Synoptic monthly gridded and ocean modeled data to assess submarine vulnerability

Naval Postgraduate School

Topic Description

- Understanding the ocean environment is imperative and directly coupled to the successful performance of undersea sensors and subsequent employment of undersea warfare weapon systems.

- In order to optimize the performance of undersea sensors and weapons systems, it is crucial to gain an understanding of the acoustic propagation in the ocean.

ASW Success Starts with FOM = SL-LE-RD

ASW success foundation

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January   July
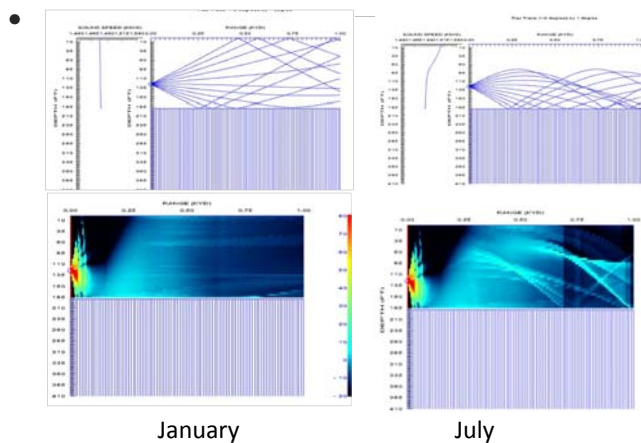
Seasonal Variability in Signal Excess (SE) from GDEM in the Yellow Yea

Difference in Acoustical Characteristics Identified from the Three Datasets in the Navy's Hot Spots

- Climatology → Navy's Generalized Digital Environmental Model (GDEM)

- Synoptic Monthly Gridded (T, S) fields for the world oceans from January 1960 to December 2015 → Synoptic GDEM (developed at NPS).

- Navy's Coastal Ocean Model (NCOM) and Hybrid Coordinate Ocean Model (HYCOM)

Potential Research Focus/Questions

- How can inter- and intra-annual variability in the ocean be leveraged by the submarine Force?

- Is GDEM or synoptic GDEM good enough to represent SVP for ASW especially in the bottom limited area?

- What is value-added of HYCOM/NCOM modeled (T, S) profiles to represent SVP for ASW?

- How can ocean models (e.g., NCOM or HYCOM) be used for submarine operations?
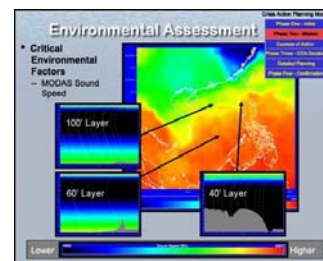
3dB Variability in Signal Excess → ASW

Environment assessment with three datasets for submarine vulnerability

Students Involvement and Collaboration

- NPS USN student officers will be recruited to work on this proposed research topic for their thesis studies.

This project will be conducted in collaboration closely among NPS (Dr. Peter C. Chu), NAVO (Mr. Ronald Betsch, ASW/MIW program manager, Mr. Mel Wagstaff, ASW Technical Leader), and NRL (Dr. Charles Barron)

Researcher Name (Distinguished Professor Peter Chu)
NPS School (GSEAS)

Topic Sponsor Organization (OPNAV – N97)