



E-SLATE

American Academy of Underwater Sciences (AAUS)

EDITORIAL BOARD NOTE – November 2010

Welcome to the November issue of the E-Slate. This month's issue offers several new job opportunities and a special piece on NOAA's 2010 mission to Cordell Bank. AAUS congratulates Henry Fastenau, this year's recipient of the Conrad Limbaugh Memorial Award. Please continue to submit news, announcements, job postings, new publications and images of underwater work to aaus@disl.org. Current and past issues of the E-Slate are available at www.aaus.org.

NEWS/ANNOUNCEMENTS

2010 Conrad Limbaugh Memorial Award

The Conrad Limbaugh Memorial Award is presented annually to an individual who has made a significant contribution in diving safety and diving leadership on behalf of the scientific diving community. Conrad Limbaugh was an underwater naturalist and Chief Diving Officer for of Scripps Institution of Oceanography, where he directed the diving program. He was killed in a scuba diving accident in the Mediterranean on March 20, 1960. Limbaugh graduated from Whittier College in 1948 and did graduate work at the University of California at Los Angeles before going to Scripps Institution in 1950. He was largely responsible for developing the diver-training program at Scripps, as well as many research techniques used by marine scientists.

The 2010 American Academy of Underwater Sciences (AAUS) Recipient of the Conrad Limbaugh Memorial Award for Scientific Diving Leadership is **Mr. Henry Fastenau**.

Henry was first scuba certified in the mid-1960s and began scientific diving in 1972 at Cal Tech's Kerckoff Marine Lab where he was eventually responsible for diving/boating operations. An interesting side note is that Conrad Limbaugh also worked at the Kerckoff Marine Lab, and one of Connie's best friends was Dr. Wheeler North, who was Henry's mentor. In 1983 Henry moved to University California - Davis' Bodega Marine Lab. He became a scuba instructor in 1989 and UC Davis Diving Officer in 1993. As an instructor and DSO Henry is a strong advocate for comprehensive and rigorous scientific diver training and safety, balancing the needs of researchers in the field and facilitating their work. During his tenure as DSO, UC Davis became a leader in nitrox diving, being the first West Coast research facility with nitrox diving capabilities. Fastenau

staffed nitrox workshops for AAUS DSOs at Catalina Island and Monterey in the 1990s. UC Davis was also an early leader in rebreather use for scientific diving. Henry as served as a former AAUS Director and Chair of the AAUS Scholarship

Committee. Since retirement in June 2010, Henry remains an active scientific diver and instructor, including staffing a scuba instructor training course. He is also active as a founding member of the Diving Officers

of California (DOCAL) organization, and the Scientific Boating Safety Association (SBSA), Fastenau is the first and current President of SBSA, providing boat operator training and advice to research boating programs.



Doug Kesling, last years Conrad Limbaugh Memorial Award winner, presents Henry Fastenau with the 2010 award. *Photo: David McGuire – Sea Stewards Studios*

Mission to Cordell Bank

A technical diving team with representatives from NOAA's National Marine Sanctuaries and the NOAA Cooperative Institute for Ocean Exploration, Research and Technology (CIOERT) at the UNC-Wilmington/Florida Atlantic University/HBOI completed a series of deep dives in rigorous conditions on Cordell Bank in northern California. Working from the NOAA research vessel FULMAR, the team completed six dives at five different locations on Cordell Bank. Depths ranged from 120-190 ft and bottom currents were estimated at one to two knots. Dive operations included open-circuit scuba using mixed gases and decompression was completed on drift lines in the open ocean 25 miles from shore. Divers returned to the boat astonished at the pristine nature and spectacular diversity represented on the upper reef areas of Cordell Bank. The team was able to accomplish all the science objectives identified in the cruise plan. These included relocating and sampling high reef areas for the first time in 30 years. These areas were originally sampled by an intrepid team of underwater explorers in the late 1970s and early 1980s. Members of the original Cordell Expeditions dive team were on board and participated in the 2010 mission as advisors. The 2010 team successfully collected benthic invertebrate samples from all locations that were preserved and catalogued by staff from the California Academy of

Sciences. The samples will be housed in the Academy collections after identification by taxonomists. Multiple quadrats were photographed at each dive site to document species composition that will allow sanctuary staff to evaluate changes that have occurred since the original surveys 30 years ago. In addition, the photo-quadrats will provide information that can be used to establish species composition and reef conditions in 2010. These data will allow the sanctuary to analyze changes in the future that may be associated with climate change, in particular ocean acidification. High definition video and digital still images will also be used to promote ocean stewardship and inform public audiences that sanctuaries are world class ocean treasures. The bottom team consisted of divers from the sanctuaries Maritime Heritage Program, Thunder Bay, Monitor, Gray's Reef, and Channel Islands National Marine Sanctuaries. Divers and dive operations support was provided by CIOERT based out of the University of North Carolina – Wilmington. Project support and infrastructure was provided by the University of California at Davis, Bodega Marine Laboratory as well as the in-water science support divers for the bottom team. For complete information on the expedition visit: <http://sanctuaries.noaa.gov/missions/2010reefcrest/welcome.html> As well as the CBNMS Facebook Page <http://tiny.cc/l2okb>. For more information contact: dan.howard@noaa.gov.



NOAA Expedition diver Russ Green explores the deep reef on Cordell Bank (Photo: Joe Hoyt/CBNMS/NOAA)

a successful and productive scientific diving program for the University of California at Davis.

AAUS Past President Retires

East Carolina University Director of Diving & Water Safety and AAUS Past President Steve Sellers is retiring from the University after 21 years of service. Steve will not be hanging up his regulator just yet, however, as he will become DSO for the National Park Service. He is scheduled to assume his new duty station based out of the Submerged Resources Center in Lakewood, CO in December 2010.

Call for Papers – Maritime Archaeology

The 22nd Annual Symposium on Maritime Archaeology and History of Hawaii and the Pacific will be held Feb 18-21, 2011 in Hilo, HI. The symposium theme is "Reading Coastal Footprints: Ecology and Maritime Archaeology in the Pacific." Papers pertaining to the following topics are preferred: applications of ecological models to archaeology, recent maritime archaeology fieldwork and general topics in maritime archaeology and maritime history. Submit abstracts (max 300 words), with title, and presenter name(s) affiliation(s). Deadline: Nov 01, 2010. Two scholarships are available for students to attend the conference. Visit: <http://www.mahhi.org>.

FUNDING OPPORTUNITIES

Women Divers Hall of Fame Scholarship

WDHOF is offering four scholarships and nine training grants in 2010. Awards are available to women and men of all ages who wish to pursue higher education and training, further their career goals and find opportunities in aquatic and diving-related industries. November 15 deadline. Visit: <http://www.wdhof.org/scholarships/scholarships.shtml>.

EQUIPMENT RECALLS

EDGE BCD Recall

In cooperation with the US Consumer Product Safety Commission, EDGE Gear is issuing a voluntary recall on all EDGE FREEDOM buoyancy compensator devices (BCDs), some EDGE STEALTH 2 BCDs (units with red weight release handles for weight pockets are not involved), HOG 32lb single tank wings identified as 'Made in China' and all EDGE 32, 38 and 58 lb wings. An EDGE Freedom BCD was returned to a dealer with a complaint of a broken spring in the over-pressurization valve (OPV). This is the first report of this issue brought to the attention of EDGE Dive gear and no injuries have been reported. Upon inspection of the unit involved and other used EDGE and HOG products utilizing the same OPV design it has been determined that the springs in the OPV exhibit an unacceptable amount of

While staying at the Bodega Marine Laboratory, the Cordell Expedition team held an evening session with a field class led by Dr. James Carlton from Williams College-Mystic Seaport, Mystic, CT. Ironically, Dr. Carlton had participated in the LT meeting the week before on the east coast. Members of the expedition summarized their jobs and briefly explained their career path. Sixteen students from 14 colleges were enrolled in the field class. A question and answer period ensued. At an evening function attended by Cordell Expedition participants, Doug Kesling from the University of North Carolina-Wilmington's Cooperative Institute for Ocean Exploration, Research and Technology presented Henry Fastenau with the 2010 American Academy of Underwater Sciences (AAUS) Conrad Limbaugh Award for Scientific Diving Leadership. Henry retired this year after 27 years as the diving officer at the Bodega Marine Laboratory. The award recognized Henry's contribution to scientific diving over the years and building

corrosion. Immediately cease use of the identified products and return the product to an authorized Edge dealer or Edge for spring OPV replacement. For more information, please contact EDGE (404-579-7631) or recall@edge-gear.com.

Recall Mares Nemo Air Quick Connector

Mares has discovered a quality issue involving the O-ring assembly of the Nemo Air Quick Connector. Under certain circumstances, the O-ring can fail and cause a slow leak of breathing gas through the Quick Connector, which could require a diver to surface quickly and face possible risk of injury or running out of air. The O-rings in some units may have been replaced in an earlier service campaign, but this recall requires replacing the entire metal quick connector female fitting at the end of the high pressure air hose that holds the O-ring (new Mares part no. 44200829). Replacement connector assemblies have a groove machined around the middle of the fitting, but recalled units do not. All consumers should stop using any Nemo Air Dive Computer and all retailers should remove these units from distribution until they have been inspected by an authorized Mares Dealer/Service Center.

Affected product codes are:

- 414158 Dive Computer Nemo Air
- 414159 Dive Computer Nemo Air w/Compass
- 44200771 HP hose w/ Nemo Air Quick Connector
- 44200770 Quick Connector Assy. Female Nemo Air

Please contact an Authorized Mares Dealer/Service Center to schedule the removal and substitution of your Nemo Air computer Quick Connector Assembly Female with the new Nemo Air computer Quick Connector Assembly Female. If you want Mares to perform the above service procedures, please contact the customer service department (1-800-874-3236) for a return authorization number. For more information visit: www.mares.com.

SITECH Inflation Hose Recall

SITECH low-pressure hoses contain a flow-restricting insert that may malfunction, potentially causing an obstruction of air flow. Anyone with a hose subject to this recall (or other equipment that has been connected to such a hose) should stop use until the insert has been exchanged by knowledgeable service personnel. Recalled inflator hoses should be sent back to the Mares Dealer or Mares US Service Center so the insert can be removed at no charge.

The SITECH recall affects the following Mares products:

- 412012 Drysuit Polarfit TLM
- 412014 Drysuit Dryfit 3.5 LX UNI
- 412015 Drysuit Dryfit 3.5 NP UNI
- 412016 Drysuit Icefit 4.0 Latex Men
- 412017 Drysuit Icefit 4.0 Latex Women
- 412018 Drysuit Icefit 4.0 Neoprene Men
- 412019 Drysuit Icefit 4.0 Neoprene Women
- 412010 Drysuit Dryfit 3.5
- 412011 Drysuit Icefit 4.0

- 480094 Drysuit 3.5 LX Man W/Radial Boots
- 480095 Drysuit 3.5 LX Lady W/Radial Boots
- 480096 Icefit 4.0 LX Man
- 480097 Icefit 4.0 LX Lady
- 480098 Polarfit TLM LX Man
- 42150060 Hose W/Wing Puller

Visit: http://www.sitech.se/pages/default_uk.asp?SectionID=3562.

Recall of Halcyon Buoyancy Compensators

Halcyon Manufacturing Inc. in cooperation with the US Consumer Product Safety Commission has initiated a voluntary recall of select Eclipse, Evolve, Explorer, Pioneer and CCR35 buoyancy compensators (BCDs) manufactured between January 2006 and September 2008. In addition, select Halcyon inflatable devices (Lift Bags, SMBs, DAMs, Surf Shuttles and Diver Lift rafts) may also be affected. These BCDs or Inflatable Devices could develop excessive corrosion or rusting problems with the stainless steel over-pressure valve (OPV) spring, causing the spring to fail and the BCD or inflatable device to leak through the OPV. It is unlikely that most of these units will experience any problems since the potential defect is limited to a very small portion of the total number of OPV springs used during this time period. However, given the potentially serious implications all OPV springs should be checked to minimize risk or inconvenience to Halcyon customers. For more information visit: www.halcyon.net/opv-recall.

UPCOMING EVENTS

DEMA 2010

The Diving Equipment and Marketing Association will hold its annual show in Las Vegas, NV November 17-20. For more information, visit: www.demashow.com.

50th Anniversary: Pennekamp State Park

The Coral Restoration Foundation (CRF) is hosting a celebration of the John Pennekamp Coral Reef State Park's 50th Anniversary in Key Largo, Florida. It includes a one-day volunteer program on December 6th hosted by the Amoray Dive Resort. This program features a morning lecture and two afternoon dives (one to the CRF nursery and one to a reef restoration site). CRF will also participate in the Educational Fair and Environmental Expo on December 11 at Pennekamp Park. For more information about these events and others celebrating the anniversary visit: <http://www.fla-keys.com/pennekamp50/>.

Dive Rescue International

DRI offers several training programs in aquatic emergency preparedness for public safety professionals. Courses include: Animal Rescue in Floods, Dive Rescue I, Evidence Recovery Operations, Interspiro Technician, Light Salvage and Recovery, Marine Sonic Sonar, Public Safety Diver

Survival, Underwater Crime Scene Tech I, Visual Cylinder Inspection, and Water Operations Officer Development. Courses are taught at various US locations. Visit: http://www.diverescueintl.com/training_calendar.aspx.

JOB OPPORTUNITIES

Academic Diving Program Coordinator - FSU

The Florida State University Coastal and Marine Laboratory (FSUCML) invites applications for the position of Coordinator of the Academic Diving Program (ADP), a non-tenure track faculty line. The FSUCML is committed to building a research program focused on coastal and marine issues of ecological importance. They seek a highly motivated individual with strong leadership skills who can build the underwater research capabilities of the ADP while serving as the University Diving Officer. They are particularly interested in someone who can strengthen the technical support for underwater research conducted by the faculty. The successful candidate will be responsible for the conduct, training, and operational aspects of all diving-related research, for supervising the technical and instructional staff of the ADP; for coordinating teaching of diving related courses ranging from Introductory Compressed Diving to Science Diver Training, based on national certification standards, and provide support to faculty teaching other underwater courses. This person will also ensure compliance with dive safety regulations and dive planning guidelines following AAUS standards and applicable state and federal statutes, review Standard Operation Procedures; develop recommendations for all new or unique activities for review and consideration by the Diving Control Board; prepare reports of program activities; and develop budget projections to assure cost effectiveness of the program. For more information visit: <http://www.marinelab.fsu.edu/news/openings.html>. To apply visit: <https://jobs.fsu.edu>. Review of applicants will begin October 30 and will continue until a successful candidate is identified. Effective date of employment: as soon as possible.

Researcher, Madagascar Marine Research Project

Frontier/ The Society for Environmental Exploration is an experienced researcher with a proven ability to direct field research and write up results for the Madagascar Marine research program. Frontier was established in 1989 as a non-profit conservation and development non-governmental organization (NGO) dedicated to safeguarding biodiversity and ecosystem integrity and building sustainable livelihoods for marginalized communities in the world's poorest countries. Originally focused largely on scientific and conservation research, Frontier's mandate soon evolved into one that combined community development, capacity building, ecosystem protection, economic growth, and the

development of civil society. The successful candidate will have a MS or a PhD in a relevant discipline, publications, and a significant amount of underwater marine survey techniques, biodiversity or conservation research experience, ideally in a tropical setting. The role will include developing and implementing the research program, involving the daily supervision of volunteer research assistants, data collection and analysis, and report-writing. For a full job profile please visit our website www.frontier.ac.uk. Forward a CV, cover letter and copy of the Research Officer application form (<http://www.frontier.ac.uk/Assets/JOBS/RO-Application-Form.doc>) to staff@frontier.ac.uk.

Sea Otter Aquarist II, Monterey Bay Aquarium

The Sea Otter Aquarist II is responsible for performing all aspects of sea otter husbandry duties without direct supervision. Husbandry activities include: daily care of sea otters, preparing and dispensing food, employing operant conditioning techniques for husbandry purposes, comprehensive record keeping, providing veterinary care (under the supervision of a licensed veterinarian) and moving animals to holding areas. Other duties include cleaning and maintenance of otter exhibit areas, which includes 1-2 scuba dives per week and assisting with plant and invertebrate collections. In addition, the employee will be required to interact with visitors. The Sea Otter Aquarist II holds responsibilities and skills of the Sea Otter Aquarist and also has the knowledge and ability to act as a resource and sometimes supervise Sea Otter Aquarists, Assistant Sea Otter Aquarists and volunteers. Visit: <https://montereybayaquarium.snaphire.com/jobseeker/safelink=JSSAJOBS&>.

Dive Officer, Monterey Bay Aquarium

The Monterey Bay Aquarium (MBA) is seeking a Dive Officer/Volunteer Diver supervisor. The Dive Officer oversees the aquarium's volunteer dive program and diving safety programs. The Dive Officer is responsible for developing and enforcing policies and procedures to ensure the safety of volunteer and staff divers. He/She supervises the volunteer diver program including selection, development, training and scheduling. The Dive Officer assists in overall dive program management and supervises daily dive operations. The ideal candidate will hold the following nationally recognized certifications: open water scuba instructor, Reef Check California instructor, scuba equipment repair technician for equipment approved for use at MBA, DAN oxygen administration instructor, CPR/First aid/AED instructor, and divers with disabilities instructor. Preferred experience includes undergraduate college degree, scientific diving instruction, small boat handling skills, and a minimum of two years experience working as a Dive Safety Officer at a public aquarium or similar environment, supervising and coordinating skills, excellent oral and written communication skills, including a working knowledge of computer processing, database programming

and operations. Candidates must have a valid driver's license, an insurable driving record and be able to pass a scientific diving physical examination. Apply online: <https://montereybayaquarium.snaphire.com>.

Full Time Research Associate with SCCF

The Marine Laboratory of the Sanibel-Captiva Conservation Foundation in Sanibel, FL has an immediate opening for a full time research associate to conduct fieldwork relating to intertidal oyster habitats and water quality. Candidates must have a background in marine or estuary ecology and experience working with both invertebrates and vertebrates. A MS in environmental, marine or ecological sciences and scientific diving experience is preferred. Visit: <http://www.sccf.org/content/120/Employment-Opportunities.aspx>

Maintenance Diver, Part-Time Georgia Aquarium

The Georgia Aquarium is seeking a part-time maintenance diver to work in their Atlanta, GA facility. Major duties are split into two categories: commercial and scientific diving work. Commercial duties include daily aquarium husbandry, inspection and preventative maintenance of aquarium exhibits and equipment ordering and inventory. Scientific duties include participation in and assistance with advanced dive personnel training, monitoring of aquarium species and sample collection, and implementation of dive safety measures. The diver may also serve as a liaison between the Georgia Aquarium and guests, media and the general public. Candidates must hold an Advanced Open Water (or higher) diving certification and have a minimum of two years experience in aquarium or scientific diving. Additional requirements relate to first aid certifications, equipment service/technician certifications and proficiency in Microsoft Office Products. For more information visit: <http://partners.georgiaaquarium.org/all/Lists/Join%20Our%20Team/DispForm.aspx?ID=71>.

Maritime Archaeology Assistants

Academic and fieldwork assistant position open for current or potential East Carolina University students. Candidates will be responsible for compiling maps and literature, planning lessons, conducting public education programs and preparing fieldwork experiments for ongoing projects in Africa and South Carolina. Interested students must qualify for Federal Work Study positions. Visit: <https://ecu.peopleadmin.com/applicants/jsp/shared/frameset/frameset.jsp?time=1279291470872>.

MS/PhD students: Caribbean Coral Reef Ecology

The Pawlik lab will be recruiting one or two new MS/PhD students for Spring or Fall 2011 to study the ecology of Caribbean coral reefs at University of North Carolina Wilmington (UNCW). The research program, funded by NSF and NOAA, includes research components in the Bahamas, southern Caribbean, and the Florida Keys, and has included missions in NOAA's Aquarius habitat. Visit: <http://people.uncw.edu/pawlikj/index.html>.

Applicants should be highly motivated and independent, with an excellent academic record, references, and past field research experiences using scuba. More information about the UNCW graduate program and about expectations of graduate students in the Pawlik lab can be found at: <http://people.uncw.edu/pawlikj/prosStudent.html>.

NEW PUBLICATIONS

Colton AM, Swearer SE. A comparison of two survey methods: differences between underwater visual census and baited remote underwater video. *Mar Ecol Prog Ser.* 2010; 400:19-36.

Essential to any model, conservation or management plan are measures of the distribution and abundance of a species. Countless methods for estimating these parameters exist, making it essential to assess the limitations and biases associated with a particular sampling protocol. Here, we compare between two methods commonly used to survey nearshore fish assemblages. Although most commonly employed, underwater visual census (UVC) may yield biased estimates of abundance depending on the strength of a fish's behavioural response (i.e., avoidance, attraction) to the presence of divers. Baited remote underwater video (BRUV) techniques have shown promise in overcoming some of the limitations of UVC, but are unable to provide an absolute measure of density in turbulent environments. We compare the abilities of these two methods to survey the nearshore rocky reef ichthyofauna of Southeast Australia. We found that relative to BRUV, UVC recorded more individuals (in terms of all species, herbivores, cryptic species, and most territorial species), higher richness at both the species and family level, and higher biodiversity as measured using the Shannon Index. These findings remain even when the data were adjusted for differences in sampling effort. In contrast, BRUV recorded proportionally more mobile predators, and a more taxonomically distinct population, though only when taxonomic evenness was not taken into account. Twenty species were unique to UVC and 17 species unique to BRUV. Considering this, studies aimed at cataloguing diversity should apply multiple methods. However, when logistical or financial constraints limit biodiversity studies to only one method, UVC will likely provide a more complete estimate of temperate reef fish diversity than BRUV.

Godoy N, Gelcich LS, Vásquez JA, Castilla JC. Spearfishing to depletion: evidence from temperate reef fishes in Chile. *Ecol Appl.* 2010; 20(6):1504-11.

Unreliable and data-poor marine fishery landings can lead to a lack of regulatory action in fisheries management. Here we use official Chilean landing reports and non-conventional indicators, such as fishers' perceptions and

spearfishing competition results, to provide evidence of reef fishes depletions caused by unregulated spearfishing. Results show that the three largest and most emblematic reef fishes targeted mainly by spearfishers (>98% of landings) [*Graus nigra* (vieja negra), *Semicossyphus darwini* (sheephead or pejeperro), and *Medialuna ancietae* (acha)] show signs of depletion in terms of abundance and size and that overall the catches of reef fishes have shifted from large carnivore species toward smaller-sized omnivore and herbivore species. Information from two snorkeling speargun world championships (1971 and 2004, Iquique, Chile) and from fishers' perceptions shows the mean size of reef fish to be declining. Although the ecological consequences of reef fish depletion are not fully understood in Chile, evidence of spearfishing depleting temperate reef fishes must be explicitly included in policy debates. This would involve bans or strong restrictions on the use of scuba and hookah diving gear for spearfishing, and minimum size limits. It may also involve academic and policy discussions regarding conservation and fisheries management synergies within networks of no-take and territorial user-rights fisheries areas, as a strategy for the sustainable management of temperate and tropical reef fisheries.

Kenney IJ, Sonksen C. Dysbaric osteonecrosis in recreational divers: a study using magnetic resonance imaging. Undersea Hyperb Med. 2010; 37(5):281-8.

OBJECTIVE: We set out to identify whether magnetic resonance imaging (MRI) would identify evidence of dysbaric osteonecrosis (DON) in a group of experienced recreational scuba divers. **DESIGN:** Local British Sub Aqua Club divers of at least Trainee Dive Leader grade were offered MRI scans (T1 and TIRM sequences) of hips, femora and shoulders. Anonymous images were interpreted separately by two radiologists, and cases not considered unequivocally normal were discussed for consensus opinion. **RESULTS:** Of 26 divers imaged, five merited discussion. Four of these were considered to show unrelated normal variants or incidental findings. Only one case (abnormalities in the right humerus and left femur) could have possibly represented osteonecrotic lesions. After obtaining plain radiographs and more detailed clinical and dive history, these lesions were considered "indeterminate" but probably not DON by both reviewers and after taking further specialist musculoskeletal MRI opinion. **CONCLUSION:** This study found no evidence that DON is a significant risk in recreational scuba diving and as such concurs with prevailing current opinion.

Lesser MP, Slattery M, Stat M, Ojimi M, Gates RD, Grottoli A. Photoacclimatization by the coral *Montastraea cavernosa* in the mesophotic zone: light, food, and genetics. Ecol. 2010; 91:990–1003.

Most studies on coral reefs have focused on shallow reef (<30 m) systems due to the technical limitations of conducting scientific diving deeper than 30 m. Compared to their shallow-water counterparts, these mesophotic coral reefs (30–150 m) are understudied, which has slowed our broader understanding of the biodiversity, ecology, and connectivity of shallow and deep coral reef communities. We know that the light environment is an important component of the productivity, physiology, and ecology of corals, and it restricts the distribution of most species of coral to depths of 60 m or less. In the Bahamas, the coral *Montastraea cavernosa* has a wide depth distribution, and it is one of the most numerous corals at mesophotic depths. Using a range of optical, physiological, and biochemical approaches, the relative dependence on autotrophy vs. heterotrophy was assessed for this coral from 3 to 91 m. These measurements show that the quantum yield of PSII fluorescence increases significantly with depth for *M. cavernosa* while gross primary productivity decreases with depth. Both morphological and physiological photoacclimatization occurs to a depth of 91 m, and stable isotope data of the host tissues, symbionts, and skeleton reveal a marked decrease in productivity and a sharp transition to heterotrophy between 45 and 61 m. Below these depths, significant changes in the genetic composition of the zooxanthellae community, including genotypes not previously observed, occur and suggest that there is strong selection for zooxanthellae that are suited for survival in the light-limited environment where mesophotic *M. cavernosa* are occurring.

Moen G, Specht K, Taxt T, Sundal E, Grønning M, Thorsen E, Troland K, Irgens A, Gruner R. Cerebral diffusion and perfusion deficits in North Sea divers. Acta Radiol. 2010 Sep 19. [Epub ahead of print].

Background: Diving is associated with a risk of cerebral decompression illness, and the prevalence of neurological symptoms is higher in divers compared with control groups. Microvascular dysfunction due to gas microembolism and exposure to hyperoxia are possible mechanisms, which may result in cerebral diffusion and perfusion deficits. **Purpose:** To investigate if possible functional derangements of the microvasculature and microstructure would be more prevalent among symptomatic divers. **Material and Methods:** Magnetic resonance imaging (MRI) was performed in 91 former divers and 45 controls. Individual parametric images of apparent diffusion coefficient (ADC), cerebral blood flow (CBF), cerebral blood volume (CBV), and mean transit time (MTT) were generated on the basis of diffusion- and perfusion-weighted imaging. To identify regions with statistically significant differences between groups ($p < 0.05$, corrected for false discovery rate), voxel-wise ANCOVA analysis was performed for each of the four parametric images. **Results:** Significant regional group differences were found in all four parametric

comparisons. Gross regional ADC differences were seen throughout the brain, including large frontal and temporal white-matter regions, the hippocampus, and parts of the cerebellum. Differences in the perfusion maps were localized in fewer and smaller clusters, including parts of the cerebellum, the putamen, and the anterior watershed regions. Conclusion: Regional functional abnormalities as measured by diffusion- and perfusion-weighted imaging were identified in the divers, and there was a partial co-localization of the regions identified in the perfusion and the diffusion images. The findings may explain some of the long-term clinical symptoms reported among professional divers.

Sieber A, L'Abbate A, Kuch B, Wagner M, Benassi A, Passera M, Bedini R. Advanced instrumentation for research in diving and hyperbaric medicine. Undersea Hyperb Med. 2010; 37(5):259-69.

Improving the safety of diving and increasing knowledge about the adaptation of the human body to underwater and hyperbaric environment require specifically developed underwater instrumentation for physiological measurements. In fact, none of the routine clinical devices for health control is suitable for in-water and/or under-pressure operation. The present paper addresses novel technological acquisitions and the development of three dedicated devices: * an underwater data logger for recording O₂ saturation (reflective pulseoximetry), two-channel ECG, depth and temperature; * an underwater blood pressure meter based on the oscillometric method; and * an underwater echography system. Moreover, examples of recordings are presented and discussed.

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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