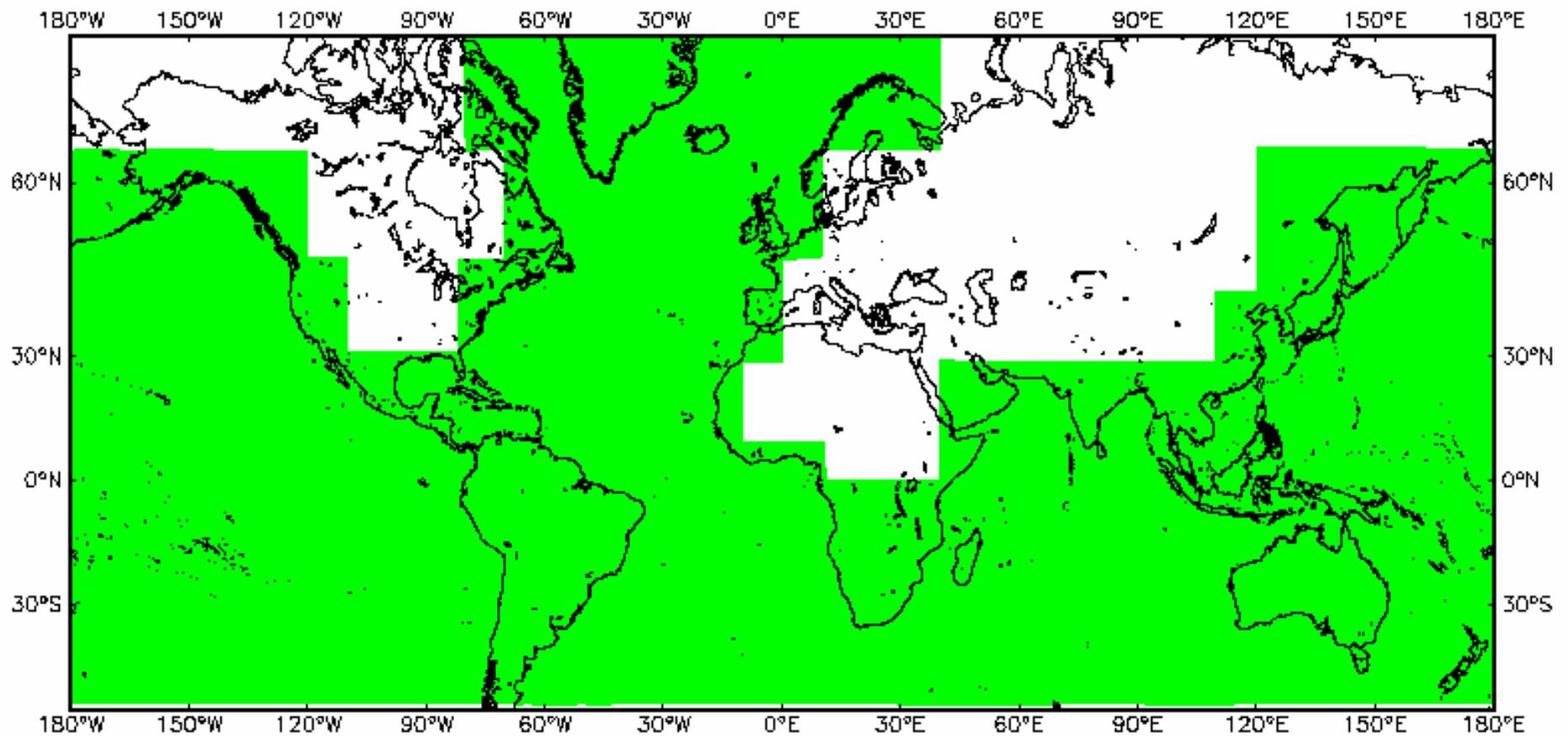


- 
N.R.L. Acoustic Instrumented Mine
- 
F.W.G. Optical Instrumented Mine
- 
Misc. Non-Instrumented Mine shapes

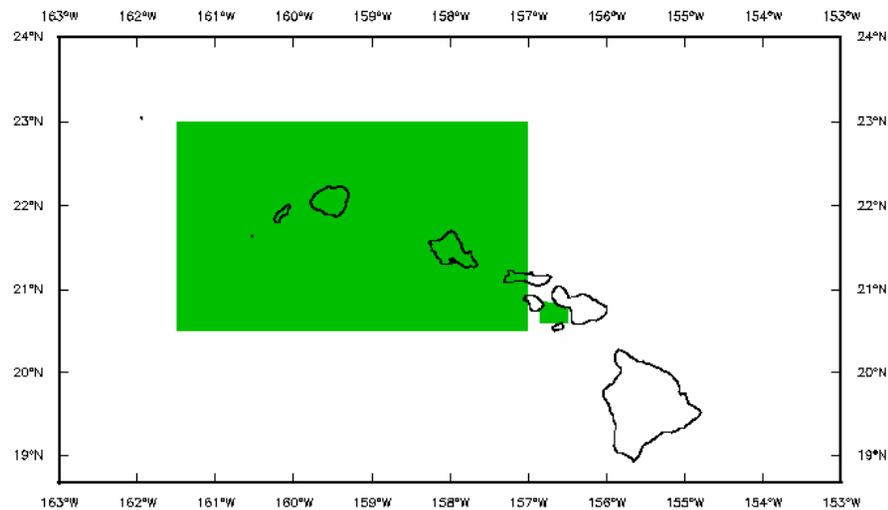
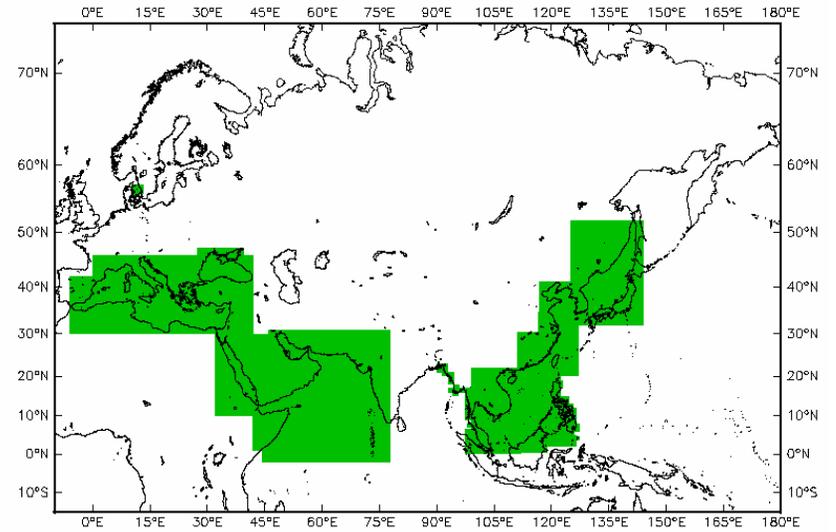
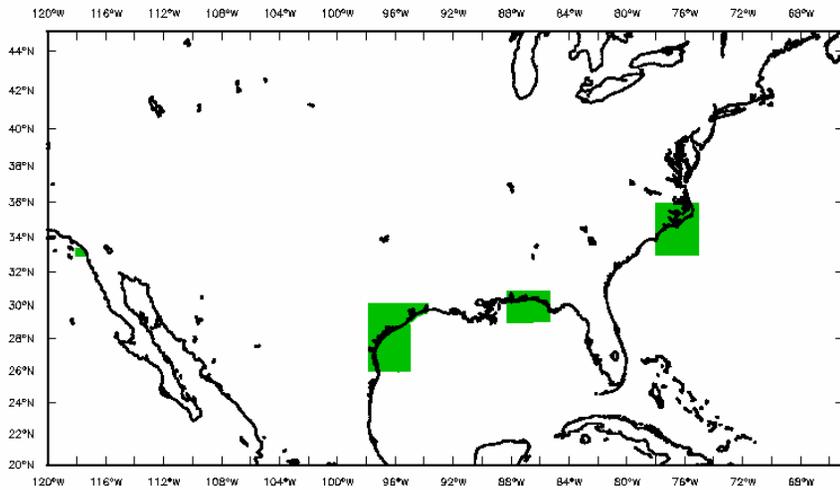
An urgent scientific problem in MIW

- What is the temporal-spatial variability in littoral environment (sediment, sound speed profiles, atmospheric forcing ...)?

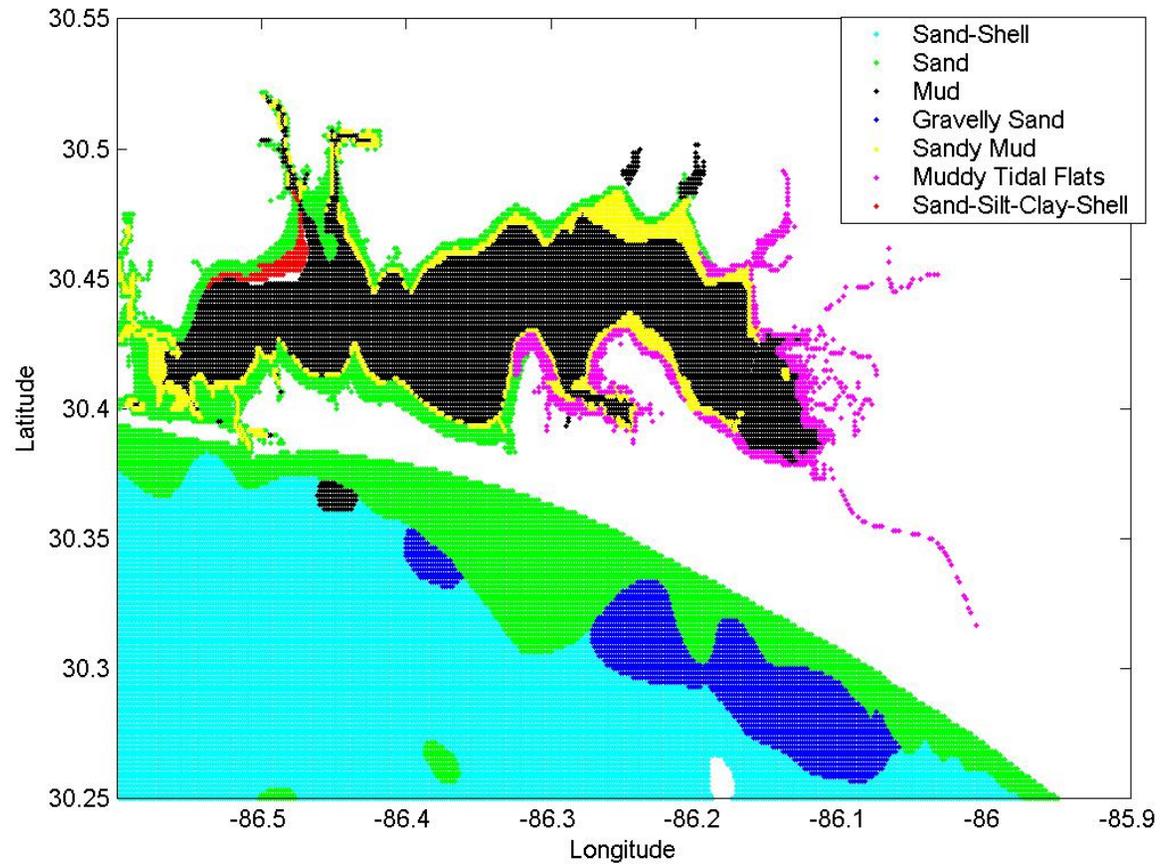
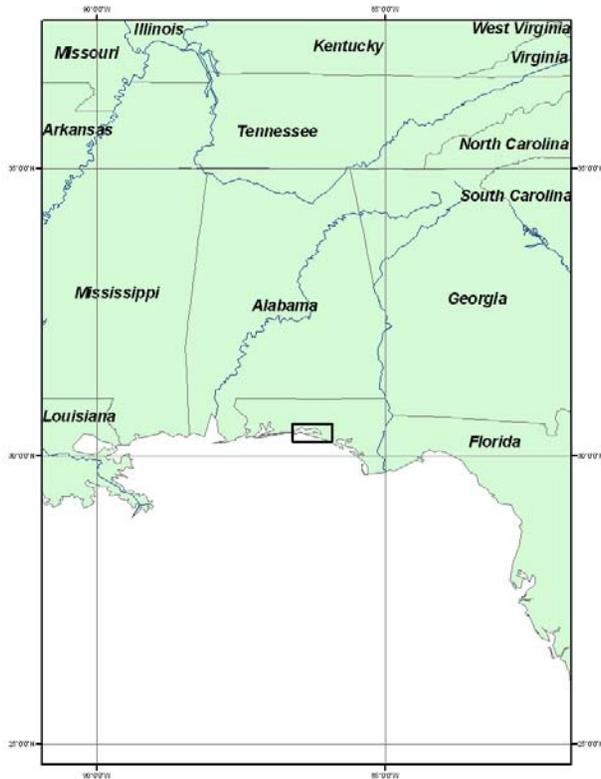
Low (5-minute) resolutions NAVO sediment type data



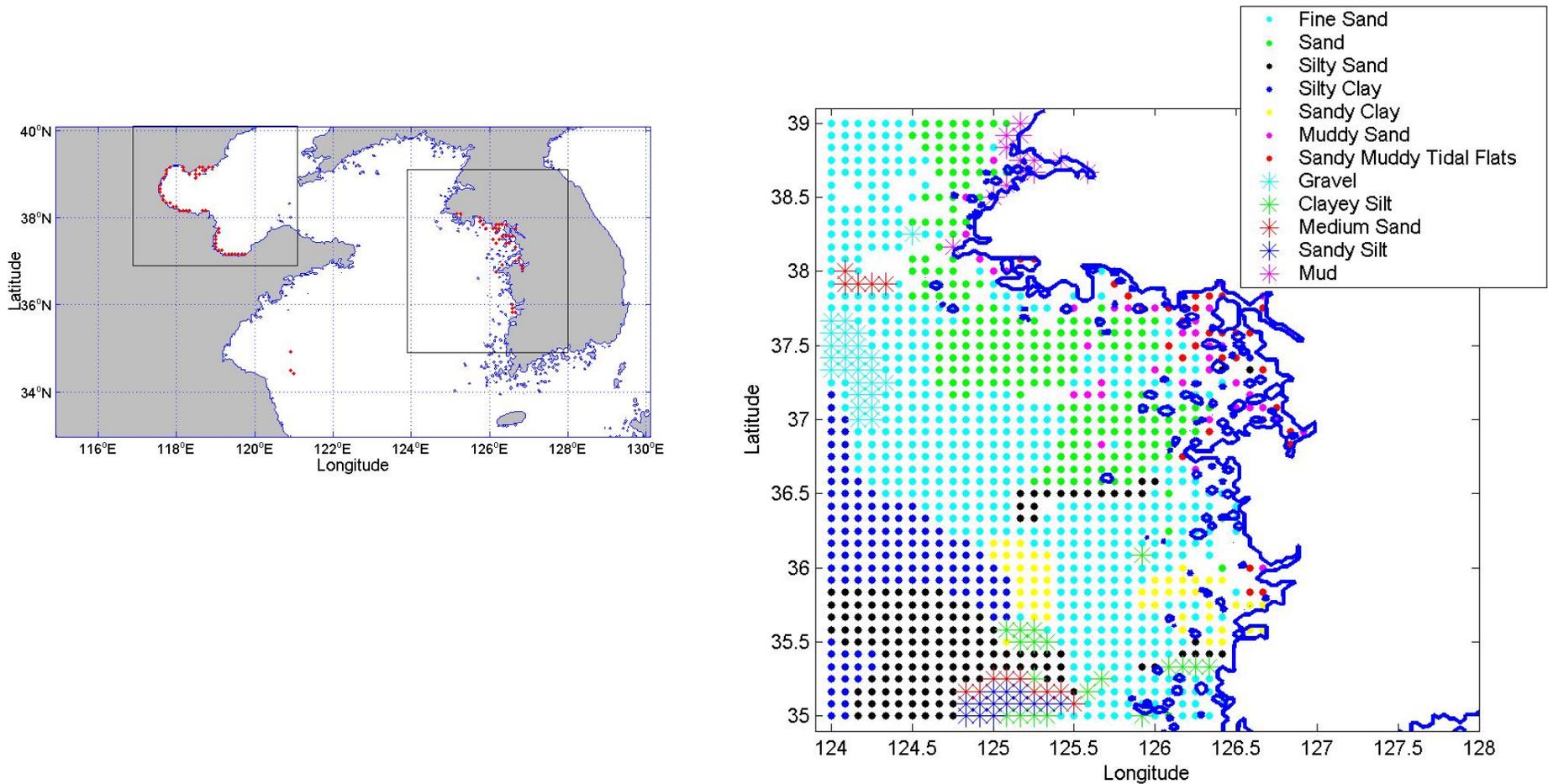
High (~150 m) resolutions NAVO sediment type data



Sediment type in the Louisiana coast (microtidal area) from NAVO's SSTDS data.



Sediment type in the Korean coast (macrotidal areas) from NAVO's SSTDS data.



Thesis Topic (1)

- (1) How often do we need to survey the ocean environment especially the sediment for MCM?
 - Determine the temporal-spatial variability in littoral zone using data and models
 - Survey Periodicity
 - 1-2 Students needed

Thesis Topic (2)

- (2) Similarity analysis on littoral environments (sediment type, sound speed profiles, atmospheric conditions, ...)
 - 1-2 Students needed