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Seaglider in AUVFEST 2005

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http://www.apl.washington.edu/projects/seaglider/asw_exercise.html

GOALS

Operate a Seaglider AUV during AUVFEST 2005 to 1) demonstrate data telemetry to and assimilation by NAVOCEANO on-site at Keyport, 2) acquire dissolved oxygen data to demonstrate the glider's ability to contribute to the study of the Hood Canal oxygen deficit problem, and 3) to conduct joint maneuvers with other gliders as requested by ONR.

OBJECTIVES

Preparation, employment, and recovery of one Seaglider for use in AUVFEST 2005. The glider will be readied, shipped, operated, recovered, and returned to APL-UW. The glider interface system will automatically generate Navy-formatted message files containing environmental data (temperature, salinity, depth-averaged current) collected by the glider on each dive. The interface system will automatically send these files to NAVOCEANO who will "bent-pipe" the data back to NAVOCEANO personnel on-site at Keyport, WA. The data will be assimilated and compared with a PC-Tides model of Hood Canal being operated at Keyport. Oxygen data will be assimilated and portrayed with flight data to ascertain the vehicle's utility to studying the oxygen deficit problem.

APPROACH

Use existing glider operation and maintenance procedures to prepare, employ, and recovery a glider in Dabob Bay and Hood Canal. Use existing glider interface software to 1) automatically reformat measured environmental data from the glider into Navy standard message format files, and 2) transmit those files to Navy channels for assimilation and application.

WORK COMPLETED

SG022 was RHIB-launched Thursday, 9 June by APLUW in Dabob Bay after resolving a cable bundle interference problem and a broken connector pin earlier in the week that delayed launch. The glider operated continuously without incident until the following Wednesday when it was recovered. During the weekend, the glider was flown five miles south of the acoustic range. On both the second and the last day of operation, the glider was successfully commanded to fly toward and station keep at a designated waypoint to which other gliders were similarly commanded to fly. A leader-follower orientation was successfully demonstrated as part of the last rendezvous. During the fourth and fifth days of operation, the glider was commanded to fly a double-bow-tie flight plan in Dabob Bay. Alaska Native Technologies provide the recovery craft on 15 June.

RESULTS

Seaglider successfully completed its AUVFEST mission including all objectives. The glider made 180 profiles all but two of which were to 100m. On the last day two dives were made to 160m. The vehicle traversed 72km horizontally (see figure (1)) and in the process consumed approximately 20% of its main battery energy. 100% of acquired data was captured. Relevant portions telemetered in Navy message format in near-real-time to NAVOCEANO and back to Keyport for assimilation and comparison with the PC-Tides model running there. Oxygen data was processed and made available for display and analysis. Data for dives 2-174 are presented in figure (2). The glider's track during its double-bow-tie maneuver on 13-14 June is shown in figure (3) and demonstrates the effectiveness of the Kalman filter used in automated flight control.

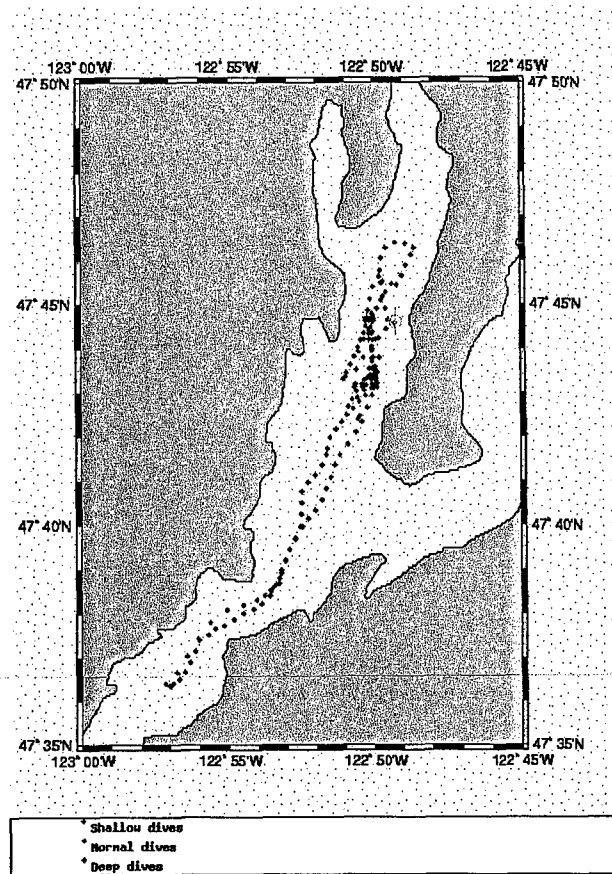


Figure (1) Seaglider SG022 track during six-day mission in Dabob Bay and Hood Canal.

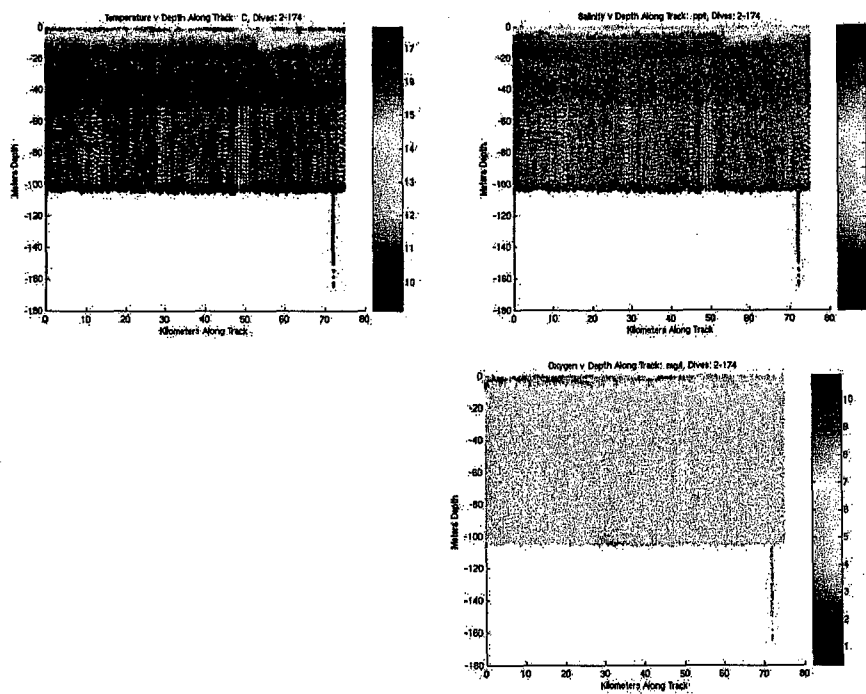


Figure (2) Temperature, salinity, and dissolved oxygen data captured from dives 2-174 over a 144 hour period.

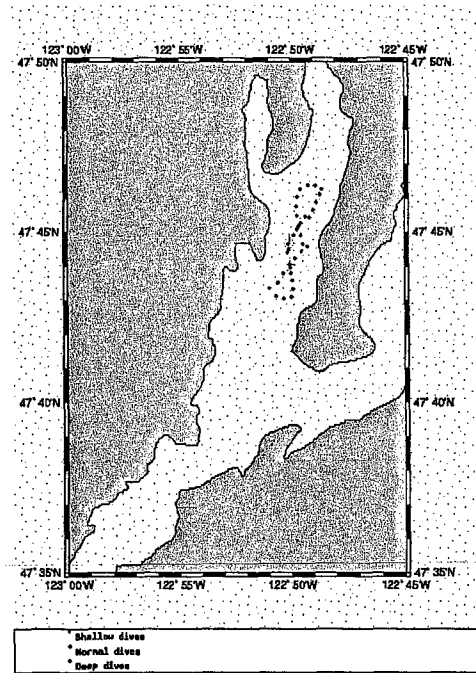


Figure (3) Seaglider SG022 track during double-bow-tie maneuver on 13-14 June.

RELATED PROJECTS

ONR separately funded APL-UW to participate in TASWEX-04 in the East China Sea AOR. APL-UW is a member of the ONR PLUSNet project managed by ARL-Penn State sponsored by Tom Curtin.