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General

Adaptation of a Hyperspectral Atmospheric Correction Algorithm for Multi-spectral Ocean Color Data in Coastal Waters, Chapter 3
B. C. Gao, M. J. Montes, and C. O. Davis.
Naval Research Lab. Nov 2003, 6p. Publicly available Unlimited. CASI. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
N20040067988WOT Price code: PC A02/MF A01

This SIMBIOS contract supports several activities over its three-year time-span. These include certain computational aspects of atmospheric correction, including the modification of our hyperspectral atmospheric correction algorithm Tafkaa for various multi-spectral instruments, such as SeaWiFS, MODIS, and GLI. Additionally, since absorbing aerosols are becoming common in many coastal areas, we are making the model calculations to incorporate various absorbing aerosol models into tables used by our Tafkaa atmospheric correction algorithm. Finally, we have developed the algorithms to use MODIS data to characterize thin cirrus effects on aerosol retrieval.

——*Proceedings, Symposia, Etc.*——

Alaska OCS Region Information Transfer Meeting and Barrow Information Update Meeting (10th). Final Proceedings. Held in Anchorage, Alaska on March 14-16, 2005 and in Barrow, Alaska on March 18, 2005
MBC Applied Environmental Sciences, Inc., Costa Mesa, CA. Jun 2005, 142p, OCS/MMS-2005-036. See also 9th Meeting, PB2004-103952. Sponsored by Minerals Management Service, Anchorage, AK. Alaska Outer Continental Shelf Office. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PB2005-110108WOT Price code: PC A08

The Minerals Management Service (MMS) mission is to manage offshore oil and gas leasing, exploration and development in an environmentally sound and safe manner. The Environmental Studies Program to support those goals in a variety of ways. Most importantly, we are seeking to obtain and move quality science in a timely and useful format into MMS decision process.

Algorithms for Processing and Analysis of Ocean Color Satellite Data for Coastal Case 2 Waters, Chapter 16
R. P. Stumpf, R. A. Arnone, R. W. Gould, V. Ransibrahmanakul, and P. A. Tester.
National Ocean Service. Nov 2003, 15p. Publicly available Unlimited. CASI. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
N20040067976WOT Price code: PC A03/MF A01

SeaWiFS has the ability to enhance our understanding of many oceanographic processes. However, its utility in the coastal zone has been limited by valid bio-optical algorithms and by the determination of accurate water reflectances, particularly in the blue bands (412-490 nm), which have a significant impact on the effectiveness of all bio-optical algorithms. We have made advances in three areas: algorithm development (Table 16.1), field data collection, and data applications.

Arctic and Antarctic Sea Ice Data 1972-1994, Version 1.0 (on CD-ROM)
National Climatic Data Center, Asheville, NC. Jul 1996, one CD-ROM disc. DOS ASCII format. Customer must provide own search and retrieval software. Available on one (1) CD-ROM disc. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PB2005-500048WOT Price code: CD-ROM CP D01

This CD-ROM contains digital sea ice data from 1972-94 NIC Arctic and Antarctic analysis charts. NIC 1995 sea ice data are currently unavailable (in digital format) at the time of this publication. CD-ROM directories contain weekly sea ice data files separated by area of interest: Arctic East, Arctic West and Antarctica. Charts were manually digitized and translated into the international format for archival and exchange of sea ice data (SIGRID) by the National Climatic Data Center (NCDC) in Asheville, NC. These digitized data, in a compacted raster format, contain information on total ice concentration, partial concentrations of ice type or stage of development and in some cases the form of ice. Location of the ice edge, ice extent, ice coverage and distribution of level ice thickness categories can be derived from these data. The level of analysis detail varies from year to year based on availability of remotely sensed and ‘in-situ’ oceanographic data. During 1995, SIGRID files on this CD-ROM underwent an extensive quality control and correction process. Section 4 of this document describes this process and details the types of errors leading to the reprocessing of the data set. Files on this CD-ROM should be used to replace all previous versions of JIC/NIC SIGRID data.

Bermuda Bio Optics Project, Chapter 14
N. Nelson.
California Univ. Nov 2003, 6p. Publicly available Unlimited. CASI. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
N20040067990WOT Price code: PC A02/MF A01

The Bermuda BioOptics Project (BBOP) is a collaborative effort between the Institute for Computational Earth System Science (ICESS) at the University of California at Santa Barbara (UCSB) and the Bermuda Biological Station for Research (BBSR). This research program is designed to characterize light availability and utilization in the Sargasso Sea, and to provide an optical link by which biogeochemical observations may be used to evaluate bio-optical models for pigment concentration, primary production, and sinking particle fluxes from satellite-based ocean color sensors. The BBOP time-series was initiated in 1992, and is carried out in conjunction with the U.S. JGOFS Bermuda Atlantic Time-series Study (BATS) at the Bermuda Biological Station for Research. The BATS program itself has been observing biogeochemical processes (primary productivity, particle flux and elemental cycles) in the mesotrophic waters of the Sargasso Sea since 1988. Closely affiliated with BBOP and BATS is a separate NASA-funded study of the spatial variability of biogeochemical processes in the Sargasso Sea using high-resolution AVHRR and SeaWiFS data collected at Bermuda (N. Nelson, P.I.). The collaboration between BATS and BBOP measurements has resulted in a unique data set that addresses not only the SIMBIOS goals but also the broader issues of important factors controlling the carbon cycle.

Bio-Optical Measurements in Upwelling Ecosystems in Support of SIMBIOS, Chapter 4
F. P. Chavez, P. G. Strutton, V. S. Kuwahara, K. L. Mahoney, and E. Drake.
Monterey Bay Aquarium Research Inst. Nov 2003, 11p. Publicly available Unlimited. CASI. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
N20040067989WOT Price code: PC A03/MF A01

The upwelling region of the equatorial Pacific Ocean, which spans one quarter of the earth s circumference, strongly impacts global biogeochemistry. This upwelling system has significant implications for global CO2 fluxes (Tans et al., 1990; Takahashi et al., 1997; Feely et al., 1999), as well as primary and secondary production (Chavez and Barber, 1987; Chavez and Toggweiler, 1995; Chavez et al., 1996; Dugdale and Wilkerson, 1998; Chavez et al., 1999; Strutton and Chavez, 2000). In addition, the region represents a vast oceanic (case 1) region over which validation data for SeaWiFS are needed. This project consists of an optical mooring program and cruise-based measurements focused on measuring biological and chemical variability in the equatorial Pacific and obtaining validation data for SeaWiFS.

C-MAN and Buoy Reports and Summarized Elements, Version 1.0 (on CD-ROM)
National Climatic Data Center, Asheville, NC. Mar 1996, two CD-ROM discs. System Requirements: IBM 286, 386, 486, Pentium, or compatible PC; EGA or VGA graphics card; 420K RAM; MS-DOS version 5.0 or higher; Microsoft CD extensions (MSCDEX). Available on two (2) CD-ROM discs. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PB2005-500044WOT Price code: CD-ROM CP D02

This CD-ROM set contains data, summary tables, and access software for 197 Buoy and C-MAN sites managed by the National Data Buoy Center. Hourly data, including air/sea temperatures, wind, pressure, wave height/period, are for the period of record through 1993. Both volumes contain summary tables for all 197 sites. Volume 1 also contains hourly data for the North Atlantic and Gulf of Mexico sites. Volume 2 also contains hourly data for the North and South Pacific, Gulf of Alaska, and Great Lakes sites.

EMPACT Beach Project: Results from a Study on Microbiological Monitoring in Recreational Waters
L. J. Wymer, K. P. Brenner, J. W. Martinson, A. O. Dufour, W. R. Stutts, and S. A. Schaub.
Environmental Protection Agency, Cincinnati, OH. National Exposure Research Lab. Aug 2005, 88p, EPA/600/R-04/023. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PB2005-109975WOT Price code: PC A06

Protecting the health of swimmers who use surface waters for recreation has been of interest to public health officials in the United States since 1930. It was well recognized at that early date that human excreta discharged to surface waters posed a health hazard to those who used the water for recreation. Although the relationship between swimming-associated health effects and feces-contaminated water used for swimming had not been defined, microbial limits based on coliform bacteria were used in many states, particularly when there was physical evidence of sewage contamination. The limiting values selected by responsible authorities were based more on attainment rather than on risk of illness. Thus, there was little uniformity among states regarding what level of coliforms constitute waters safe for swimming. Several states chose 1,000 coliforms per 100 ml as a measure of good quality water, but there was not much uniformity among states regarding what level of coliforms was a safe level. There was, however, a general understanding that fecal contamination of surface water posed a risk to those exposed to the water, and that the risk might be limited by setting a level of fecal contamination above which exposure would be unacceptable. The manner in which water samples were taken, the frequency of sampling, and the number of samples were usually not described in the early literature.

Long-Term Data Sets About Freezing Rain and Ice Storms in the United States (on CD-ROM)
National Climatic Data Center, Asheville, NC. Global Analysis Branch. 2001, one CD-ROM disc. System Requirements: Customer must provide own search and retrieval software. Dates of coverage: 1948-2001. Available on one (1) CD-ROM disc. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PB2005-500043WOT Price code: CD-ROM CP D01

This project developed historically reliably data sets on freezing rain occurrences and ice storm losses. The specific objectives were to develop enhanced climatological data sets and make these data available to the scientific, government and business communities. This project was done in cooperation with the National Climatic Data Center (NCDC). Also includes ASCII tables for Hourly and Daily counts.

Optimization Of Ocean Color Algorithms: Application To Satellite And In Situ Data Merging, Chapter 9
S. Maritorena, D. A. Siegel, and A. Morel.
California Univ. Nov 2003, 10p. Publicly available Unlimited. CASI. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
N20040067984WOT Price code: PC A02/MF A01

The objective of our program is to develop and validate a procedure for ocean color data merging which is one of the major goals of the SIMBIOS project (McClain et al., 1995). The need for a merging capability is dictated by the fact that since the launch of MODIS on the Terra platform and over the next decade, several global ocean color missions from various space agencies are or will be operational simultaneously. The apparent redundancy in simultaneous ocean color missions can actually be exploited to various benefits. The most obvious benefit is improved coverage (Gregg et al., 1998; Gregg & Woodward, 1998). The patchy and uneven daily coverage from any single sensor can be improved by using a combination of sensors. Beside improved coverage of the global ocean the merging of ocean color data should also result in new, improved, more diverse and better data products with lower uncertainties. Ultimately, ocean color data merging should result in the development of a unified, scientific quality, ocean color time series, from SeaWiFS to NPOESS and beyond. Various approaches can be used for ocean color data merging and several have been tested within the frame of the SIMBIOS program (see e.g. Kwiatkowska & Fargion, 2003, Franz et al., 2003). As part of the SIMBIOS Program, we have developed a merging method for ocean color data. Conversely to other methods our approach does not combine end-products like the subsurface chlorophyll concentration (chl) from different sensors to generate a unified product. Instead, our procedure uses the normalized waterleaving radiances (LwN) from single or multiple sensors and uses them in the inversion of a semianalytical ocean color model that allows the retrieval of several ocean color variables simultaneously. Beside ensuring simultaneity and consistency of the retrievals (all products are derived from a single algorithm), this model-based approach has various benefits over techniques that blend end-products (e.g. chlorophyll): (1) it works with single or multiple data sources regardless of their specific bands, (2) it exploits band redundancies and band differences, (3) it accounts for uncertainties in the LwN data and, (4) it provides uncertainty estimates for the retrieved variables.

SOPAC 2002 IGS Analysis Center Report
P. Fang, P. Jamason, L. Prawirodirdjo, and Y. Bock.
Scripps Institution of Oceanography. Sep 2004, 7p. Text in English. Publicly available Unlimited. CASI. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
N20050192501WOT Price code: PC A02/MF A01

The Scripps Orbit and Permanent Array Center (SOPAC) at the Scripps Institution of Oceanography (SIO) has been producing precise satellite orbits, Earth Orientation Parameters, and station positions since 1991 when the Permanent GPS Geodetic Array (PGGA) project was initiated in southern California. SOPAC has been an analysis center from the inception of IGS. This report covers the activities between 2000 and 2002, and will focus on SOPAC s GPS analysis strategy, changes in the software/procedure, and a review of some of the results.

Biological Oceanography

Aerial Surveys of Endangered Whales in the Beaufort Sea, Fall 2002-2004
C. Monnett, and S. D. Treacy.
Minerals Management Service, Anchorage, AK. Alaska Outer Continental Shelf Office. 2005, 174p, OCS/MMS-2005-037. See also rept. for Fall 2001, PB2003-104234.
Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PB2005-110442WOT Price code: PC A09

This report describes field activities and data analyses for aerial surveys of bowhead whales conducted during Fall 2002 (22 August-07 October), Fall 2003 (1 September-19 October), and Fall 2004 (1 September-18 October) in the Beaufort Sea, primarily between 140 degrees west and 156 degrees west longitudes south of 72 degrees latitude.

Correction Factor for Ringed Seal Surveys in Northern Alaska. Final Report
B. P. Kelly.

Alaska Univ., Juneau. School of Fisheries and Science. Feb 2005, 42p, OCS/MMS-2005/006. Sponsored by Minerals Management Service, Los Angeles, CA. Pacific OCS Region. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PB2005-110099WOT Price code: PC A04/MF A01

Aerial surveys have been widely used to estimate local densities and, by extrapolation, population size, of ringed seals (Phoca hispida) and other pinnipeds. Spatial and temporal comparisons typically rest on the assumption (often implicit) that the proportion of animals visible is constant from survey to survey. In a few instances, that assumption has been tested in harbor seal (Phoca vitulina richardsi) populations using radio telemetry. Another recent approach to harbor seal surveys ignored the unseen fraction and analyzed population trends by adjusting counts to standardized conditions based on environmental and temporal covariates. The latter approach assumes that the appropriate covariates to predict the peak number of animals potentially visible have been identified.

Plumes and Blooms: Modeling the Case II Waters of the Santa Barbara Channel, Chapter 15
D. A. Siegel, S. Maritorena, and N. B. Nelson.
California Univ. Nov 2003, 7p. Publicly available Unlimited. CASI. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
N20040067991WOT Price code: PC A02/MF A01

The goal of the Plumes and Blooms (PnB) project is to develop, validate and apply to imagery state-of-the-art ocean color algorithms for quantifying sediment plumes and phytoplankton blooms for the Case II environment of the Santa Barbara Channel. We conduct monthly to twice-monthly transect observations across the Santa Barbara Channel to develop an algorithm development and product validation data set. The PnB field program started in the summer of 1996. At each of the 7 PnB stations, a complete verification bio-geo-optical data set is collected. Included are redundant measures of apparent optical properties (remote sensing reflectance and diffuse attenuation spectra), as well as in situ profiles of spectral absorption, beam attenuation and backscattering coefficients. Water samples are analyzed for component in vivo absorption spectra, fluorometric chlorophyll, phytoplankton pigment (by the SDSU CHORS laboratory), and inorganic nutrient concentrations. A primary goal is to use the PnB field data set to objectively tune semi-analytical models of ocean color for this site and apply them using available satellite imagery (SeaWiFS and MODIS). In support of this goal, we have also been addressing SeaWiFS ocean color and AVHRR SST imagery. We also are using the PnB data set to address time/space variability of water masses in the Santa Barbara Channel and its relationship to the 1997/1998 El Nino. However, the comparison between PnB field observations and satellite estimates of primary products has been disappointing. We find that field estimates of water-leaving radiance, L(sub wN)(lambda), correspond poorly to satellite estimates for both SeaWiFS and MODIS local area coverage imagery. We believe this is due to poor atmospheric correction due to complex mixtures of aerosol types found in these near-coastal regions. Last, we remain active in outreach activities.

Sea Otter Small Boat Survey 2003-2005
C. Kava, and L. Jack.
Alaska Sea Otter and Steller Sea Lion Commission, Anchorage AK. Jun 2005, 558p. Sponsored by Fish and Wildlife Service, Washington, DC. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
PB2005-107597WOT Price code: PC A25/MF A04

The Sea Otter Small Boat Survey's (SBS) study area are Tribal boundaries surrounding Cordova, Unalaska, Port Graham, Nanwalek, Yakutat, Craig, Chignik Lagoon, Port Heiden and Hydaburg. The SBS monitors sea otter populations within the Tribal boundaries. The Tribe can evaluate sea otter movement into other subsistence food resources (examples: clams; mussels; abalone beds). They can monitor subsistence take of sea otters and the effect on sea otter population. They can monitor sea otter population growth. Tribes can cooperate within each region communicating results of each tribe's small boat surveys to enhance TASSC's regional management plan.

Marine Engineering

Analysis, Fabrication, and Testing of a Composite Bladed Propeller for a Naval Academy Yard Patrol (YP) Craft
C. D. Wozniak.
Naval Academy, Annapolis, MD. 6 May 2005, 120p, USNA-TSPR-341 (2005). The original document contains color images. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
ADA436648WOT Price code: PC A07/MF A02

The U.S. Navy, and much of the maritime industry, uses nickel-aluminum-bronze (NAB) as the primary material for propeller construction. This is done for many reasons, including its anti-biofouling characteristics, high stiffness, and low corrosion potential. However, NAB is a cathodic metal. While it experiences little corrosion itself, its presence leads to galvanic corrosion of the surrounding hull steel. The Navy has considered the feasibility of a composite bladed propeller design, but several variables need investigation. The goal of this Trident project was to design, build and test the Navy's first composite propeller. The detailed objectives of the research were to: evaluate a hub design; perform a structural design of a Yard Patrol (YP) craft composite bladed propeller; and finally, build and test a full-scale propeller using the composite materials. As the general concept used composite blades attached to a NAB hub, the first step was to develop a design for the hub-blade interaction. Afterwards, the loads were predicted using computational fluid dynamics. The pressure plot was then combined with the geometry in a finite element structural analysis program to determine fiber orientation and strength characteristics. A full-scale mold plug was created using stereolithography. Finally, the carbon/epoxy blades were laid up in this mold. The YP craft was selected as the test platform as it: 1) has two propellers (in the event of failure); and 2) is used for many hours, often in harsh conditions.

Proceedings, Symposia, Etc.

Analysis of the Causal Factors behind the United States Navy's Warship-Building Programs from 1933-1941
J. M. Barrett.
Army Command and General Staff Coll., Fort Leavenworth, KS. 17 Jun 2005, 122p. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
ADA436462WOT Price code: PC A07/MF A02

On 7 December 1941, the U.S. Navy had 343 warships in commission. However, a 'second' fleet, consisting of 344 warships, was in various stages of construction in shipyards across the country. Given that building a warship could take anywhere from less than a year for a destroyer, to over 3 years for a battleship or aircraft carrier, it is clear that the foresighted building of warships in the years prior to U.S. involvement in World War II would play a major role in enabling the U.S. Navy to counter and eventually defeat the Imperial Japanese Navy in the Pacific. In tracing the evolving influences behind this warship building program, this thesis divides the pre-war period into three separate phases. The first phase begins in 1933 with the arrival of President Roosevelt in office and ends in 1937 with the USS Panay incident. The second phase of analysis begins in 1938 and runs through 1940, ending with the outbreak of war in Europe. The final phase of analysis continues from the outbreak of war in Europe through the attack on Pearl Harbor on 7 December 1941. In total, the building programs of all three pre-war phases amounted to 586 warships.

Beaufort Gyre Observing System 2004: Mooring Recovery and Deployment Operations in Pack Ice
Woods Hole Oceanographic Institution, MA. Dept. of Applied Ocean Physics and Engineering. May 2005, 33p.
ADA436418WOT Price code: PC A04/MF A01

For complete citation see Physical & Chemical Oceanography

Characteristics of a Dual-Slotted Circulation Control Wing of Low Aspect Ratio Intended for Naval Hydrodynamic Applications
E. O. Rogers, and M. J. Donnelly.
Naval Surface Warfare Center Carderock Div., Bethesda, MD. Hydromechanics Directorate. Jan 2004, 30p. Presented at the AIAA Aerospace Sciences Meeting (42nd), held in Reno, NV on 5-8 Jan 2004. Published as AIAA 2004-1244. The original document contains color images. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
ADA436473WOT Price code: PC A03/MF A01

An experimental investigation was conducted in a water tunnel to explore the application of Coanda-effect circulation control to low aspect ratio wings. The facility was the Large Cavitation Channel in Memphis, TN. The intended application is to high-lift control surfaces (appendages) on underwater naval vehicles. Test results are interpreted in light of both theory and the extensive experience with circulation control (CC) technology at NSWCCD. The semi-span wing test model with a taper ratio of 0.76 was mounted on a load cell; a reflection plane provided for an effective aspect ratio of 2. Dual upper/lower trailing edge tangential jet slots were incorporated for bi- directional force generation. Findings include: finite-span effects on CC augmented lift are consistent with the effects on conventional lift-due-to-angle-of-attack, and cavitation in the Coanda wall jet region does not result in jet detachment or an abrupt lift stall. Wing lift augmentation ratios are up to 36 and meet expectations. Unexpected virtues of a dual-slotted configuration were found that enhance the value of CC to ship and VSTOL aircraft applications. A small flow from the second slot will significantly extend the lift capability beyond that of single slot operation by preventing what is believed to be the adverse effects of excessive turning of the wall jet at high momentum coefficients. Dual slot flow produces a merger of the two wall jets into a free planar jet that enables static thrust vectoring of the jet momentum flux over the full 0-360 degree range. This steerable-jet provides a jet-flap mode of lift development for use at very low vehicle speeds, as an extension of the high efficiency CC mode.

Damage Control and Crew Optimization
J. A. Hiltz.
DEFENCE RESEARCH AND DEVELOPMENT ATLANTIC DARTMOUTH (CANADA). Jan 2005, 34p, DRDC-ATLANTIC-TM-2005-010. The original document contains color images. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
ADA436391WOT Price code: PC A04/MF A01

The costs associated with personnel and maintenance account for approximately 70% of the total operating costs of a ship. Of these costs more than 50% are associated with personnel. As the Canadian Forces have made the reduction of the total operating costs of ships a priority, approaches to the reduction in crewing levels without jeopardizing operational capabilities and safety are being investigated. Of particular concern is how labour-intensive tasks, such as damage control and fire control, can be carried out on ships with reduced crewing levels. To aid in addressing the challenges arising from attempts to reduce crewing levels and maintain or enhance damage control, DRDC Atlantic has initiated a project entitled Damage Control and Crew Optimization. In this memorandum, the approaches to reducing crewing levels, including the use of functional analysis in conjunction with modeling and simulation to evaluate the effectiveness of several crewing level-automation for damage control technology configurations, reviews of damage and fire control technologies, the evaluation of the impact of remote condition monitoring systems on maintenance requirements and situational awareness, and the introduction/development of materials with enhanced fire and damage tolerance are discussed.

Dynamic Action Spaces for Autonomous Search Operations
C. A. Earnest.
Massachusetts Inst. of Tech., Cambridge. Dept. of Civil and Environmental Engineering. Jun 2005, 151p. Prepared in cooperation with Charles Stark Draper Laboratory, Cambridge,

MA. The original document contains color images. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
ADA436654WOT Price code: PC A09/MF A02

This thesis presents a new approach for a Navy unmanned undersea vehicle (UUV) to search for and detect an evading contact. This approach uses a contact position distribution from a generic particle filter to estimate the state of a single moving contact and to plan the path that minimizes the uncertainty in the location of the contact. The search algorithms introduced in this thesis will implement a motion planner that searches for a contact with the following information available to the decision system: (1) null measurement (i.e., contact not detected at current time), (2) timedated measurement (i.e., clue found at current time that indicates contact was at this location in the past), and (3) bearings measurement (i.e., angular measurement towards contact position detected at current time). The results of this thesis will be arrived at by evaluating the best methods to utilize the three types of information. The underlying distribution of the contact state space will be modeled using a generic particle filter, due to the highly non- Gaussian distributions that result from the conditions mentioned above. Using the particle filter distribution and the measurements acquired from the three conditions, this thesis will work towards implementing a path planning algorithm that creates dynamic action spaces that evaluate the uncertainty of position distribution. Ultimately, the path planner will choose the path that contains the position distribution and leads to sustained searches.

Numerical Simulation of Galvanic Corrosion Caused by Shaft Grounding Systems in Steel Ship Hulls
Y. Wang.
DEFENCE RESEARCH AND DEVELOPMENT ATLANTIC DARTMOUTH (CANADA). Jan 2005, 36p, DRDC-TM-2004-284. The original document contains color images. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
ADA436656WOT Price code: PC A04/MF A01

The shaft grounding systems used on board HMC ships have substantially reduced the shaft-to-hull resistance and, thus, improved the performance of the shipboard impressed current cathodic protection (ICCP) system. Under some circumstances, however, the shaft grounding systems have been left on while the ICCP system was turned off. This led to the accelerated corrosion of the exposed steel ship hull on paint holidays because of the substantial difference of the electric potentials between the steel ship hull and the nickel-aluminum bronze propellers. The extent of the increased corrosion rate of the steel ship hull depends on a variety of conditions including the locations and areas of the paint holidays on the ship hull, the overall paint degradation, and seawater domain where the ship is located. A boundary element code, named CPBEM, developed at Defence R AND D Canada - Atlantic was used to numerically simulate the galvanic corrosion of the steel hull under the aforementioned various conditions. A box model was also used to demonstrate the effect of fluid domain on galvanic corrosion current and solution resistance. The modelling results have shown that the paint damage area significantly affects the galvanic corrosion rate, while the effect of the paint damage location on the galvanic corrosion rate is not significant when the ship is in an open sea. The little solution resistance encountered in the area away from the anodes and the cathode is attributed to the much larger cross sectional area for the galvanic current path in the large volume of seawater. The potential contours and galvanic corrosion current at various degrees of the paint degradation were also demonstrated.

Towards a Trial Plan for Evaluating the COMDAT TD
M. L. Matthews, and A. R. Keeble.
HUMANSYSTEMS INC GUELPH (ONTARIO). 31 Mar 2004, 36p, DRDC-TORONTO-CR-2004-053. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
ADA436408WOT Price code: PC A04/MF A01

This report outlines a series of evaluations and analyses of the COMDAT TD with a view to conducting future trials to evaluate its potential impact upon operator performance in the Operations Room of the Halifax Class frigate. Specific issues commented upon include the operator-machine interface, the logistics of integrating the TD into a suitable trial environment, the availability of existing scenario elements to provide a suitable evaluation context, the types of performance measures that could be feasibly implemented and options for the format and location of future trials.

WaMoS II, CFAV Quest Trial Q279
S. Skey.
SEA-IMAGE COMMUNICATIONS LTD VICTORIA (BRITISH COLUMBIA). May 2004, 42p, DRDC-ATLANTIC-CR-2004-141. Prepared in cooperation with OceanWaveS GmbH. The original document contains color images. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
ADA436398WOT Price code: PC A04/MF A01

This report details some of the wave data comparisons between an operational WaMoS II wave radar mounted on the CFAV QUEST and a free floating TRIAXYS directional wave buoy. The data were taken from a trial in late January/early February 2004 off the Scotian Shelf in deep water. In general the comparisons between the two measuring devices was very good. If one takes the measurement parameters of significant wave height and peak period as indicators of sea state then the two devices showed excellent agreement in most conditions. If the sea surface is truly homogenous and the buoy location is in the same area as that measured by WaMoS II, then one might expect similar results for all measured parameters and spectra. By and large these were the findings of this report. However, there is a significant difference in what each device is measuring. Typically, with the Quest travelling at 6 knots, over a 30 minute averaging period, the WaMoS II samples approximately 7 sq km of the ocean surface. The WaMoS II data thus incorporates a large spatial average. On the other hand the TRIAXYS directional wave buoy is measuring data from a single point (with some drift over the 30 minute period). Even in deep water, the sea surface is not uniform either spatially or temporally, so we would expect to see some differences in the data between the two sensors. Most noticeable were the differences in the overall shape of the 1-dimensional frequency spectra and the 2-dimensional frequency/direction spectra in some instances.

Marine Geophysics & Geology

T-Phase Observations from the May 1999 Ascension Island Experiment

A. Rodgers, and P. Harben.
Lawrence Livermore National Lab., CA. 19 Jul 2000, 16p, UCRL-JC-138996. Sponsored by Department of Energy, Washington, DC. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

DE2005-15013205WOT Price code: PC A03/MF A01

The Comprehensive Nuclear-Test-Ban Treaty (CTBT) specifies that an International Monitoring System (IMS) will be used to detect and locate disturbances that could be related to nuclear testing. In order to monitor disturbances in and near the world's oceans, the IMS will rely on a network of 11 hydroacoustic stations. This hydroacoustic network will be composed of 6 hydrophone stations and 5 T-phase seismic stations. The hydrophone stations will record pressure variations in the ocean. The T-phase stations will record the seismic waves in the solid earth that are excited when an hydroacoustic wave strikes an island or continental margin. The coupling of hydroacoustic-to-seismic energy for the purpose of CTBT monitoring is currently an active area of research. We report observations of hydroacoustic waves and their conversion to seismic waves (T-waves) at the volcanic edifice of Ascension Island.

Physical & Chemical Oceanography

Assimilation of Altimeter Wave Measurements into Wavewatch III

P. A. Wittmann, and J. A. Cummings.
Naval Research Lab., Stennis Space Center, MS. Oceanography Div. 2 Aug 2005, 12p, NRL/PP/7320--04-0003. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

ADA436548WOT Price code: PC A03/MF A01

Assimilation of altimeter measured significant wave heights (SWH) into a global implementation of the Wavewatch III model was performed for March 2004, using SWH data obtained from ENVISAT and JASON satellites. The wave model is forced by 3-hourly Navy Operational Global Atmospheric Prediction System (NOGAPS) marine surface winds. A 6-hour time window about the synoptic time is used to select the altimeter SWH data for the assimilation. The satellite measurements are quality controlled and bias corrected before being used in the analysis An Optimum Interpolation (OI) scheme is used to compute the SWH increment field from the altimeter SWH innovations. The 'first guess: 6-hr model forecast directional wave spectra are then corrected by the ratio of the analysis wave height over the first guess wave height. This correction is distributed uniformly over the wave model spectra Prior to the March 2004 assimilation run, a 6- month analysis-only run (no forecast model update) was performed. Wavewatch III prediction errors at the 6-hr. forecast period, and spatial covariance functions. Observation errors are found to vary with satellite , prediction errors are found to vary with position, and a second- order autoregressive function is found to be an adequate fit to the bin- averaged spatial autocorrelation estimates. Spatial correlation analysis of the analysis residuals shows that the analysis is effectively extracting all of the information in the altimeter SWH measurements.

Beaufort Gyre Observing System 2004: Mooring Recovery and Deployment Operations in Pack Ice

J. Kemp, K. Newhall, W. Ostrom, R. Krishfield, and A. Proshutinsky.
Woods Hole Oceanographic Institution, MA. Dept. of Applied Ocean Physics and Engineering. May 2005, 33p, WHOI-2005-05. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.

ADA436418WOT Price code: PC A04/MF A01

In this technical report, the authors describe the methods of recovering and re-deploying instrumented deep-ocean bottom-tethered moorings within the Arctic perennial ice pack from icebreakers without diver assistance. Situated beneath the Arctic perennial ice pack, the principal components of the Beaufort Gyre Observing System are three deep ocean, bottom-tethered moorings with CTD and velocity profilers, upward looking sonars for ice draft measurements, and bottom pressure recorders. A major goal of this project is to investigate basin-scale mechanisms regulating freshwater and heat content in the Arctic Ocean, and particularly in the Beaufort Gyre throughout several complete annual cycles. The methods of recovering and re-deploying the 3800- meter long instrumented moorings from the Canadian Coast Guard Icebreaker Louis S. St. Laurent in August 2004 are described. In ice-covered regions, deployments must be conducted anchor-first, so heavier wire rope and hardware must be incorporated into the mooring design. Backup buoyancy at the bottom of the mooring is advised for backup recovery should intermediate lengths of the mooring system get tangled under ice floes during recovery. An accurate acoustic survey to determine the exact location of the mooring, adequate ice conditions, and skilled ship maneuvering are all essential requirements for a successful mooring recovery. Windlass (or capstan) procedures could be used for the recovery, but a traction winch arrangement is recommended.

Developing Malaysian Ocean Wave Database Using Satellite

O. Yaakob, N. Zainudin, Y. Samian, A. M. Malik, and R. A. Palaraman.
UNIVERSITI TEKNOLOGI PETRONAS PERAK DARUL RIDZUAN (MALAYSIA) DEPT OF MECHANICAL ENGINEERING. Nov 2004, 7p. Proceedings of the 25th Asian Conference on Remote Sensing, Held in Chiang Mai, Thailand on 22-26 November 2004. Copyrighted; Government Purpose Rights License. Published by Geo-Informatics and Space Technology Development Agency., The original document contains color images. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS

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ADA436472WOT Price code: PC A02/MF A01

Correct wave data is a very important input to predict the performances of the marine vehicles and structures at preliminary design stages particularly regarding safety effectiveness and comfort of passengers and crews. Presently, available wave data in Malaysian seas are based on visual observations from ships, oil platforms and limited wave buoys whose accuracy, reliability and comprehensiveness are often questioned. This paper presents an effort to develop a more reliable and comprehensive wave database for Malaysia sea areas using satellite altimetry. Significant wave height data is extracted from oceanographic satellite TOPEX/Poseidon for one selected area with the grid of 2 deg X 2 deg in the South China. Results are presented in the form of probability distribution functions and compared to data from Global Wave Statistics and Malaysian Meteorological Service.

Environmental Complexity and Stochastic Modeling of High-Frequency Acoustic Scattering From the Seafloor
C. D. Jones.
Washington Univ., Seattle. Applied Physics Lab. 5 Aug 2005, 12p. The original document contains color images. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
ADA436394WOT Price code: PC A03/MF A01

Models of acoustic scattering from the seafloor generally assume that sediment heterogeneity is statistically homogeneous with single-scale correlation structure. Current statistical descriptions of the seafloor are incapable of capturing information about complex seafloor heterogeneities that are often encountered in marine environments (e.g. non-uniform or clustered scatterers, patchiness in the sediment physical properties). Seafloor complexity is due to a variety of processes including bioturbation (burrows, fish pock marks), biogenic deposits (shell lags), hydrodynamics factors (ripples), and geological processes that create stratification and non-uniform deposition (flaser bedding), for example. An overly simplified description of the seafloor will lead to errors in acoustic model predictions, uncertainty in interpreting measurements of acoustic scattering, and unreliable inversions for environmental parameters. This investigation addresses the effects of complex and non-Gaussian seafloor heterogeneity on scattering. A combination of numerical modeling, stochastic process modeling, and field data analysis are employed to investigate the errors and uncertainty associated with using incomplete models of seafloor randomness.

Finescale Structure of the Temperature-Salinity Relationship
K. L. Polzin, and R. Ferrari.
Woods Hole Oceanographic Institution, MA. Dept. of Physical Oceanography. 17 Jun 2005, 9p, WHOI-13335600. Prepared in cooperation with Massachusetts Institute of Technology (MIT), Cambridge, MA. The original document contains color images. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
ADA436440WOT Price code: PC A02/MF A01

The long term goal of this project is to understand the processes that establish the temperature-salinity relationship in the ocean, with emphasis on the interplay between advection at the large scale, eddy stirring at the mesoscale and turbulent mixing at the finescale. The objectives of this proposal are (1) to unfold the processes that participate in the creation of the temperature-salinity relationship in two high-resolution data sets, the North Atlantic Tracer Release Experiment (NATRE) and the Salt Finger Tracer Release Experiment (SFTRE), and (2) to determine the relative importance of eddy stirring and turbulent mixing in the ocean interior with a combination of numerical and theoretical tools.

SAS Imaging and the Sea Surface Bounce Path
Washington Univ., Seattle. Applied Physics Lab. 29 Jul 2005, 14p. The original document contains color images. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
ADA436389WOT Price code: PC A03/MF A01

Modeling and interpretation of SAS measurements taken during SAXO4 experiment in conducted near Panama City, Florida (fall 2004), is completed. Both data and simulation show how multipath interaction with the sea surface delivers the SAS transmit waveform roundtrip, and causes three time horizons for a single target located near the sea surface. The results shed light on the role of sea surface interaction in SAS methodologies whenever they are applied to: (1) long-range applications, e.g., over-the-horizon SAS (OTHSAS), or SAS Systems at Far Ranges and Severe Sites (SASSAFRASS); and (2) applications involving detection and imaging of near-surface targets.

Sea-Surface Specular Multipath for Surface-Level Antennas: Phase 1
J. C. Allen, R. E. Goshorn, B. Zeidler, and A. A. Beex.
Space and Naval Warfare Systems Command, San Diego, CA. Jun 2005, 89p, SSC/SD-TR-1924. The original document contains color images. Product reproduced from digital image. Order this product from NTIS by: phone at 1-800-553-NTIS (U.S. customers); (703)605-6000 (other countries); fax at (703)605-6900; and email at orders@ntis.gov. NTIS is located at 5285 Port Royal Road, Springfield, VA, 22161, USA.
ADA436339WOT Price code: PC A06/MF A01

This document describes a specular multipath simulation for antennas located close to a sea surface. The antennas are circularly polarized but the ray-trace implementation readily accommodates any other polarizations. The transmitted signal S(T)(t) arrives at the receiver's antenna along the direct path and from multiple reflections off the sea surface. The surface-level antenna turns the multipath into multiplicative noise-assuming the receiver is narrow band. Under this narrow-band assumption, the received signal s(R)(t) is approximated by modulating the transmitted signal s(T)(t) with this multiplicative noise: S(R)(t) = a(t) x sT(t). The multiplicative noise (question mark)a(t)(exclamation point) is determined by the sea surface, the elevation angle of the transmitted signal path, and the receiver's antenna. By sweeping over various realizations of the sea surfaces, elevation angles, and various antenna heights and speeds, the systems engineer can estimate sea-surface specular multipath effects on the surface-to-satellite link.

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A06	$ 68.00	$ 85.00	E06	$ 74.00
A07	$ 76.00	$ 95.00	E07	$ 83.00
A08	$ 83.00	$ 104.00	E08	$ 92.00
A09	$ 95.00	$ 119.00	E09	$ 102.00
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