E-SLATE

American Academy of Underwater Sciences (AAUS)

EDITORIAL BOARD NOTE – March 2010

Welcome to the March E-Slate. We look forward to seeing you at the symposium later this month. Please state that you are attending the AAUS meeting if you book your room at the Ala Moana Hotel. It should not increase your price but will reduce our costs. Agenda topics for the AAUS general membership/business meeting can also still be submitted. Finally, please support the AAUS Scholarship fund and enter the raffle to win Kathy Johnston's beautiful print.

The E-Slate is a newsletter from and for the scientific dive community. We welcome news, job positions, new citations, and images with captions of underwater work. Please submit items to aaus@disl.org. Current and past issues of the E-Slate are available at www.aaus.org.

NEWS/ANNOUNCEMENTS

Kathy Johnston Scholarship Raffle

The Kathy Johnston AAUS scholarship is funded by the continuing support of artist Kathy Johnston. Kathy's painting for the 2010 scholarship, "Off Waikiki Beach," features the beautiful Hawaiian triggerfish. This 35" x 41" framed artist's giclee print is signed and numbered first of the reproduction series. A limited number of tickets (300) will be sold, so take a chance now to have this awesome underwaterscape hanging in your home or office! Tickets may be purchased online for $10 each or six for $50. Thank you for supporting the AAUS Student Scholarship fund. To purchase raffle tickets visit: https://web.memberclicks.com/mc/quickForm/viewForm.do?orgId=aaus&formId=73758.

Since only one person can win the large giclee print, the rest of us have the opportunity to buy a smaller print (24" x 30"). The cost of the print is $300 of which Kathy donates $85 back to the AAUS Scholarship Fund. If you are interested in the original watercolor, Kathy Johnson will sell the waterscape for $4,000 to any AAUS member and donate $2,000 back to AAUS. Email aaus@disl.org if you are interested in purchasing the original.

AAUS Symposium Workshop Updates

The regulator repair workshop at the symposium will be for Aqualung regulators, not Oceanic; LOR and UH Visiting Diver Forms are required for the UH Scientific Diver Training Methods and Towboarding workshops; LOR and UH Visiting Diver Forms are NOT required for the UW Photography and Coral Disease workshops. Also, the two PSI workshops have been cancelled and the University of Hawaii Scientific Diver Training and the Digital Photography Workshops are full. For more information visit: http://www.aaus.org/mc/page.do?sitePageId=94127&orgId=aaus.

More on Clean Breathing Air

Dan Marelli, DSO, Perry Institute for Marine Science and President, Scientific Diving International.

Sean Sheldrake made some excellent points in his article on clean breathing air (January 2010 E-Slate). And though fill stations should regularly test the gas they deliver to divers, testing is not the only aspect to consider. Some years ago there was a fatality in Florida that was directly traced to air that had high levels of CO in it. The dive shop had experienced a compressor problem resulting in elevated levels of CO in the air. The compressor had been repaired, but the contaminated gas still remained in the storage banks and was sold to a few customers. The state of Florida subsequently passed a law requiring fill stations that sell air to have their compressors tested every six months and post the results as well as report them to the state Department of Health. This is a step in the right direction, but it does not guarantee that compressed gas quality remains acceptable during the six-month interval between tests. It is also important that the compressor operator understands why providing high quality breathing gas is important and that the operator follows a strict maintenance schedule on the compressor. The operator should be changing hydrocarbon filters, compressor oil and oil filter as required by the manufacturer. They should also be paying attention to interstage pressures and the oil consumption of the compressor, as this information can tell a lot about how the compressor is operating. A strict maintenance schedule and careful monitoring indicate that a compressor operator is 'in tune' with the compressor and dedicated to safety. Get to know your air provider and ensure that they are running a clean operation.

2010 North American OWSS Rolex Scholar

Mr. Joshua D. Stewart, 21, of New York City has been selected as the Our World-Underwater Scholarship Society's 2010 North American Rolex Scholar. Josh will graduate in May from Indiana University with a BA in Marine Biology,

minors in Biology and Anthropology, and a Certificate in Underwater Resource Management. An enterprising student, he designed his own degree program and will be the University's first marine biology graduate. Josh is an avid scientific diver, an Assistant Instructor, and has worked on several international underwater field research projects.

Oahu Diving for AAUS Symposium Attendees

Dive Oahu, a shop close to the symposium hotel, is offering two-dive morning charters during the week of March 20-27. The first dive is usually on one of two artificial reef shipwrecks on the Oahu Southshore, the second on a natural reef. Dive reservations must be booked on-line, which includes a 20% discount off the phone-booking price. The charter fee includes hotel pick-up and return, two air or EAN tanks, and core gear rental as needed (BC, regulator and dive computer). Divers should supply mask, fins and wetsuit at a minimum. An additional $20 store credit for merchandise purchases will be given to AAUS-affiliated divers, which will cover many small shop items (e.g., t-shirts, hats or mugs) but cannot be used to pay for the charter fee. To qualify for the credit, put 'AAUS' after the diver's last name in the 'last name' field (e.g., 'Pence AAUS') when making reservations on-line. Then show your AAUS registration badge when checking in at the shop prior to diving. Dive Oahu's boat can carry 16, but they usually run more often with 12 or fewer. If AAUS divers target March 23 and March 24 (0810 departure) it will ensure that we are diving with many of our friends and colleagues. For more information about Dive Oahu, their charters, dive sites, or to make reservations, visit www.diveoahu.com

Hawaii Symposium Flights and Hotel

Continental Airlines offers discounts off published fares of 2% to 10% or Zone fares. Call your travel professional or Continental MeetingWorks at 800-468-7022 for reservations. Refer to ZGJS and ALFFHT. Or, save an additional 3% off by booking your own reservations at www.continental.com. Choose your flight times and access your meeting discounts by inserting ZGJSALFFHT in the Offer Code box. Location: HONOLULU. Valid travel dates: March 19-30, 2010. Most of the symposium workshops and meetings will be held at the Ala Moana Hotel, located across the street from a beautiful beach and within the Honolulu shopping area. For more information visit: www.alamoanahotelhonolulu.com.

FUNDING/SCHOLARSHIPS

AAUS 2010 Student Scholarships

AAUS will award two $2,500 scholarships in 2010 to graduate students conducting research who are using scientific diving as their principal research tool or studying diving science. Contingent on funding and quality of proposals, two additional $1,500 scholarships may be awarded. The application deadline is June 30. Recipients will be announced Oct. 1. For more information, contact the Scholarship Committee Chair at aaus@disl.org or visit: http://www.aaus.org/mc/page.do?sitePageId=64326&orgId=aaus.

EQUIPMENT RECALLS

Recall of Mares Nemo Air Computers

Mares is recalling all Nemo Air Computers. Mares issued a recall last summer for the slow-leaking O-rings on the Nemo Air computer's Quick Connector hose, but the replacement O-ring issued did not solve the problem. On February 1, Mares announced another recall for the entire hose. Mares designed a new quick disconnect system to replace the faulty hose. All Nemo Air dive computers need this replacement. Contact a Mares dealer to get the hose replacement, free of charge. If you want Mares to do the replacement, call Customer Service at 800-874-3326 with your computer's serial number.

TUSA Regulator Recall

TUSA has announced a recall of RS-670 regulators sold between May and September 2009 because loosening of the BLC plug on the first stage may cause a high-pressure leak. Affected units have first stage serial numbers between 22 and 29, 31 and 103, 637 and 676, 708 and 716, and 737 and 776. Take your regulator back to the dealer or contact TUSA at info@tusa.com or 800-482-2282 for repair under warranty.

Cressi Safety Recall

Cressi USA has announced a safety recall of its Ellipse Black MC5 scuba regulator. This recall affects regulators distributed and sold from March 2009 through August 2009. The words 'Cressi Black' appear on the second stage cover and the words 'Cressi MC5' are visible on the first stage. The problem is that partial obstruction of the high pressure port can produce an inaccurate reading on the pressure gauge, resulting in an overestimate of remaining gas supply. Free repair will be provided by Cressi or any Cressi-authorized dive shop. For more information contact Cressi-sub USA (800-338-9143) or visit: www.cressi.com.

Dive Rite Wings

The U.S. Consumer Product Safety Commission has issued a recall of 16,000 Dive Rite Wings because the overpressure valve springs could rust and fail, allowing the BCD to leak and pose a drowning hazard. The affected models include Travel, Venture, Rec, Trek, Classic, Nomad and Super Wings, and were sold in red, blue or black. Faulty springs were used on wings that have an opaque white or blue-tinted bladder and welded in flanges. Wings with a black bladder are not affected. Only the Dive Rite wings that have a serial number ranging from 42,000 through 72,000 and were sold from June 2006 to October 2008 are included in this recall. Return units to an authorized distributor or call Dive Rite at 800-495-1046.

UPCOMING EVENTS

AAUS General Membership/Business Meeting

The AAUS General Membership/Business Meeting and Diving Safety Officer Meeting will be conducted on Thursday, March 25 2010 from 0800-1700 at the Ala Moana Hotel in Honolulu, HI. All AAUS members and Diving Safety Officers are encouraged to attend. Please forward proposed agenda items to Michael Lang, AAUS President-Elect, via Laurie Penland (penlandl@si.edu). A draft agenda will be posted on the AAUS website (www.aaus.org) on March 1, 2010.

Diving for Science - 2010 AAUS Symposium

The 29th AAUS scientific symposium will be held at the Ala Moana Hotel, March 25-27, in Waikiki, HI. All symposium meetings including the DSO meeting and business meeting will be held at the hotel. The banquet will be at the Waikiki Aquarium (http://www.waquarium.org). Call 808-955-4811 or visit http://www.alamoanahotelhonolulu.com/ for reservations.

2010 AAUS Draft Symposium Program

March 26th

0800-0810 - Opening Comments

0810-0830 - **Comparative analysis of Federal program polluted water protocols**

Sean A. Sheldrake, E. Rob Pedersen, P. Bruce Duncan, Alan Humphrey
USEPA, Region 10, Environmental Cleanup Office

0830-0850 - **Decontamination tests on the Viking drysuit**

E. Rob Pedersen, Stephanie A. Bailey, Stephanie I. Harris, Sean A. Sheldrake, P. Bruce Duncan
USEPA, Region 10, Environmental Cleanup Office

0850-0910 - **Environmental response team standard operating procedures for contaminated water diving operations**

Alan Humphrey, Scott C. Grossman, John D. McBurney
EPA, Environmental Response Team, Edison, NJ; LM SERAS, Edison, NJ

0910-0930 - **An improved new class of decompression models relevant to scientific and recreational diving**

Saul Goldman
Department of Chemistry, Guelph-Waterloo Physics Institute and Guelph-Waterloo Center for Graduate Work in Chemistry, University of Guelph, Guelph, Ontario, Canada

0930-0950 - **Integrating scientific diving and science education to develop the next generation of explorers**

Christopher S. Moses[1], Elizabeth F. Moses1, David Palandro[2], Libby Carnahan[3], Julia Galkiewicz4, Keith Kolasa[5], and Sennai Habtes[4]
[1] SCUBAnauts International, St. Petersburg, FL; [2] Florida Fish and Wildlife Research Institute, St. Petersburg, FL; [3] Florida Dept. of Environmental Protection, Terra Ceia, FL; [4] University of South Florida, College of Marine Science, St. Petersburg, FL; [5] Southwest Florida Water Management District, Brooksville, Fl

0950-1020 - Break

1020-1040 - **The nearshore benthic community of Kasatochi Island, one year after the 2008 volcanic eruption**

Stephen C. Jewett[1], James L. Bodkin[3], Héloïse Chenelot2, George G. Esslinger[3], and Max K. Hoberg[2]
[1] Institute of Marine Science, University of Alaska Fairbanks, Fairbanks, AK; [2] Institute of Marine Science, University of Alaska Fairbanks, Fairbanks, AK; [3] US Geological Survey, Anchorage, AK

1040-1100 - **Maritime archaeology in the Pacific Islands region: what works (and what doesn't)**

Hans Van Tilburg
NOAA Office of National Marine Sanctuaries

1100-1120 - **Scientific diver rebreather fatality: an incident review**

Kenneth D. Johns
University of North Carolina Wilmington, Wilmington, NC

1120-1140 - **NOAA Aquarius Reef Base: entering a new decade**

Karen M. Kohanowich[1], Thomas Potts[2]
[1] NOAA Office of Ocean Exploration and Research, NOAA Office of Ocean Exploration and Research, Silver Spring MD; [2] University of North Carolina, Wilmington, NC

1140-1200 - **Diving in the Columbia River: challenges and techniques**

Katie J. Rathmell, Michael P. Wilkin, Antonio M. Baptista
Center for Coastal Margin Observation and Prediction, OHSU, Beaverton OR

1200-1310 - Lunch

1310-1330 - **Baseline surveys of exploited reef-fish populations at Kamiali, Papua New Guinea: challenges and progress working in a remote, subsistence economy**

Ken Longenecker[1], Ross Langston[1], Richard Pyle[1], David Pence[2], Simon Talbot[3]
[1] Bishop Museum, Honolulu, HI; [2] University of Hawaii Diving Safety Program, Honolulu, HI; [3] University of Tasmania & Tasmanian Aquaculture and Fisheries Institute, Hobart, Tasmania Australia

1330-1350 - **Seaweed and oomycete benthic diversity in the Canadian marine Arctic: managing scientific diving**

operations in a remote location

Martin DJ Sayer[1], Frithjof C Küpper[2], Pieter van West[3], Hugh Brown[1], Elaine Azzopardi[1]

[1] UK National Facility for Scientific Diving, Scottish Association for Marine Science, Dunbeg, Oban, Argyll, Scotland UK; [2] Scottish Association for Marine Science, Dunbeg, Oban, Argyll, Scotland UK; [3] University of Aberdeen, College of Life Sciences and Medicine, Institute of Medical Sciences, Foresterhill, Aberdeen, Scotland UK

1350-1410 - **Using risk management principles to operate a safe scientific diving program**

Vallorie Hodges[1], Dennis Nixon[2]

[1] Oregon Coast Aquarium, Newport OR; [2] UNOLS University of Rhode Island

1410-1430 - **Ama divers in the 21st Century, Ise-Shima, Japan**

Robert H. Reavis, Reiko Y. Reavis

Glendale Community College, Glendale AZ

1430-1450 - **Managing scientific freediving**

Neal W. Pollock[1,2], Kirk Krack[3]

[1] Divers Alert Network, Durham, NC; [2] Center for Hyperbaric Medicine and Environmental Physiology, Durham, NC; [3] Performance Freediving, Fort Lauderdale, FL

1450-1520 - Break

1520-1540 - **Seasonal and diel movement patterns of the Hawaiian grouper, Epinephelus quernus, at remote Hawaiian atolls**

Jonathan J. Dale[1,2], Yannis P. Papastamatiou[1], Carl G. Meyer[1]

[1] Hawaii Institute of Marine Biology, University of Hawaii at Manoa, Coconut Island, Kaneohe, HI; [2] Department of Zoology, Edmonson Hall, University of Hawaii at Manoa, Honolulu, HI

1540-1600 - **The 'Choral Reef': a review of fish sounds and behavior**

Phillip S. Lobel

Biology Dept., Boston University, Boston, MA

1600-1620 - **New report of black coral species from the Northwestern Hawaiian Islands**

Daniel Wagner[1], Robert J. Toonen[1], Yannis P. Papastamatiou1, Randy K. Kosaki[2], Kelly A. Gleason[2], Gregory B. McFall[3], Raymond C. Boland[4]; Richard L. Pyle[5]

[1] Hawaii Institute of Marine Biology, Kaneohe, HI; [2] NOAA Papahānaumokuākea Marine National Monument, Honolulu, HI; [3] NOAA National Marine Sanctuary Program, Savannah, GA; [4] Pacific Islands Fisheries Science Center, National Marine Fisheries Service, Honolulu, HI; [5] Bernice P. Bishop Museum, Honolulu, HI

1620-1640 - **Lost and found in Papahānaumokuākea Marine National Monument: updates from the Monument's Maritime Heritage Program**

Kelly Gleason

Papahānaumokuākea Marine National Monument, Honolulu, HI

1640-1700 - **Southeast Alaska dive fisheries and stock assessment**

Jan Rumble

Alaska Department of Fish and Game

March 27th

0800-0805 - Opening Comments

0805-0835 - **History of diving medicine in Hawaii**

Richard Smerz

Honolulu, HI

0835-0905 - **Doctors under pressure, interesting cases from the University of Hawaii Hyperbaric Treatment Center**

Robert Sanders

Honolulu, HI

0905-0925 - **Predator exclusion experiments in the San Juan Islands, WA**

Kevin R. Turner

Friday Harbor Labs, University of Washington

0925-0945 - **A Whale of a project: the sinking, search and partial retrieval of a 60 ft fin whale in San Juan Channel, WA**

Pema Kitaeff, University of Washington

0945-1005 - **A biphasic technique employed during deep reef closed-circuit rebreather dives for combined benthic and pelagic sampling**

William E. Browne[1], Kevin Flanagan[2], David F. Pence[2]

[1] University of Miami, Coral Gables, FL; [2] University of Hawaii, Honolulu, HI

1005-1035 - Break

1035-1055 - **Coral disease and the scientific diver**

Thierry M. Work[1], Greta S. Aeby[2]

[1] US Geological Survey; [2] Hawaii Institute of Marine Biology

1055-1115 - **Courtship behavior, neuropeptide sensory modulation, and the role of sensory systems in behavioral sex change in the endemic Hawaiian labrid, *Thalassoma***

duperrey

Kasie Groom, Timothy Tricas
Hawaii Institute of Marine Biology

1115-1135 - **Smithsonian underwater research: the biodiversity that lurks beneath**

Michael A. Lang
Smithsonian Institution, Office of the Under Secretary for Science

1135-1155 - **Technical diving used for mesophotic coral ecosystem characterization in the Papahanaumokuakea Marine National Monument**

Randall Kosaki[1], Richard L. Pyle[2], Raymond Boland[3], Greg McFall[4], Kelly Gleason[5]
[1] NOAA Papahanaumokuakea Marine National Monument; [2] BP Bishop Museum; [3] NOAA Fisheries Pacific Island Fisheries Science Center; [4] NOAA Gray's Reef National Marine Sanctuary; [5] NOAA Papahanaumokuakea Marine National Monument

1155-1300 - Lunch

1300-1320 - **Rebreather detectives: case of the noisy fishes**

Timothy C. Tricas, Kelly S. Boyle
Department of Zoology and Hawaii Institute of Marine Biology, University of Hawaii at Manoa, 2538 The Mall, Honolulu, HI

1320-1340 - **Scuba diving needs of a natural resource management agency**

Anthony Montgomery
Hawaii Division of Aquatic Resources/ Department of Land and Natural Resources, Honolulu, HI

1340-1400 - **Behavior and functional morphology of pyramid butterflyfish sound production**

Kelly S. Boyle
Department of Zoology and Hawaii Institute of Marine Biology, University of Hawaii at Manoa, Honolulu, HI

1400-1420 - **Scientific diving procedures utilized by the Hawaii coral reef assessment and monitoring program (CRAMP)**

Paul L. Jokiel, Ku'ulei S. Rodgers
Hawaii Institute of Marine Biology, Kaneohe, HI

1420-1440 - **Genetic connectivity among reef fishes across the Hawaiian archipelago**

Tonatiuh Trejo-Cantwell[1], Jeff A. Eble[1], Brian W. Bowen[1], Robert J. Toonen[1], Randall K. Kosaki[2]
[1] University of Hawai`i, Hawai`i Institute of Marine Biology, Kane`ohe, HI;
[2] Papahanaumokuakea Marine National Monument, National Ocean Service, Honolulu, HI

1440-1510 - Break

1510-1530 - **Caverns, compressed air, and crustacean connectivity: insights into Hawaiian spiny lobster populations**

Matthew Iacchei, Robert J. Toonen
Hawai'i Institute of Marine Biology, Kane'ohe, Hawai'i

1530-1550 - **Where have all the larvae gone? Patterns of connectivity in the Hawaiian Archipelago**

Rob Toonen[1], Chris Bird[1], Jeff Eble[1,2], Anuschka Faucci[3], Greg Concepcion[1,2], Derek Skillings[1,2], Brian Bowen[1]
[1] Hawaii Institute of Marine Biology, University of Hawaii at Manoa, Honolulu, HI;
[2] Department of Zoology, University of Hawaii at Manoa, Honolulu, HI; [3] Department of Biology, University of Hawaii at Manoa, Honolulu, HI

1550-1610 - **Reefs under a microscope: micro-spatial genetic and thermal architecture of Hawaiian coral reefs**

Stephen A. Karl, Kelvin Gorospe, Valery Baranets
Hawaii Institute of Marine Biology, The University of Hawaii, Manoa, Kaneohe, HI

1610-1630 - **It's just a flesh wound: non-lethal invertebrate sampling for conservation genetics studies**

Derek J. Skillings, Christopher E. Bird, Robert J. Toonen
The Hawaii Institute of Marine Biology, Kaneohe, Hawaii

1630-1650 - **Methods for measuring long-term changes in biogenic rhodolith beds and detecting major disturbances events**

Diana L. Steller[1], Rafael Riosmena-Rodriguez[2], Paul Tompkins[1]
[1] Moss Landing Marine Laboratories; [2] Universidad Autónoma de Baja California Sur

1650-1700 - Closing Comments

DAN Diving Fatalities Workshop

Divers Alert Network will host a 2.5 day workshop, April 8-10, in Durham, NC focusing on strategies to reduce compressed gas diving fatalities. Presentations and panel discussions will be led by or include an array of experts and industry stake-holders in this globally-focused workshop. The goal is to develop consensus for effective strategies. Those who would benefit from participating include persons having responsibilities for training divers, supervising diving operations, conducting medical examinations of divers and diver candidates, and/or investigation of diving accidents. Registration is $395 per person ($435 for physicians who can earn 20 hours of continuing medical education credit). For more information, contact Jeanette Moore (jmoore@dan.org; 919-684-2948) or visit: https://www.diversalertnetwork.org/Events/Event.aspx?EventID=758.

JOB OPPORTUNITIES

DSO Position – Woods Hole Oceanographic Institute

Woods Hole Oceanographic Institute is seeking a Diving Safety Officer. The DSO is responsible for initiating and supervising the diving program and training divers. Major duties include: operational authority for the diving program, implementing policy as established by the Diving Control Board, reviewing the latest diving technology and procedures, and recommending budgets for the Diving Program and compiling an annual report of diving activities for the DCB. Applicants should have a degree in Marine Science or a related field and must possess a current Instructor's Certificate issued by a nationally recognized agency, have at least 4 years of varied diving experience plus 100 hours underwater using scuba and surface supplied equipment. Applicants must exhibit a thorough knowledge of diving theory, safety practices, operational procedures and diver training. Some sea duty may be required. For more information visit: http://www.whoi.edu/services/HR/jobdescp/administrative/dive_off.htm.

North-Central Coordinator - Reef Check CA

The Reef Check Foundation seeks a half-time North Central Baseline (NCB) Coordinator to organize the continuation and expansion of the Reef Check California (RCCA) Program's subtidal monitoring network in the Marine Life Protection Act North Central Coast Study Region (Pigeon Pt. to Pt. Arena, work primarily in Sonoma and Mendocino counties). The primary responsibility of the NCB Coordinator will be to ensure the completion of baseline subtidal monitoring of 17 sites associated with the recently sited marine protected areas along the north central coast. The NCB Coordinator will work closely with the RCCA Director and Regional Manager to ensure work is fully integrated into the statewide monitoring network and to help maximize trained volunteer involvement in the data collection. This is a half-time position (80 h/month) based out of a home office and includes Divers Alert Network accident and worker's compensation insurance. A stipend will also be provided to support the purchase of dive gear. The position is currently funded for two years at $20/hour. Weekend work and some regional travel required. Starting date will be approximately March 15, 2010.

Qualifications:

- AAUS certification (current certification preferred)
- Minimum of 75 dives with ≥25 in cold water (<65° F)
- BS degree in biology/related field with good command of California nearshore fishes, invertebrates and algae.
- Experience conducting, organizing, and overseeing scuba field work in California (preferably northern region)
- Experience with small boat handling
- Experience conducting underwater visual census surveys (PISCO/CRANE or RCCA methodology preferred)
- Experience with in-water/classroom instruction of divers

The candidate must be organized and capable of working independently. Successful candidates must have a strong work ethic coupled with a high level of self-motivation and enthusiasm. Applicants will need to have their own computer with reliable internet access. Special consideration will be given to applicants based in Sonoma or Mendocino counties.
Job duties include assisting in the training of volunteer divers, organizing and planning logistics for field excursions, regular correspondence with volunteers and research partners, data entry and basic summary analyses, building support from the diving community with dive shop visits and club talks, presentations at MLPA meetings, and writing articles for monthly newsletters. Applicants should submit a CV and cover letter via email by March 5, 2010 to Cyndi Dawson cdawson@reefcheck.org.

Diving Technician Position

The Academic Diving Program of the Florida State University Coastal and Marine Laboratory invites applications for the position of Diving Technician. The successful candidate will provide operational support for all diving-related academic and training courses, and will be responsible for the maintenance and repair of diving equipment. Visit: http://www.marinelab.fsu.edu/news/openings.aspx#diving or contact Alison Ma, Marine Technical Operations Coordinator and Diving Safety Officer (ama@fsu.edu; 850-697-2078).

NEW PUBLICATIONS

Barbosa E, García-Manso JM, Martín-González JM, Sarmiento S, Calderón FJ, Da Silva-Grigoletto ME. Effect of hyperbaric pressure during scuba diving on autonomic modulation of the cardiac response: application of the continuous wavelet transform to the analysis of heart rate variability. Mil Med. 2010;175(1):61-4.

This study sought to determine the effects of hyperbaric pressure on heart rate modulation, by analyzing potential changes in heart rate variability (HRV). Ten divers were exposed to pressures of 1, 2, 3, and 4 atmospheres absolute (ATA). The test was performed in a hyperbaric chamber. Heart rate (HR) was recorded in supine subjects for 10 minutes per atmosphere. HRV was analyzed in the frequency mode (fast-Fourier transform and continuous wavelet transform). Results confirmed bradycardia as pressure increased. The drop in HR attained statistical significance after 2, 3, and 4 ATA. Signal energy (normalized TP values) rose progressively, becoming significant at 2 ATA. High frequency and low frequency displayed similar behavior in both cases. Although frequency band peaks did not yield clear results, continuous wave transform analysis showed that the frequency spectrum tended to shift into the high-frequency range as pressure increased. In summary, increased pressure prompted increased bradycardia, and HRV shifted into high-frequency range.

Connor CW, Ferrigno M. Estimates of N_2 narcosis and O_2 toxicity during submarine escapes from 600 to 1,000 fsw. Undersea Hyperb Med. 2009;36(4):237-45.

The U.S. Navy recommends submarine escape for depths down to 600 fsw, with deeper escapes entailing the risks of decompression sickness, nitrogen (N_2) narcosis and CNS oxygen (O_2) toxicity. However, the escape equipment, including the submarine escape and immersion equipment and the escape trunk, could probably function even at 1,000 fsw. Here we report a theoretical analysis of the risks of both N_2 narcosis and CNS O_2 toxicity for different escape profiles from 600 to 1,000 fsw. The effect of N_2 narcosis, calculated as a function of N_2 pressure in the brain using Gas Man software, was expressed as equivalent narcosis depth (END), corresponding to the depth at which the same pressure of N_2 would be produced in the brain after five minutes of scuba diving with air. The risk of O_2-induced convulsions was estimated using the model developed by Arieli et al. Different dwell times (DTs) at maximal pressure in the escape trunk (from 0 to 60 s) and lungs-to-brain circulation times (10 to 30 s) were included in our analysis. When DT in the escape trunk is very short (e.g., 10 s), the risk of either incapacitating N_2 narcosis and/or O_2-induced convulsions occurring in the trunk is low, even during escapes from 1,000 fsw.

Coulange M, Rossi P, Gargne O, Gole Y, Bessereau J, Regnard J, Jammes Y, Barthélémy A, Auffray JP, Boussuges A. Pulmonary oedema in healthy scuba divers: new physiopathological pathways. Clin Physiol Funct Imaging. 2010 Feb 4. [Epub ahead of print]

Summary Introduction: The mechanism of immersion pulmonary oedema occurring in healthy divers is a matter of debate. Among consecutive injured divers admitted to our hyperbaric centre, we analysed prospective data about pulmonary oedema. Method: A total of 22 divers suffering from immersion pulmonary oedema without cardiac disease were included. The occurrence of events was compared to the diving conditions as assessed by diving-computer. Each patient underwent a clinical examination, laboratory tests, thoracic CT scan and echocardiography. Results: The median age was 49 years, with a higher proportion of women, in comparison with the data of the French diving federation. The common feature was the occurrence of respiratory symptoms during the ascent after median dive duration of 29 min with strenuous exercise and/or psychological stress. Most of the dives were deep (37 msw/121 fsw) in cool water (15°C/59°F). The average inspired oxygen partial pressure was 0.99 bar. Progression was rapidly favourable, and the medical check-up after clinical recovery was normal. Conclusion: Immersion, body cooling, hyperoxia, increased hydrostatic pressure and strenuous exercise likely combine to induce pulmonary oedema in patients without cardiac disease. This study underlines new physiopathological tracks related to the frequent occurrence of symptoms noticed in the last part of the ascent and a higher incidence in women.

Escaravage V, Herman PMJ, Merckx B, Wlodarska-Kowalczuk M, Amouroux JM, Degraer S, Gremare A, Heip CHR, Hummel H, Karakassis I, Labrune C, Willems W. Contribution to the Theme Section 'Large-scale studies of the European benthos' Distribution patterns of macrofaunal species diversity in subtidal soft sediments: biodiversity-productivity relationships from the MacroBen database. Mar Ecol Progr Ser. 2009;382:253-64.

We analyzed patterns of species diversity in a compiled data set covering the European coast (from Norway to Crete) that was made available in the framework of the MarBEF European Network of Excellence. The focus was on the distribution patterns of species diversity over large areas across Europe. The objectives of our analysis were two-fold. First, we attempted to separate the effects of species-area relationships from that of species accumulation. Second, we explored the relationship between species diversity and productivity, and compared this to the proposed explaining factors (depth, survey area and latitude). The following conclusions are drawn: 1) within a given habitat (subtidal soft sediment), the distribution of marine macrofaunal species richness in different areas between 3 and 200 m in average depth throughout Europe is shown to follow general rules derived from observations and experiments mostly based on terrestrial communities; 2) soft-bottom macrofauna accumulate in the subtidal environment (up to 200 m) following the Arrhenius plot model at a rate (similar to 0.5) corresponding to about a 3-fold increase in the number of species when the sampling area increases by 1 order of magnitude; 3) the distribution of the intrinsic species richness (point species richness) between the selected data sets (subtidal soft sediment) is significantly correlated with the levels of organic flux reaching the sea bottom; and 4) the close relationship between depth and the fraction of surface primary production that reaches the sea bottom is proposed as an explanation for the previously described increase of species richness with depth.

Flouris AD, Scott JM. Heart rate variability responses to a psychologically challenging scuba dive. J Sports Med Phys Fitness. 2009;49(4):382-6.

AIM: Given the controversy regarding cardiovascular responses and heart rate variability (HRV) in underwater conditions, the authors assessed the combined effect of psychological stress and scuba diving on cardiac autonomic modulation measured through HRV during and following a diving mission. METHODS: Ten healthy adults (three females; seven males; Body mass index [BMI] 23.7±2.1; age 26.4±2.9) performed a 20-minute dive in a neutral buoyancy water tank (27°C) at a depth of five meters. The dive scenario involved repairing components of a scientific instrument using a high fidelity task mock-up. Data for HRV (three from the time domain and three from the

frequency domain) were obtained for 20 minutes prior to (PRE), during (DIVE), and for 20 minutes following (POST) the dive sortie. RESULTS: Heart rate in DIVE was increased when compared to PRE and POST (74±10 vs. 108±16 vs. 72±8 beats.min^{-1}, respectively). The time domain measure pNN50 (37.3±16.9 vs. 14.1±10.1 vs. 22.0±12.2%, respectively), and the R-R interval (0.72±0.26 vs. 0.59±0.11, vs. 0.86±0.24, respectively) showed a significant decrease in DIVE compared to PRE and POST, while no changes were detected in the frequency domain indices between measurements. During POST, the square root of the mean of squared differences between successive intervals returned to PRE levels, but pNN50 values remained decreased at DIVE levels. CONCLUSIONS: These findings suggest a decrease in parasympathetic indices during a psychologically challenging scuba dive and a delay in vagal reactivation during the 20-minute period following the dive.

Jansen T, Mortensen CR, Tvede MF. It is possible to perform a double-blind hyperbaric session: a double-blinded randomized trial performed on healthy volunteers. Undersea Hyperb Med. 2009;36(5):347-51.

In hyperbaric medicine, blinded trials are remarkably few, making results susceptible to criticism. The scopes of the present study are to present a method for a double-blinded randomized clinical study and evaluate the validity of the method in a hyperbaric setting. Twenty-two healthy volunteers with no diving experience were included. The volunteers were randomized either to a "therapeutic pressure" group (15 msw, 253 kPa) or to a "placebo" group (2 msw, 120 kPa). The two profiles were made equal regarding noise, temperature and ventilation. The volunteers were asked whether they had been exposed to placebo or therapeutic pressure. They were asked to present their certainness of the answer on a visual analogue scale (VAS). Fisher's exact test calculates a probability of P = 0,328, which indicates that the volunteers have no valid opinion as to whether they were exposed to 15 msw or to 2 msw. It is found that it is possible to perform a blinded treatment on healthy volunteers with no prior diving experience.

Lavon H, Tal D, Kaminski-Graif G, Hershkovitz D, Shupak A. Vestibular evoked myogenic potentials and saccular plasticity in divers. Aviat Space Environ Med. 2010;81(2):103-6.

INTRODUCTION: Otolith function, which is dependent on linear velocity and acceleration, may be expected to change in underwater divers, who are submerged in a medium that is denser than air. The purpose of the present study was to examine possible changes in the sacculocollic reflex of professional divers and to investigate whether there might be diving-induced adaptation of the saccular response. METHODS: We used the vestibular evoked myogenic potential (VEMP) response to evaluate saccular function in 12 professional divers shortly after a dive and after an interval of at least 24 h. The control group consisted of 12 matched non-divers. Wave latencies and amplitudes, asymmetry ratio, and the response threshold were compared between the groups. RESULTS: Statistically significant shortening of N23-wave latency was found in the divers compared with the control group. The mean±SE were 22±0.1 and 22.1±0.7 ms early and late after a dive in the divers group vs. 24.5±0.5 ms in the control group. No significant differences were found in any of theVEMP parameters between the early and late post-dive recordings. DISCUSSION: We suggest that the reduction in N23 latency reflects long-term adaptation of the sacculocollic reflex to underwater conditions. Increased sensitivity of the reflex is required to compensate for the decrease in linear velocity and acceleration, resulting in reduced stimulation of the otolith organ.

Lynch JH, Bove AA. Diving medicine: a review of current evidence. J Am Board Fam Med. 2009; 22(4):399-407.

Recreational scuba diving is a growing sport worldwide, with an estimated 4 million sport divers in the United States alone. Because divers may seek medical care for a disorder acquired in a remote location, physicians everywhere should be familiar with the physiology, injury patterns, and treatment of injuries and illnesses unique to the underwater environment. Failure to properly recognize, diagnose, and appropriately treat some diving injuries can have catastrophic results. In addition, recreational dive certification organizations require physical examinations for medical clearance to dive. This article will review both common and potentially life-threatening conditions associated with diving and will review current evidence behind fitness to dive considerations for elderly divers and those with common medical conditions.

Miller RJ, Etter RJ. Shading facilitates sessile invertebrate dominance in the rocky subtidal Gulf of Maine. Ecol: 2008;89(2):452-62.

Dramatic shifts in community composition occur between vertical and horizontal rocky surfaces in subtidal environments worldwide, yet the forces mediating this transition are poorly understood. Vertical rock walls are often covered by lush, diverse communities of sessile suspension-feeding invertebrates, while adjacent horizontal substrates are dominated by algae, or corals in the tropics. Multiple factors, including light, sedimentation, water flow, and predation have been proposed to explain this pattern, but experimental tests of these hypotheses are lacking. We manipulated light level and predation to test whether variation in these mechanisms could be responsible for the shift in composition of sessile communities between vertical and horizontal surfaces in the rocky subtidal Gulf of Maine. Shaded horizontally oriented granite plots were dominated by invertebrates (e.g., ascidians, barnacles, bryozoans) after 25 months. Unshaded plots were dominated by macroalgae, which was virtually absent in shaded plots. Exclusion of

grazers with cages had no effect on percent cover of invertebrates or algae. Preferential settlement of invertebrate larvae to shaded plots, due to larval behaviors such as negative phototaxis, did not seem to play a role. Shading likely affects post-settlement mortality of invertebrates by alleviating competition for space with algae, although greater abundance of micropredators in algal-dominated communities could also be important. Communities on shaded plots lacked many taxa present on natural wall communities, likely due to greater disturbance on horizontal substrates and/or lack of sufficient time for colonization of these taxa. These results suggest that light plays a key role in controlling the structure, composition, and function of shallow subtidal communities.

Ong LM, Bennett MH, Thomas PS. Pulmonary dysanapsis and diving assessments. Undersea Hyperb Med. 2009;36(5):375-80.

Airway obstruction is a relative contraindication to diving. Dive candidates are assessed clinically, and lung function tests evaluate variables such as forced vital capacity (FVC), forced expiratory volume in one second (FEV_1) and the FEV_1/FVC ratio. A small number of individuals have a normal FEV_1, but a disproportionately large lung capacity, or pulmonary dysanapsis. These individuals have a decreased FEV_1/FVC ratio, suggesting airway obstruction, which may affect their dive medical assessments. Three cases of pulmonary dysanapsis presented for fitness-to-dive assessment. Case 1, a 29-year-old male had an FEV_1: 3.52 L (85% predicted), FVC: 5.31 L (108.5% predicted), giving a FEV1/FVC of 66%. Case 2, a 25-year-old male with an FEV_1: 4.55 L (95% predicted), FVC: 7.0 L (121% predicted) and a FEV_1/FVC of 66%. Albuterol produced an FEV_1 increase of 11%, but his hypertonic saline challenge was negative. Case 3, a 61-year-old man had an FEV_1: 3.49 L (126% predicted), FVC: 7.06 L (216% predicted), and a FEV_1/FVC of 49%. This report highlights pulmonary dysanapsis which may be confused with obstructive airway disease and applicants deemed unfit to dive. While pulmonary dysanapsis may increase the risk of airway hyperresponsiveness, there is no evidence of an association with diving-related pulmonary barotrauma.

Panneton WM, Gan Q, Juric R. The rat: a laboratory model for studies of the diving response. J Appl Physiol. 2010 Jan 21. [Epub ahead of print]

Underwater submersion in mammals induces an apnea, a parasympathetically-mediated bradycardia, and a sympathetically-mediated peripheral vasoconstriction. These effects are collectively termed the diving response, potentially the most powerful autonomic reflex known. Although these physiological responses are directed by neurons in the brain, the study of the neural control of the diving response has been hampered since: a) it is difficult to study the brains of animals while they are underwater, b) feral marine mammals are usually large and have brains of variable size, and c) there are but few references on the brains of naturally-diving species. Similar responses are elicited in anesthetized rodents after stimulating their nasal mucosa, but this nasopharyngeal reflex has not been compared directly to natural-diving behavior in the rat. In the present study, we compared the hemodynamic responses elicited in awake rats during volitional underwater submersion to those of rats swimming on the water's surface, to those of rats involuntarily submerged, and to those either anesthetized or decerebrate and stimulated nasally with ammonia vapors. We show that the hemodynamic changes to voluntary diving in the rat are similar to those of naturally diving marine mammals. We also show that the responses of voluntary diving rats: 1) are significantly different than those seen during swimming, 2) are generally similar to those elicited in trained rats involuntarily 'dunked' underwater, and, 3) are generally different than those seen from dunking naïve rats underwater. Nasal stimulation of anesthetized rats differed most from the hemodynamic variables of rats trained to dive voluntarily. We propose that the rat trained to dive underwater is an excellent laboratory model to study the neural control of the mammalian diving response, and also suggest that some investigations may be done with nasal stimulation of decerebrate preparations to decipher such control.

The mission of the American Academy of Underwater Sciences is to facilitate the development of safe and productive scientific divers through education, research, advocacy, and the advancement of standards for scientific diving practices, certifications, & operations.

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