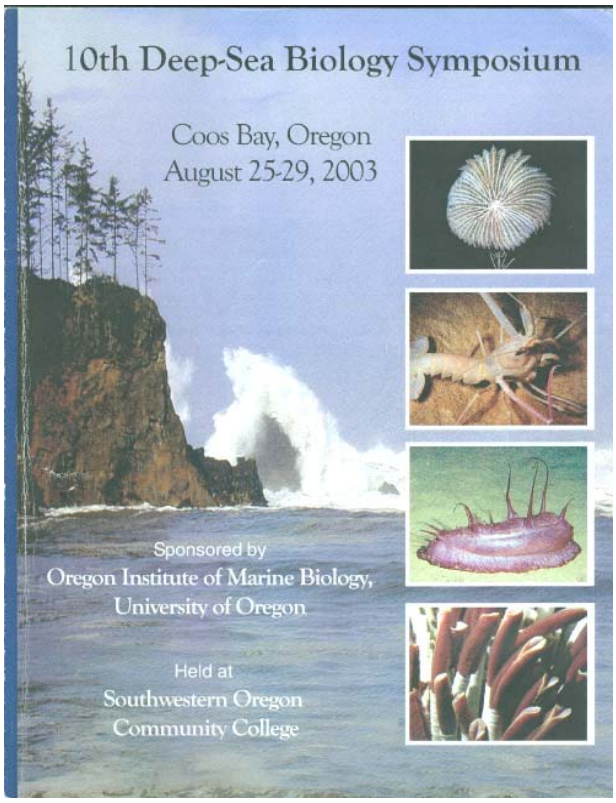
No. 33, February 2004

TENTH DEEP-SEA BIOLOGY SYMPOSIUM
COOS BAY, OREGON COAST, U.S.A. – AUGUST 25–29, 2003

Account of the Meeting



The 10th Deep-Sea Biology Symposium came and went. It came thanks to the enlightened and spirited preparatory work of Craig Young, other members of the organising committee and Craig's team at the Oregon Institute of Marine Biology (University of Oregon, not the State University of Oregon). That it went so well is thanks to thoughtful and comprehensive organisation of Craig and the local team, especially Sandra Brooke; the vigorous participation of about 180 participants; the efforts of session chairpersons; and the rugged beauty of Oregon. In particular the beautifully produced Program and Activity Schedule will provide a lasting memento and invaluable source of information to us for some time, as well as a useful address book. Craig, Thank you from all of us!

Everyone seemed to enjoy themselves and opportunities for interaction, not only the desirable cerebral variety but also the less demanding but every bit as enjoyable socialising and partying. Such latter opportunities were well sufficient to the task and sometimes memorable, and not just to the younger element. Talking of which Craig Smith finally got his shirt back … after we heard first-hand of his thrusting experiences in the Reeperbahn (Hamburg, Germany).

The event was held at Southwestern Oregon Community College, a few miles from the Marine Biology Institute. The Community College offered splendid auditorium facilities and excellent, and reasonably priced, accommodations for most of us, while others stayed off-site at the

numerous other Hotel and Motel options. The catering and general ambience at the College was excellent and achieved a new benchmark for future Deep-Sea Symposia.

Five days of intensive listening to the no less than 106 presentations left us happily tired, particularly those who had previously travelled down coast from Newport after the two-and-a-half day Census of Marine Life Workshops on Seamounts and in Submarine Canyons and Sediments, held there at the Oregon State University's Hatfield Marine Science Center. But there is no doubt that the DSBS experience was well worthwhile, even uplifting. The general agreement seemed to be that despite the short time available for each (15 minutes including questions), this was better than having parallel sessions (future organisers note!). I cannot remember a single serious hitch in the audio visuals despite the serious technology required to switch between Microsoft, Mac and overhead projector slides. Session chairpersons usually were strict on time keeping and this kept the program rolling well. Question time could, however, be limiting, and many upstretched hands, no doubt precursors of biting queries, did not meet their targets. It was noticeable, however, that the "old guard" provided most of the questioning, despite the "young-uns" being gratifiably present in force, but not all in questioning mode. If this strikes a chord with the reader then please adapt in time for next time in 3 years at Southampton! You will be older then anyway, and some of the "old-uns", if still around, will welcome hearing some fresh thinking!

In addition, there was a great variety of well presented posters, 75 in all, and sufficient time allowed for discussion of them one day.

So what were the big ideas that came from the Symposium?

Michael Rex. (Photo Buz Wilson)

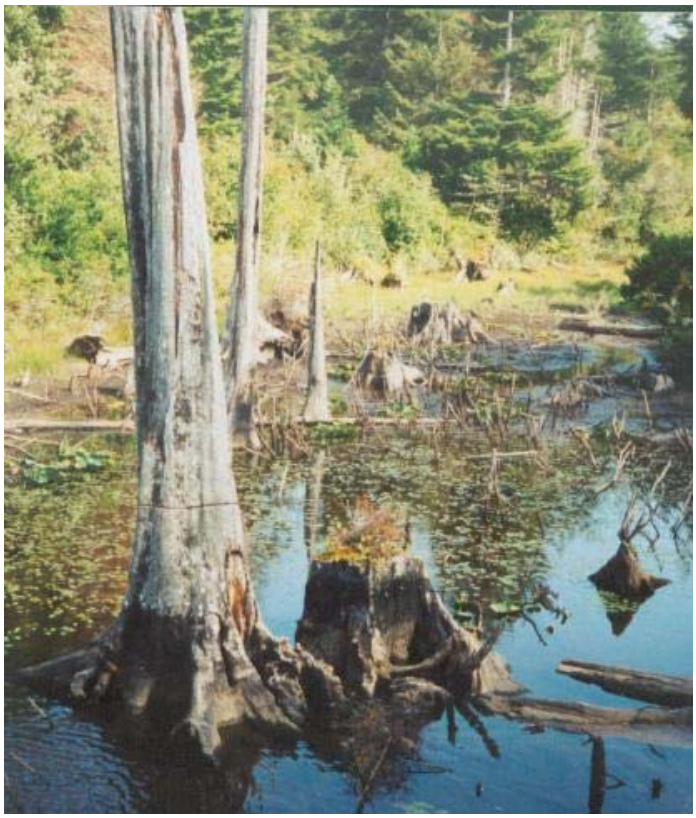
I think Mike Rex's translation of source-sink dynamics to the origin and maintenance of gastropod biodiversity in the abyssal deep sea must come near the top. I foresee a frenzy of hypothesis testing in coming years in order to test this idea with other taxa; not least because of its importance to pressing conservation issues now looming.

A few years ago few of us would have taken such threats to our patch of the natural environment seriously. But times and economic pressures have changed, and large areas of the continental margin and even areas of the abyss are experiencing what has been going on in coastal waters and on the continental shelf for a long time, some would argue for centuries. Fishing – and overfishing – and exploitation of non-living resources such as oil and gas sometimes at staggering depths (I think 2,400 m is the current record off Brazil), as well as serious consideration of using the deep ocean for ridding ourselves of excess atmospheric carbon dioxide, need expert assessment. This should always be based on the best possible science. We are increasingly being asked to provide this to decision makers, sometimes via NGOs. But it is important that *our* voice is heard, and that it is based on the best possible science; and, if it is only opinion, that appropriate levels of uncertainty are given.

Hopefully expressing the mind set of the symposium, Hjalmar Thiel, together with a small group of colleagues, drafted a Statement of Concern on risks to deep-seabed habitat and organisms posed by unregulated exploitation, especially deep-sea trawling, to be sent to the United Nations. Gratifyingly a majority of participants signed. Perhaps not all of us were entirely happy with details, such as the scientists themselves as stakeholders seeking to conserve patches of seabed for science, as well as our duty to provide information. And it was a pity that time for discussion of such issues in order to reach a consensus, although provided, was rather limited. The Statement calls for a moratorium on deep-sea bottom trawling and this can only be good news to the Deep Sea, ven 3if it happens only at a few places such as seamounts. We shall see with great interest what happens to this resolution.

Other big ideas? Yes, there were. Perhaps the one that emerges most clearly to me is the sheer scale of temporal as well as spatial variability in the deep sea. At the beginning of my career more than 30 years ago the idea of homogeneous habitat and uniform and stable (even if highly diverse) species composition was still alive and well. Not any more! We now know that high species richness may be found in bathyal seabed experiencing the most variable range in physical conditions (Bhavani Narayanaswamy & me), with significant changes in megafauna over a long timescale on the continental rise off California (Ken Smith *et al.*) and at rapid scales both on hydrothermal vents (Jennifer Dreyer & Cindy Van Dover) and in foram communities (Andy Gooday & Gabriella

Malzone). A range of papers kept us up-to-date on seasonal and shorter-term spatial and temporal variability (jelly lakes of David Billett *et al.*; Mediterranean brine lakes of Tassos Tselepides *et al.*) and the sometimes subtle and



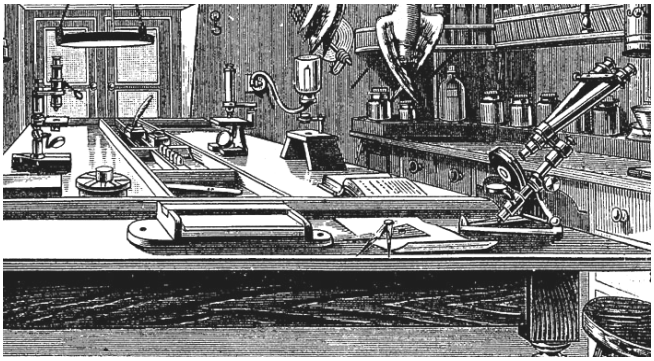
Left: Virgin Forest between dormitory houses and conference hall. Right: Southwestern Oregon Community College Conference Hall. (Photos Torben Wolff)

sometimes mind-boggling organism responses to them (Craig Smith *et al.*; Henry Ruhl & Ken Smith; Nic Johnson *et al.*). There were so many more I could mention!

Other presentations provided the opportunity for jaw-dropping awe (Janet Voight and her giant baby octopus – too bad you had to pickle them Janet!), Steve Haddock's delicate Radiolaria, and Peter Herring's fish with coloured lights, to name a tiny selection.

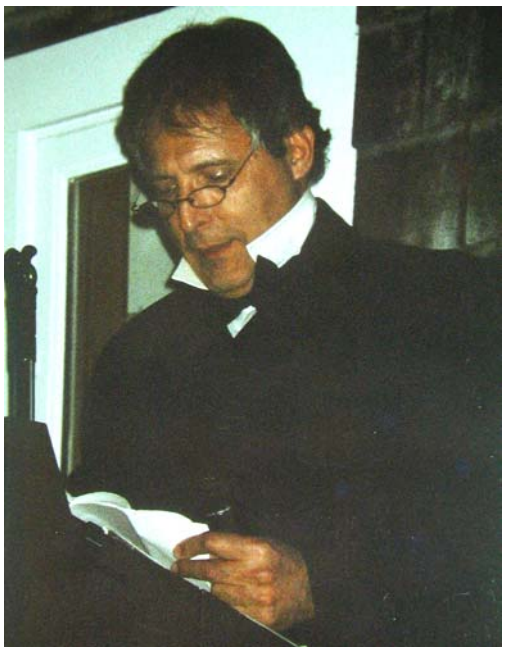
This brings me on to the mid-water environment. Yes, we had some excellent presentations, but the participation by these close colleagues of us seabed people was relatively small despite the usual stalwarts and good representation from the whiz kids at Monterey. Let us hope that at Southampton (yes, this was the democratically agreed next venue in 2006) will present more of this blue water science in order to provide a more balanced perspective!

Two Challenger Expedition microscopes. (Photo Buz Wilson)



Detail from figure of Challenger Laboratory showing two microscopes in photo at left.

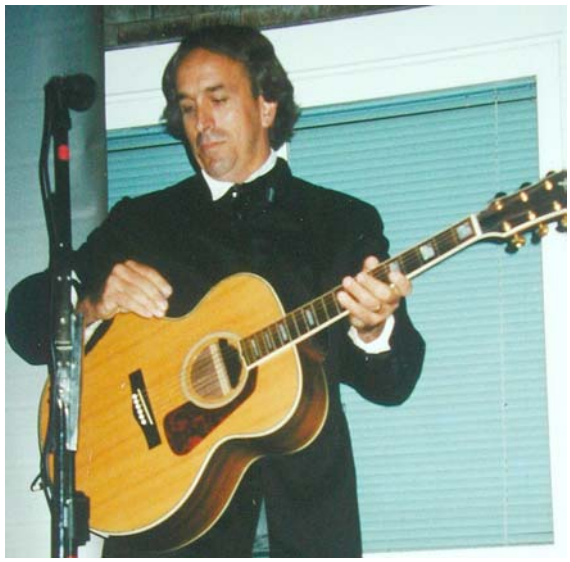
Bob George presenting Torben Wolff with the Sir George Deacon Medal and plaque in recognition of his contribution towards bridging the history of oceanography with classical marine biology.



Chuck Messing as George Wallich lecturing, revived after 150 years to advance his ideas on marine biology. (Photo Mary Rice)

Above: Torben's traditional Maori *Haka* war dance (he forgot to remove his spectacles and watch!). (Photo Bob George)

Above: Lisa Levin and Myriam Sibuet – two of the appreciative audience. (Photo David Billett)



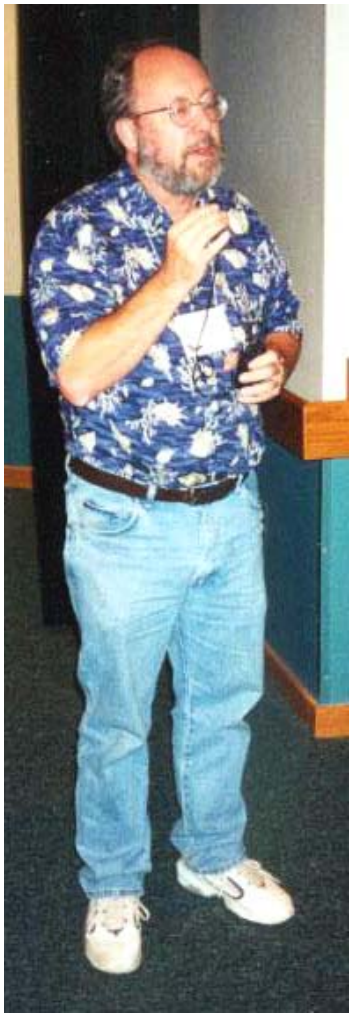
Right: Dan McCarthy's rendition of Edward Forbes' Dredging Song. (Photo Mary Rice)

My final thought is on the technology. Gone are the days of small research ships tugging bits of bent iron around far below. They felt lucky just to retrieve a few souvenirs of its contact with the bottom. Now we are rejecting the supposed cutting-edge of box corers in favour of the Megacorer (Tammy Horton & Brian Bett). Gone are research ships … almost. Even if manned submersibles are becoming less easy to operate because of health-and-safety (and bladder-holding) issues, we now have Remote Operated Vehicles (ROVs) and Benthic Landers and a range of other moored seabed instrumentation. Scotland's new OceanLab under Monty Priede is rapidly making a presence in this field, and we heard some fascinating insights and prospects of using deep-seabed observatories to make long-term observations from his group and from others, such as the seismic-driven NEPTUNE project in the NE Pacific, billed "to provide a fiber optic telescope to inner space". Clearly this environment has turned out to be a highly variable one, and still the ultimately most fascinating of environments.

Social events

Very finally, we all have happy memories of Oregon's natural beauty and wildlife and the final banquet. During the half-day excursion, busses took us along the coast with stops underway to admire the rugged and carved, wave-swept sandstone rocks and a huge colony of sea lions and a passing gray whale. Later a mail boat ran us up the Rogue River through majestic conifer forest to dinner high over the river of Singing Springs Resort, returning towards dusk with highlights such as three bears, one with a cub, black-tailed deer, otters, one beaver and eagles.

The mellifluous tones of frock-coated Edward Forbes and George Wallich intoned, respectively, by the talented Dan McCarthy and Chuck Messing at Craig Young's splendid banquet at the OIMB buildings at Charleston will live on for a long time. Not to mention a live performance by Dan, with instrumental accompaniment, of Forbe's wonderful Dredging Song, not well-known to us non-Victorians. What treats!



But for me the highlight of the evening was the presentation of the prestigious Sir George Deacon Medal to our own great survivor of the famous Galathea Expedition, Torben Wolff, the last of the Great Danes … for now anyway. And, yes, we were treated to his now traditional Maori-style response. And didn't the girls howl for more!

John Gage
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UK and USA get-together: John Gage, Craig Smith and Paul Tyler. (Photo David Billett)

Craig the Boss! (Photo Torben Wolff)

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Participants of 10th Deep-Sea Biology Symposium, Coos Bay, Oregon Coast, U.S.A, 25-29 August 2003. Photo Kay Heikilla.

10th DEEP-SEA BIOLOGY SYMPOSIUM

Coos Bay, Oregon, USA
August 25–29, 2003

ORAL PRESENTATIONS

Monday, August 25 **(* Indicates speakers who are not the first or only author)**

Young, C.M. – Welcome to Oregon and general introduction.

Session 1. Physiological ecology of deep-sea and midwater organisms

Bailey, D.M., P.M. Bagley, A.J. Jamieson, A. Cromarty, M.A. Collins, B. Genard, J.-F. Rees, A. Tselepidis & I.G. Priede. – Integrated studies of deep-sea animal physiology and activity: experiments on the eel *Synaphobranchus kaupi* and the shrimp *Acanthephyra eximia*.

Genard, B., A. Dekerchove, D.M. Bailey, S. Dupont, M.A. Collins, I.G. Priede & *J.-F. Rees. – Seasonal, ontogenical and depth-dependent variations in metabolic enzyme activities and proten content in muscles of deep-sea demersal fish.

Bernhard, J.M. & S.S. Bowser. – The peroxisome puzzle: do foraminifers living in sulfide-enriched sediments respire using peroxisomal oxygen?

Wigham, B.D., B.J. Bett, D.S.M. Billett & A.J. Gooday. – Patterns of megabenthic community structure and activity in relation to oxygen minima on the Oman continental slope, NW Arabian Sea.

Kemp, K., A. Jamieson, P.M. Bagley & I.G. Priede. – Physical time signals in the deep sea, and the behavioural and physiological response of the fish community.

Stowasser, G., R. McAllen, G.J. Pierce, C.F. Moffat, M.A. Collins & I.G. Priede. – Fatty acids and stable isotopes: a new approach to the trophic ecology of the deep-sea ichthyofauna.

De Kerchove, A., B. Genard, M.A. Collins, I.G. Priede & *J.-F. Rees. – Muscles metabolic enzymes and swimming speeds in *Antimora rostrata* and *Coryphaenoides (N.) armatus*, two deep-sea demersal fish.

Jörundsdottir, K. & *J. Svavarsson. – Eyelessness among the Gnathiidae (Crustacea, Isopoda).

Herring, P.J., E.A. Widder & C. Cope. – Fishes with red lights: different structures, different mechanisms.

Battle, E.J.V., M.A. Collins, J.C. Partridge, P.M. Bagley & *I.G. Priede. – Observations of pelagic and benthic deep-sea bioluminescence in the North East Atlantic Ocean using an ISIT camera.

Session 2. Physiology and ecology of vent and seep organisms

Prieur, D., D. Flament, G. Henneke, G. Erauso, C. Geslin, E. Jolivet, M. Le Romancer, S. Lucas, V. Marteinsson, J.-P. Raffin & J. Querellou. – New biological microbial models from deep-sea hydrothermal vents.

Le Bris, N., M. Zbinden, P.-M. Sarradin & F. Gaill. – Chemical constraints in the *Alvinella pompejana* environment: new insights.

Skebo, K. – Distribution of zooplankton and nekton above hydrothermal vents on the Juan de Fuca and Explorer Ridges.

Fujiwara, Y., M. Kawato, K. Uematsu, S. Arakawa, T. Miwa, Y. Suzuki, T. Sato & C. Kato. – Dual "symbiont transmission mechanisms" of a hadal thyasirid clam, *Maorithyas hadalis.*

Yancey, P.H., N.K. Rosenberg, R.W. Lee, K.M. Kemp & D.M. Bailey. – Unusual organic osmolytes in abyssal and hydrothermal-vent animals: adaptations to hydrostatic pressure and sulfide metabolism?

Dreyer, J. & C.L. Van Dover. – Time-series comparison of hydrothermal-vent mussel bed communities on the East Pacific Rise between 1999 and 2001.

Sarrazin, J., S.K. Juniper, C. Levesque, M.K. Tivey, G. Massoth & P. LeGendre. – Mosaic community dynamics on Juan de Fuca Ridge sulfide edifices: refining a model of community succession.

Levin, L.A., W. Ziebis & G. Mendoza. – Metazoan response to sulfide stress at Pacific methane seeps: distribution, community structure, nutrition, and recruitment.

Session 3. Methods, approaches and tools in deep-sea research

Horton, T. & B. Bett. – A comparative trial of macrobenthos samplers—the box corer versus the megacorer.

Jamieson, A., P.M. Bagley, D. Bailey, M.A. Collins & I.G. Priede. – Bentho-pelagic fish behavioural responses to autonomous lander platforms.

Bagley, P.M, A. Jamieson, E. Battle, D. Bailey, M. Player & I.G. Priede. – New approaches to observations of deep-sea mid-water fauna using free-fall, profiler and drifter vehicles.

Grassle, J.F., Y. Zhang & *K. Stocks. – The ocean biogeographic information system: a new tool for deep-sea biology.

Billett, D.S.M. – Deep-sea sediment biodiversity: results of the Census of Marine Life Hatfield Workshop.

Tuesday, August 26

Session 4. Human impacts and marine protected areas

Blake, J.A., N.J. Maciolek & I.P. Williams. – Rapid recolonization of infaunal benthos at a deep-sea disposal site.

Narayanaswamy, B.E. & J.D. Gage. – Time-series monitoring of deep-water environments.

Barry, J.P., J.C. Drazen, K.R. Buck, B.A. Seibel, M.N. Tamburri, C. Lover & L. Kuhnz. – Field experiments on the biological impacts of deep-sea CO_2 injection.

Thistle, D., K.R. Carman, L. Sedlacek, J.P. Barry, P.G. Brewer & J.W. Fleeger. – Consequences for the deep-sea fauna of injection of liquid carbon dioxide: preliminary results.

Baker, K. & R.L. Haedrich. – Could some deep-sea fishes be species-at-risk?

Stocks, K.I. & G.W. Boehlert. – Seamounts and submarine canyons: the known, the unknown, the unknowable, and future steps.

Schlacher, T.A., M.A. Schlacher-Hoenlinger, B.R. De Forges & J.A. Hooper. – Elements of richness and endemism in sponge assemblages on seamounts.

Howard, C. – APEC Fisheries Working Group and deep-sea fisheries.

George, R.Y. – Deep-sea *Lophelia* coral reefs and gorgonian forests in the North Atlantic Ocean as marine protected areas.

Colaço, A, F. Tempera, F. Cardigos & R. Serrão Santos. – Offshore marine protected areas on the Azores: why, where and what for?

Christiansen, S. – Tackling the conservation of deep-sea biota—the way forward.

Gianni, M. – Seamounts and the biodiversity of the Deep Sea: United Nations General Assembly initiatives to protect the wealth of species on the high seas.

Thiel, H. – Protection of high-seas areas—status report.

Session 5. Benthic-pelagic coupling: Short-term responses

Witte, U. – The fate of organic carbon settling at the deep-sea floor: an experimental approach.

Sommer, S. – Meiobenthic response to the pulsed deposition of phytodetritus—an *in situ* experiment in the Porcupine Abyssal Plain.

Buehring, S.I., N. Lampadaiou, L. Moodley, A. Tselepides & U. Witte. – Benthic response to varying food input: *in situ* experiments in the oligotrophic Mediterranean.

Aspetsberger, F., A. Ahke, T. Ferdelman, M. Zabel & U. Witte. – Influence of organic carbon quality on benthic mineralization: *in situ* experiments in a high-productivity area.

Gage, J.D., R.D. Anderson, P.A. Tyler, R. Chapman & E. Dolan. – Ravenous for phytodetritus: can brittle star opportunists prevent phytodetrital mass accumulation in the N.E. Atlantic?

Billett, D.S.M., B.J. Bett & B.D. Wigham. – Jelly lakes in the abyssal Arabian Sea—massive food falls?

Debenham, N.J., P.J.D. Lambshead, T.J. Ferrero & C.R. Smith. – Do whale fall events increase nematode abundance?

Hughes, D.J., L. Brown, G.T. Cook, G. Cowie, J.D. Gage, E. Good, H. Kennedy, A.B. MacKenzie, S. Papadimitriou, G.B. Shimmield, J. Thomson & M. Williams. – Using biology to inform geochemistry: analysis of burrow contents from two sites in the bathyal N.E. Atlantic.

Session 6. Benthic-pelagic coupling: long term responses

Smith, K.L. Jr., R.J. Baldwin, H.A. Ruhl, B.G. Mitchell & M. Kahru. – Climate change and benthic boundary layer processes at 4,100 m depth in the N.E. Pacific: a 13-year time-series study.

Gooday, A.J. & G. Malzone. – Long-term (decadal) changes in 'live' benthic foraminiferal assemblages at an abyssal site in the NE Atlantic.

Ruhl, H.A. & K.L. Smith, Jr. – Variation in deep-sea epibenthic megafauna distribution and abundance, and particle flux in the N.E. Pacific.

Hudson, I.R., B.D. Wigham, D.S.M. Billett, D.W. Pond, P.A. Tyler & G.A. Wolff. – Deep-sea biology, food for thought? Seasonal and reproductive aspects of food availability in deep-sea holothurians.

Tselepides, A., E. Hatziyanni, N. Lampadariou & C. Corselli. – Benthic community structure in the deep hypersaline anoxic basins of the Eastern Mediterranean Sea.

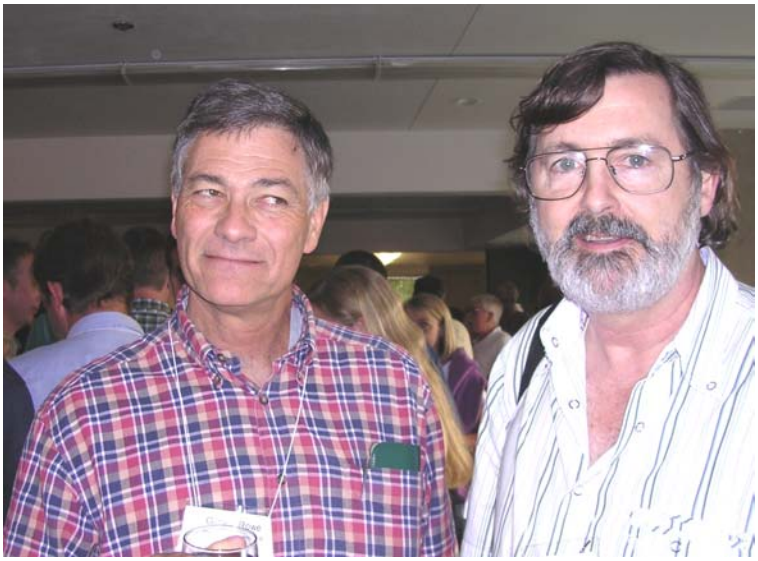
Johnson, N.A., J.W. Campbell, T.S. Moore, C.R. McClain, M.A. Rex & M.D. Dowell. – Surface-benthic coupling and the structuring of deep-sea communities.

Snelgrove, P.V.R., P.A. Ramey & B. Oake. – Regulation of deep, cold ocean, benthic infauna by surface processes.

Session 7. Discussion on human impacts and marine protected areas

SHOTS BY BUZ WILSON OF DEEP-SEA FOLKS AT LEISURE …

Gary Poore, Australia and Jody Martin, USA

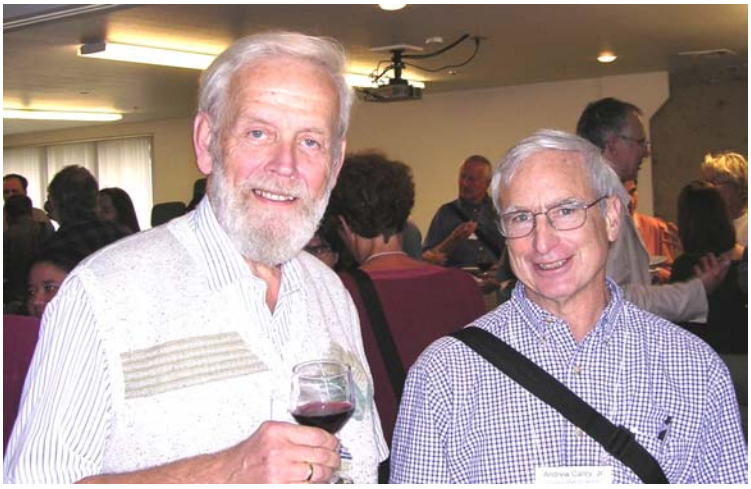


Gil Rowe, USA and Buz Wilson, Australia

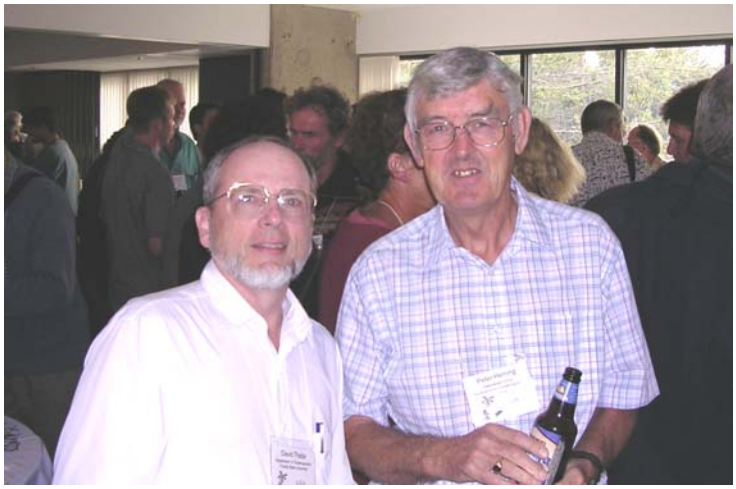
Karen Osburn, USA

Jörundur Svavarsson, Iceland and John Freytag, USA

Magdalena Gutowska, USA



Hjalmar Thiel, Germany and Andrew Carey, USA



David Thistle, USA and Peter Herring, UK

Wednesday, August 27

Session 8. Benthic-pelagic coupling at high latitudes

Smith, C.R., S. Mincks, A. Glover, D.J. DeMaster & P.Y. Sumida. – Food banks of the deep Antarctic shelf: the impact and fate of summer bloom material at the seafloor.

Galley, E., P.A. Tyler, A. Clarke & C. Smith. – Responses of benthic organisms on the deep Antarctic continental shelf to a highly seasonal food supply.

Mincks, S.L., C.R. Smith, D.J. Demaster & C.J. Thomas. – Benthic response to seasonal phytodetritus deposition on the west Antarctic Peninsula shelf.

Schewe, I. & T. Soltwedel. – Living on the (ice-) edge: first results from inter-annual and seasonal studies at an Arctic deep-sea benthic station.

Poster Session (2½ hours), followed by mid-conference excursion.

Thursday, August 28

Session 9. Population genetics, evolution and systematics

Rogers, A.D. & M. Le Goff. – Genetic structure of *Lophelia pertusa* populations in the NE Atlantic

Baco, A.R. – Population genetic structure of Hawaiian precious corals using microsatellites.

France, S.C. – Patterns of mitochondrial DNA sequence variation in deep-sea octocorals.

Shank, T.M. – Genetic structure of nascent biological communities at Galápagos rift vent fields

Vrijenhoek, R. – A new look at evolutionary pathways and the age of deep-sea hydrothermal vent taxa.

Martin, J.W. & T. Shank. – Decapod crustaceans from hydrothermal vents and cold seeps: an update.

Mah, C. – Species-level phylogenies in the Goniasteridae (Asteroidea: Echinodermata): patterns of evolution in deep-sea starfish.

Santini, F. – Phylogeny and historical biogeography of the Triacanthodidae (Tetraodontiformes, Teleosti), with comments on the role of island arcs systems and Pleistocene sea level changes in causing the present-day distribution of this clade.

Boyle, E.E., R.J. Etter & M.A. Rex. – Phylogeography of the deep-sea rissoid gastropod *Benthonella tenella*.

Session 10. Biology of the deep Gulf of Mexico

Schroeder, W.W. – Observations of hard substrate and epibenthic megafauna at an upper slope site in the Gulf of Mexico.

Sutton, T., T. Hopkins & S. Burghart. – Who is eating most of the zooplankton in the oceanic Gulf of Mexico? The impact of mesopelagic fishes.

Blend, C.K. & N.O. Dronen. – Helminth parasites of deep-sea fishes from the Gulf of Mexico and Caribbean Sea.

Carney, R.S., S. MacAvoy, S.A. Macko & C.H. Fisher. – Isotopically traced scenarios of background/foreground trophic interaction at Gulf of Mexico hydrocarbon seeps: exporting or importing?

Rowe, G., J. Morse, M. Wicksten, J. Deming, E. Escobar Briones, R. Haedrich & P. Montagna. – Structure and function of benthic communities in the deep Gulf of Mexico.

Wilson, G.D.F. – Benthic isopod diversity in the Gulf of Mexico.

Session 11. Patterns of abundance and diversity

Rex, M.A., C.R. McClain & N.A. Johnson. – A source-sink hypothesis for abyssal biodiversity.

Brenke, N. – Faunal diversity and zoogeography of the abyssal asellota (Crustacea: Isopoda) in the Southeast Atlantic deep sea.

Brandt, A., H.-G. Andres, N. Brenke, S. Brix, J. Guerrero-Kommritz, U. Mühlenhardt-Siegel & W. Wägele. – Abundance, diversity and community patterns of peracarid crustaceans (Malacostraca) from the abyssal plain of the Angola Basin.

Gage, J.D., P.J.D. Lambshead, J.D.D. Bishop, N.S. Jones & B.E. Narayanaswamy. – Large-scale biodiversity pattern of cumacea in the deep Atlantic.

VanReusel, A., A. Muthumbi, M. Raes, S. Van Gaever, S. VanHove & H. Vermeeren. – High nematode species diversity in the deep sea: correlations and causes for diversification within genera?

Glover, A.G., C.R. Smith, G.L.J. Paterson & G.D.F. Wilson. – The worm's turn: species diversity on the Central Pacific Abyssal Plain.

Haddock, S.H.D. – Natural history of deep-sea tuscarorid radiolarians.

Buck, K.R., K.R. Carman, D. Thistle, L. Kuhnz, C. Lovera & J.P. Barry. – Sediment standing stocks from an abyssal site in Monterey Canyon, California.

Rowden, A.A., M.R. Clark, S. O'Shea & D.G. McKnight. – Biodiversity of the Kermadec Volcanic Arc seamounts: an opportunity to answer long-asked questions.

Session 12. History of deep-sea biology

Campos-Creasey, L.S, H.P. Lavrado, P. Costa & A.P.C. Falcão. – Brazilian deep-sea biology research: a recent history overview.

Wolff, T. – The Danish *Dana* Expeditions: Purpose and Accomplishments.

Morita, R.Y. – Early and recent history of deep-sea microbiology.

Friday, August 29

Session 13. Reproduction, development and larval biology

Drazen, J.C., S.K. Goffredi, B. Schlining & D.S. Stakes. – Aggregations of egg brooding deep-sea fish and cephalopods on the Gorda Escarpment: a reproductive hotspot.

Voight, J.R. – The biggest baby octopus in the world: hatchlings of *Graneledone*.

Benitez-Villalobos, F. & P.A. Tyler. – Temperature and pressure tolerances of embryos and larvae of the Atlantic seastar *Asterias rubens* (Echinodermata Asteroidea): potential for deep-sea invasion from shallow water.

Brooke, S.D. & C.M. Young. – Embryogenesis and larval biology of the ahermatypic scleractinian coral *Oculina varicosa*: implications for ecosystem recovery.

Hilario, A., P.A. Tyler & C.M. Young. – Why do female vestimentiferans store sperm?

Järnegren, J., C.M. Young, C.R. Tobias & S.A. Macko. – Oophagous lifestyle in *Acesta bullisi*, a bivalve associated with cold-seep tube worms

Waller, R.G. & *P.A. Tyler. – The reproductive ecology of two deep-water reef building corals in the N.E. Atlantic Ocean.

Tyler, P.A., E. Dolan, M. Baker & C.M. Young. – Gametogenic periodicity in the genus *Bathymodiolus*.

Howell, K.L., A.D. Rogers, P.A. Tyler & D.S.M. Billett. – Reproductive isolation among morphotypes of the Atlantic seastar species *Zoroaster fulgens* (Asteroidea: Echinodermata).

Geiger, D.L. & C.L. Thacker. – Colonization patterns of the deep sea: insights from basal snails (Vetigastropoda) using molecular phylogenetics.

Pradillon, F., M. Zbinden & F. Gaill. – Reproductive patterns in *Alvinella pompejana* (Polychaeta: Alvinellidae) colonies from 9°N and 13°N EPR hydrothermal vents.

Session 14. Distribution and zonation

C.G. Messing. –Biozonation on deep-water carbonate mounds and associated hardgrounds along the western margin of Little Bahama Bank, with notes on other deep Bahamian bank-margin assemblages.

Osborn, K. – Distribution and feeding of munnopsid isopods in the deep water column of the Gulf of California, Mexico.

Veit-Köhler, G. – Typical shallow water Copepoda Harpacticoida in the Atlantic deep sea.

Yeh, H.M. & S. Ohta. – Modified concept of faunal zonation suggested from the horizontal and vertical trend of zonation of deep-sea demersal fish around Japan.

Henriques, C., I.G. Priede, M.A. Collins & P.M. Bagley. – Scavenging fishes of the deep Eastern Atlantic Ocean: a comparison of behaviour and distribution at latitudes 49°N to 10°S

Ingole, B. – Distributional pattern of deep-sea macrofauna in the Indian Ocean.

Moore, J.A. – Biogeography of the deep-sea fish fauna off New England.

McClain, C.R. – A new hypothesis for bathymetric size clines in the deep sea.

Session 13* [sic, should be 15]. *Cold seeps and allied ecosystems

Soltwedel, T., N.-V. Quéric & I. Schewe. – Gradients in activity and biomass of the small-sized benthic biota around the Håkon Mosby Mud Volcano, SW Barents Sea slope.

Sibuet, M., J.C. Caprais, P. Crassous, S. Duperron, M.C Fabri, A. Fifis, J. Galéron, A. Khripounoff, L. Menot, T. Nadalig, K. Olu-Le Roy, A. Vangriesheim, A. Andersen & R. Von Cosel. – Rich and complex deep sea ecosystems on the equatorial African margin: general objectives and results of the BIOZAIRE environmental program.

Olu-LeRoy, K., T. Nadalig, J.C. Caprais, A. Fifis, M.C. Fabri, H. Ondréas & M. Sibuet. – Spatial variability of the chemosynthetic fauna, chemical environment and microbial communities on a giant pockmark in the Gulf of Guinea.

Galeron, J., N. Cam, J.C. Caprais, P. Crassous, M.C. Fabri, A. Fifis, A. Khripounoff, L. Menot, M. Moison, T. Nadalig, K. Olu, M. Sibuet & A. VanGriesheim. – Macrofauna communities in detritic and chemosynthetic based ecosystems in the Gulf of Guinea.

Referendum on location of next Symposium

THE EXCURSION

Member of the Welcome Committee. (Photo Bob George)

Heavily eroded sandstone rock with sea lion colony offshore. (Photo Torben Wolff)

Boat trip. (Photo David Billett)

POSTER PRESENTATIONS

Absalão, R. S. & C. H. S. Caetano – Brazilian deep-water skeneimorphs gastropods from Bacia de Campos, Rio de Janeiro State, Brazil.

Andersen, A., S. Hourdez, B. Marie, D. Jollivet, F. H. Lallier & M. Sibuet – *Escarpia southwardae* a new species of vestimentiferan tubeworm from west-african cold seeps.

Aranda da Silva, A. & A. J. Gooday – Giant protozoa from the Arabian Sea.

Arellano, S. M. & N. Terwilliger – Hemocyanin, cryptocyanin and phenoloxidase in deep sea (*Bathynomus giganteus*) and intertidal (*Cirolana harfordi*) isopods.

Arellano, S. M. & C. M. Young – Embryology and larval ecology of the cold-seep mussel, *Bathymodiolus childressi.*

Bagley, P. M., A. Jamieson, D. Bailey, R. Paterson, E. Battle, K. Kemp & I. G. Priede – Landers for deep sea research.

Batson, P. B., P. K. Probert, A. A. Rowden & A. M. Smith – Patterns of benthic Megafauna diversity and biomass in the Otago Submarine Canyon Complex, south-eastern New Zealand.

Bell, E., M. Solan, A. Jamieson, A. K. Mackenzie, G. Belmonte, F. Rubino, L. Della Tommasa & F. Boero – Resting stages in the deep sea sediments: potential for benthic pelagic coupling?

Berger, M. S. & C. M. Young – Physiological response of the cold seep mussel, *Bathymodiolus childressi*, to thermal stress.

Bluhm, B. A., K. Iken, I. C. Debenham & I. MacDonald –Distribution and abundance of macrobenthos in the Canada Basin, high Arctic – preliminary results.

Brugler, M. R. & S. C. France – Do antipatharians belong in the subclass Ceriantipatharia?: Inferring phylogeny from mitochondrial gene order of a deep-sea black coral.

Burton, E. J., A. P. Devogelaere, R. E. Kochevar, G. M. Cailliet, T. Trejo, S. R. Benson, D. A. Clague, M. N. Tamburri & W. J. Douros – Exploring Davidson seamount: biological characterization and protection.

Caprais, J. C., M. C. Fabri, K. Olu, T. Nadalig, D. Levache, H. Budzinski, A. Fifis, P. Crassous & M. Sibuet – Chemical environment of chemosynthetic communities from two distinct cold seep sites (Gulf of Guinea).

Carney, S. L., C. R. Fisher & S. W. Schaeffer – Sequencing, localization and expression of globin genes in the vestimentiferan *Ridgeia piscesae.*

Chausson F., L. Menard & F. H. Lallier – Acid-base responses to hypercapnia in hydrothermal vent crustaceans.

Costa, P. A. S., A. C. Braga, M. R. S. Melo & G. W. A. Nunan – The mid-slope demersal fish community off the eastern Brazilian coast.

Cowie, G., A. Anestis, J. H. Andersson, B. J. Bett, D. S. M. Billett, T. D. Brand, E. Breuer, M. Danish, A. da Silva, T. Edwards, J. D. Gage, A. J. Gooday, M. Harvey, R. M. Jeffreys, H. Johnstone, P. A. Lamont, K. E. Larkin, L. A. Levin, S. McKinley, A. Miller, O. Peppe, T. Sawyer, M. Schwartz, D. Teare, W. Thompson & C. Woulds – Interactions of benthic communities and sediment geochemistry across the Pakistan margin (Arabian Sea) oxygen minimum zone.

De Cian, M. C., A. Andersen & F. H. Lallier – Carbonic anhydrase localisation in the gills of two hydrothermal vent crustaceans, *Bythograea thyermydron* and *Rimicaris exoculata.*

Drazen, J. C., J. P. Barry & L. E. Bird – Development of a hyperbaric trap-respirometer for the capture and maintenance of live deep-sea organisms.

Gage, J. D. – Growth and production of the bathyal brittle star *Ophioctem gracilis* along the Scottish continental margin.

Genard, B., A. De Kerchove, D. M. Bailey, I. G. Priede & J.-F. Rees – Unusual scaling of metabolic enzymes of white muscle of the eel *Synaphobranchus kaupi.*

George, R. Y. – Biodiversity of deep sea asellote isopod crustacea in historical and evolutionary perspectives.

Govenar, B., S. Hourdez, J. Glanville, N. Le Bris & C. R. Fisher – Spatial and temporal variability in *Riftia pachyptila* communities at 9°N (East Pacific Rise).

Gutowska, M., J. Drazen & B. Robison – Chitinase activity of fishes with varying depth distributions.

Gutzmann, E., P. Martinez Arbizu, A. Rose & G. Veit-Köhler – Composition, abundance and diversity of the meiobenthic assemblage of the abyssal Antarctic.

Hatziyanni, E., A. Tselepides & A. Eleftheriou – Foraminiferal communities inhabiting the abyssal Eastern Mediterranean Sea.

Helms, A. R. & J. J. Young – Extreme salinity tolerances of *Methanoaricia dendrobranchiata* (Polychaeta: Orbiniidae).

Horton, T. – Deep-sea taxonomic research – Amphipoda and the oil and gas industry.

Hughes, D. J. & J. D. Gage – Benthic community structure and bioturbation along a continental margin transect from Norway to Svalbard.

Iken, K., B. Bluhm & R. Gradinger – Feeding on the bottom at the top of the world.

Jones, D. O. B., B. J. Bett & P. A. Tyler – Megabenthic ecology of the DEEP Faroe-Shetland Channel: A photographic study.

Jorundsdottir, K. & J. Svavarsson – Eyelessness among the Gnathiidae (Crustacea, Isopoda)..

Juterzenka, K. V. & T. Soltwedel – Benthic distribution patterns and turnover processes in an Arctic deep-sea channel system.

Kitazato, H., T. Nakatsuka, K. Suzuki, M. Shimanaga, H. Nomaki, J. Kanda, W. Soh, Y. Kato, Y. Okada, A. Yamaoka, T. Masuzawa & Y. Shirayama – Does benthic-pelagic coupling exist in a eutrophic deep-sea environment? : Results from "The Project Sagami".

Law, C. G. – An individual-based model approach model approach to the characterization of macrobenthic community dynamics.

Lovera, C., P. J. Whaling & J. P. Barry – Direct measurement of ~decadal-scale population changes for a deep-sea sessile benthic community.

MacNeil, M. A., P. Vecsei, J. Svavarsson, M. Treble, G. B. Skomal, J. Borucinska, A. T. Fisk & G. W. Benz – Ecology of the Greenland shark *Somniosus microcephalus* (Bloch and Schneider, 1801).

Mah, C. & D. B. Blake – Evolution and diversification of deep-sea Goniasterid starfishes: Phylogeny, paleontology and macroevolution.

Mah, C., C. Kelley & P. Colin – New deepwater Goniasterid starfish from Hawaii and the south-central Pacific.

Malzone, M. G. & A. J. Gooday – *Epistominella exigua* and *Alabaminella weddellensis* (Protista, Foraminifera): two abyssal "phytodetritus species" with contrasting ecological characteristics.

Melo, M. R. S., P. A. S. Costa, A. C. Braga & G. W. A. Nunan – Gadiformes (Teleostei: Osteichthyes) collected by the French R/V Thalassa on the Brazillian Continental slope between 11º and 22ºS.

Melo, M. R. S., G. W. A. Nunan, P. A. S. Costa & A. C. Braga – A new synaphobranchid eel (Anguilliformes: Synaphobranchidae), with comments on other Southwestern Atlantic species.

Messing, C. G., J. David, T. K. Baumiller, M. Roux & N. Ameziane – Stalk growth rates of Isocrinidae (Echinodermata: Crinoidea): A summary of a decade of *in situ* experiments.

Nadalig, T., S. Duperron, K. Olu-LeRoy, J. C. Caprais, M. A. Cambon-Bonavita, N. Dubilier, A. Boetius & M. Sibuet – Structure and diversity of microbial communities at methane seep sites (Gulf of Guinea).

Nomaki, H., P. Heinz, T. Nakatsuka, M. Shimanaga & H. Kitazato – Benthic foraminiferal uptake of organic carbon measured by in situ experiments using ^{13}C labeled algae in Sagai Bay, NW Pacific.

Olabarria, C., E. Ramirez-Llodra & D. S. M. Billett – *Tibia delicatula* (Newill, 1881), a very abundant gastropod in the Oxygen Minimum zone of the Oman margin.

Orlov, A. M. & I. N. Moukhametov – Feeding habits of Greenland Halibut, Kamchatka flounder and Pacific Halibut in the Russian waters of the northwestern Pacific.

Orlov, A. M. & A. M. Tokranov – What do we know about Skilfish *Erilepis zonifer* (Anoplopoma-tidae)?

Pendlebury, S., P. A. Tyler & P. Dando – Feeding ecology of hydrothermal vent limpets of the genus, *Lepetodrilus.*

Phillips, M. R., K. Fielman, D. Shin, J. Tainer, C. Cary, A. Marsh, A. Berglund & E. A. Johnson – cDNA microarrays reveal differential gene expression in the deep-sea eurythermal polychaete *Alvinella pompejana.*

Premke K., L. Schewe I. & M. Klages –Aggregation dynamics of Arctic deep-sea scavengers at large food falls: temporal attraction, consumption rate and population structure.

Priede, I. G., M. A. Collins & P. M. Bagley – Deep sea biology cruises to the Porcupine Sea-bight, NE Atlantic Ocean 2000–2002.

Priede, I. G., A. Tsellipedes, E. G. Jones, D. Bailey, A. Jamieson & P. M. Bagley –Active deep-sea fauna of the basins of the eastern Mediterranean Sea.

Priede, I. G., J. Mienert, R. Person, T. C. E.Van Weering, O. Pfannkuche, N. O'Neill, A. Tselepides, L. Thomsen, P. Favali, F. Gasparoni, N. Zitellini, C. Millot, H. W. Gerber, J. M. A. De Miranda & M. Klages – ESONET- European Sea Floor Observatory Network.

Quéric, N.-V. & T. Soltwedel – Impact of small-scale sediment structures on the variability of bacterial dynamic patterns in Arctic deep-sea sediments.

Ramirez Llodra, E., P. A. Tyler & C. R. German – ChEss: Biogeography of deep-water chemosynthetic ecosystems for the Census of Marine Life.

Reid, W. D. K., D. S. M. Billett, B. J. Bett, I. R. Hudson, E. Z. Ramirez Llodra & B. D. Wigham – Long-term change in abyssal ecosystems – The "*Amperima* event" revisited.

Robison, B. H., K. R. Reisenbichler, J. C. Hunt & S. H. D. Haddock – Bioluminescence from the arm tips of the bathypelagic cephalopod *Vampyroteuthis infernalis.*

Rogers, R. L. & F. Necker – Low temperature hot water engine – electrical power generation project.

Ross, M. F., D. M. Bailey, H. J. Wagner & I. G. Priede – Olfactory, gustatory and tactile searching behaviour by the deep-sea grenadier fish *Coryphaenoides armatus.*

Shimanaga, M., H. Kitazato & Y. Shirayama – Differences in reproductive activity among deep-sea benthic copepod species

Smart, T. I. – Size, plate development and distribution in the epibiotic barnacle, *Octolasmis Aymonini geryonophila.*

Stromberg, J.-O. – Ecophysiology of *Meganyctiphanes norvegica;* some recent advances.

Stuart, C. T. & L. D. Keigwin – Abundance of a *Sargassum*-dwelling gastropod, *Litiopa melanostoma*, in deep-sea sediment cores representing the last 35,000 years.

Suetsugu, K. & S. Ohta – Diel change in occurrence for some deep-sea demersal fishes in southwest Japan.

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Waller, R. G., T. M. Shank, D. J. Fornari, M. Kurz & S. Pomponi – The deep water fauna of the Galapagos Archipelago.

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Wigham, B. D., D. S. M. Billett, I. R. Hudson, P. A. Tyler & G. A. Wolff – Ecosystem change at abyssal depths – a link to climatic modulation of organic matter fluxes??

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The DEEPSEA Research Newsgroup

The Deepsea Research Newsgroup was started around 10 years ago to serve scientists carrying out research into deep-sea and hydrothermal vent/seep biology, oceanography and geology. Several hundred members in more than 30 countries use the newsgroup for searches for specialist literature, expert opinion, specimen exchange, technical enquiries, and general discussions about deep-sea marine biology and geology. I would like to encourage you all to make use of this facility – where else can you gain access to such expertise with a single message? Check out the website (http://www.le.ac.uk/biology/gat/deepsea/deepsea.html) and if you have any appropriate material for the site, such as conference announcements, links or documents of wide interest, let me know and I will add them.

Discussions can be followed using a newsreader (news:bionet.biology.deepsea) or by having the e-mails sent to you. If you would like to subscribe to the mailing list (which is moderated so that you do not receive junk mail) please follow the instructions below. The archives for the newsgroup are available via the World Wide Web at http://www.bio.net:80/hypermail/DEEPSEA/ and a search facility is available on that page.

How to subscribe to the deepsea newsgroup

If you are in Europe, Africa or central Asia send an e-mail to majordomo@hgmp.mrc.ac.uk and do not include anything in the subject line. In the body of the message type:

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To post a message, send an e-mail to bionet-biology-deepsea@hgmp.mrc.ac.uk

If you have any problems subscribing or any enquiries about the Deepsea newsgroup, please contact me:

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11th DEEP-SEA BIOLOGY SYMPOSIUM

LATE JULY OR AUGUST 2006 IN SOUTHAMPTON

First Announcement

The next Deep-Sea Biology Symposium is being hosted by the DEEPSEAS group at Southampton Oceanography Centre, in conjunction with the Scottish Association for Marine Science in Oban, OCEANLAB of the University of Aberdeen and the Natural History Museum in London.

The meeting will be held at the University of Southampton in late July or August 2006. Precise dates will be announced on the website below as soon as they are confirmed. We take great pleasure in inviting all persons interested in any aspects of deep-sea biology to join us.

We plan to have participants staying in the halls of residence of the University of Southampton and activities will take place at the main University site and at the Southampton Oceanography Centre.

Details of the University of Southampton and SOC can be found on the web site www.soton.ac.uk and www.soc.soton.ac.uk, where further information about the meeting will be posted.

We look forward to seeing old friends and colleagues and to introducing new ones to the many fascinating challenges of deep-sea biology.

Paul Tyler, for the Symposium Committee
pat8@soc.soton.ac.uk

THE COOS BAY STATEMENT OF CONCERN: CONSERVATIVE MEASURES BEYOND NATIONAL JURISDICTION

During the 10th Deep-Sea Biology Symposium, held in Coos Bay, Oregon, concern was expressed about the growing threats to deep-sea habitats, particularly through fisheries in remote regions such as seamounts and continental slopes. Deep-sea fish stocks have already become over-exploited and deep-water coral reefs destroyed by heavy trawling equipment. To support ongoing actvities in the development of conservational measures for the high seas a "Statement of Concern" addressed to the United Nations General Assembly was prepared before the symposium and presented to the participants. After thorough discussions the document (see next page) was open for signatures. During the remaining three days of the symposium the Coos Bay Statement of Concern was signed by 105 participants, predominantly scientists. Although endorsing the activities for the conservation of deep-sea habitats, several participants could not sign this petition because, for example, they could not act in their personal capacity or because of a relationship to the fishery industry.

Robert Y. George presented the Coos Bay Statement of Concern later to the participants of the 2nd International Symposium on Deep-sea Corals in Erlangen, Germany and another 37 scientists signed the document.

General statements on the intrusion of man's activities in the deep sea date back several decades when concepts for deep-sea mining were developed and scientists advised on potential impacts. Conservation areas in the deep sea were discussed in 1978 during a conference of the International Union for the Conservation of Nature (IUCN, now the World Conservation Union) in Ashkhabad, USSR, although the proposed Stable Reference Areas have no conservation function, but aim at monitoring the re-establishment of the community after mining. The threats to high seas fish stocks and benthic habitats became well known from Australian seamount studies following the destruction of habitats, fish populations and benthic communities (see Koslow et al. 2000, Koslow et al. 2001, also for further references).

Scientists also realised that the UN Convention on the Law of the Sea (UNCLOS) is insufficient to provide for the conservation of high sea areas. Whereas coastal states assume responsibility for the development of protective measures in their territorial zones (12 nautical miles from the coastline) and the exclusive economic zone (if declared, 200 nm, exceptions up to 350 nm), UNCLOS does not asign any responsibility for the high seas to any administrative unit, except to the International Seabed Authority related to mineral resource exploitation (see Thiel 2003).

Therefore, a few scientists, conservationists from IUCN and WWF (World Wide Fund for Nature) and legal experts were invited to participate in a workshop at Vilm, Germany, in 2001. The participating scientists discussed threats to various habitats, communities and species. They requested help from the legal experts to identify existing protective regulations, gaps for effective conservation of high sea areas in UNCLOS, and also to propose steps towards, for example, establishment of high seas marine protected areas (HSMPAs). The recommendations and the report (Thiel & Koslow, eds 2001, Gjerde 2001) were delivered to the United Nations Informal Openended Consultative Process on Oceans and the Law of the Sea (UNICPOLOS, now ICP: Informal Consultative Process) through political channels. The Vilm workshop was followed up by workshops at Malaga, Spain in 2003, organized by IUCN, WWF and other NGOs (Gjerde & Breide 2003), and at Cairns, Australia, in 2003 arranged by the governments of Australia, Canada and others (report pending). Other organizations have also considered the promotion of these actvities and the establishment of HSMPAs, e.g. the Convention on Biodiversity (CBD) and the World Park Congress, held in Durban in September 2003.

After initiatives by scientists to re-activate discussions on HSMPAs between 1999 and 2001 activity was mainly taken forward by administrators from governments, NGOs and international organizations. In this context it is timely that scientists are again expressing their concerns on abuse of deep-sea resources and severe destruction of deep water habitats and biodiversity.

Statement of concern to the United Nations General Assembly regarding the risks to seamounts, cold-water corals and other vulnerable ecosystems of the deep-sea

Deep-sea biologists from around the world met for the 10th Deep-Sea Biology Symposium at the Institute of Marine Biology, University of Oregon, in Coos Bay, 25 - 29 August 2003. We, the undersigned, discussed anthropogenic threats to deep-sea biodiversity and ecosystems in light of the request by the UN General Assembly and the United Nations Informal Consultative Process on Oceans and the Law of the Sea to `consider urgently' the risks to the biodiversity of seamounts, cold-water corals and other deep-sea ecosystems. We concluded the following:

- **populations of numerous commercially important species of deep-sea fish and precious corals associated with seamounts, ridges, plateaus, continental slopes, coral reefs and sponge fields in the deep-sea have been serially depleted by fishing;**
- **benthic habitats and communities have been severely damaged by fishing activities;**
- **the biological characteristics of most deep-sea species render the deep sea particularly sensitive to anthropogenic disturbance and exploitation;**
- **although knowledge of deep-sea biodiversity is limited, evidence to date suggests that deep water habitats such as coral, seamount, seep and vent ecosystems are likely to harbour distinct assemblages of diverse and highly endemic species.**

The lack of effective international regulations for the conservation of natural systems and the protection of the biodiversity of the deep sea on the High Seas, as well as within areas of national jurisdiction (EEZs), is a cause of great concern. In this regard, consistent with the precautionary approach, we recommend that:

- **the conservation and protection of the biodiversity of the deep sea is the responsibility of all nations, in particular on the global ocean commons – the high seas;**
- **non-commercial research, within ecologically appropriate constraints, should be promoted and freely conducted to better understand species diversity and life history, community structure, trophic organization and ecosystem processes of the deep-sea;**
- **conservation measures should be established at the global, regional and national levels with an emphasis on developing representative networks of marine protected areas (MPAs) as called for by the World Summit on Sustainable Development and endorsed by the UN General Assembly;**
- **areas critical for baseline scientific research and to furthering the understanding of the deep-sea environment should be designated as Science Priority Areas;**
- **the UN General Assembly should adopt a moratorium on deep-sea bottom trawl fishing on the High Seas effective immediately;**
- **all regulations should be in conformity with the 1982 UN Convention on the Law of the Sea and other relevant instruments, including the Convention on Biological Diversity and the 1995 UN Fish Stocks Agreement.**

[The signatories to this statement listed below have signed in their individual capacity. Institutional affiliations are for identification purposes only.]

Many scientists have expressed their view by signing the above Coos Bay Statement of Concern. This is an important document since the political process leading to the justified development of protective measures in the high seas needs the support and also the advice from the scientific community of deep-sea biologists – now and in the future.

The Coos Bay Statement of Concern was presented to H. E. Mr. Kofi Annan, Secretary-General of the United Nations and to other persons in the UN and its organizations in early October 2003. The statement was accompanied by a letter and the lists of 142 signatories, handwritten as originally produced and typed.

The petition was submitted in time to be considered during the drafting process of the Annual Report of the UN Secretary-General. The concerns the signatories had expressed were incorporated in various paragraphs of the Annual Report and thus we have achieved our aim. The statement was also well accepted and used in documents of the UNEP (United Nations Environment Programme) and the CBD (Convention on Biological Diversity). I am most grateful to all who have supported the development of the Coos Bay Statement of Concern by participating in discussions, advice and signature.

E-mail endorsement of the Coos Bay Statement of Concern

Many scientists who were not able to attend the Deep-Sea Biology Symposium asked whether they could become signatories to the Coos Bay Statement of Concern by e-mail endorsement. Since discussion on conservation of the oceans will be part of a long-term process it is important that opportunity is provided for more scientists to sign up in support of the views expressed in this document. Therefore, the Coos Bay Statement of Concern is **open for e-mail endorsement until 10 March 2004**.

Please, send your endorsement by e-mail to: **hthiel@uni-hamburg.de**

The text should read:

This is to endorse the Coos Bay Statement of Concern as it is copied from its original text in Deep-Sea Newsletter 33.

This must be followed by:

Name
Title, or eventually scientific function (see arguments below)
Institution and full address, or private address

You may also recruit colleagues to send their endorsement. Not everyone may receive the Deep-Sea Newsletter, not everyone may read it before 10 March. We should deliver an impressive list of signatories. But please, make sure that only scientists join this endorsement campaign. The value lies in the scientific knowledge of the signatories backing up this petition (see below).

All e-mail endorsement signatories will be compiled in a list and this will be mailed to the United Nations and its subunits, to the CBD, and to the chairmen of the ICP for discussions on ammendments to the UN Law of the Sea.

I am grateful to all additional signatories. It is important to state that we deep-sea biologists as a loosely connected scientific community are able to express our concerns and become part of the political process in this context.

New experience: The Coos Bay Statement of Concern

Communication with administrators and politicians is not the daily business of most scientists. I assume that most participants in the 10th Deep-Sea Biology Symposium and the 2nd International Symposium on Deep-sea Corals, and also most readers of the Deep-Sea Newsletter, have no experience with drafting, discussion and delivery of documents such as the Coos Bay Statement of Concern. This has been the same for me, and therefore I report on some experiences for similar future activities.

Statement preparation

A statement of concern should be short and concise, not longer than one page. Otherwise it runs the danger of not being read. It should cover short background and knowledge paragraphs followed by the statements and / or recommendations. A drafting group may prepare a proposal, present this to assembled scientists for discussion before writing the final version. One cannot expect that all participants of a meeting agree with the statement, but the discussions and the reviewing process must attempt to make the statement inclusive of all opinions without losing its essential elements. The Coos Bay Statement of Concern developed through a few stages: draft proposal, modification by small drafting / revising group, presentation to and discussion in plenum, discussion in drafting / revision group, finalisation of statement, and signing.

Statement signature

The final version should be placed in a prominent place for signature, and the personal information given should include first and family names in print letters, title(s), country, institutional affiliation, address, and signature. All should be readable without problems. All single pages provided for signature should have the headline, e.g. the symposium, dates, and the single personal indications asked.

Statement importance

Everyone feels his statement to be of great importance. The significance of our statement of concern is that it was signed predominantly by scientists. UN Departments receive statements regularly, and in almost all cases it is difficult or impossible to evaluate the knowledge-base of the signatories. Therefore,it would have been helpful if each single signatory had indicated her / his scientific status and / or education (BA, MSc, PhD, Prof., senior scientist, ...). We had asked the potential signatories for this, but many did not add their scientific identification. Although we usually do not use our titles, in the political landscape they demonstrate – at least to some extent – our knowledge, responsibility and the ability to evaluate the scientific background of such a statement. At the UN such scientist-based statements of concern are higly evaluated and appreciated. In a way we failed to demonstrate our scientific background, yet did not fail in our impact on the political process for conservative measures for the high seas.

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THE DEEP-SEA NEWSLETTER

The Newsletter is now being distributed electronically, which has greatly improved the quality for all recipients and reduced the time and expense needed for duplication and distribution. Whereas the editor(s) earlier put together the newsletter by the cut-, paste- and photocopy method, sending a second-generation photocopy to each correspondent, who then copied this and sent third-generation copies to their subscribers, with the inevitable reduction in quality each time, all subscribers now receive the newsletter as one or more electronic pdf files that can be viewed on the screen or printed.

Contributions from readers may be mailed directly to the Editors, best as e-mail attachments (see last page of newsletter). We thank all contributors for much interesting illustrative material and articles for the present issue.

Further, we thank Drs. P. Sivadas, Suguru Ohta, and Craig Young, from India, Japan, and Eastern USA, resp., for help in distributing the newsletter in the past, and welcome Drs. Baban S. Ingole, Yoshihiro Fujiwara, and David Thistle, who replace them. New Zealand is newly represented by Dr. Steve O'Shea.

The Editors

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CONSERVATION AND MANAGEMENT OF DEEP-SEA CORAL REEFS: NEED FOR NEW DEFINITION, AN AGENDA AND ACTION PLAN FOR PROTECTION

Recent discovery of commercially important deep-sea fishes from seamounts and deep-sea coral beds at bathyal depths from 300 to 1000 m has raised the question of protective measures both within the EEZ and in the High Seas beyond the 200 mile limit. The potential risk of stakeholders (oil exploration, mining and deep-sea fishing) diverting their interest from continental shelf (where overfishing depleted the bulk of the fisheries in recent decades) to bathyal depths poses the concern of deep-sea biologists.

Our knowledge about the basic biology (demography, growth, maturation, fecundity, reproduction, spawning sites, nursery grounds) is meager at this juncture and this situation calls for resource mobilization to answer unanswered questions. Nevertheless, we have witnessed the dismal disappearance of orange roughy populations due to excessive fishing pressure at depths around New Zealand and Tasmanian seamounts. We are still in denial in accepting deep-sea coral beds as "reefs" and one of my faculty colleagues, a renowned tropical coral researcher, told me that "By definition a reefs is a submarine feature that interferes with boat traffic".

New Definition

Because of the immense data, originating from most recent submersible dives (*Jago* in the Sula Ridge off Norway by German- and Norwegian deep-sea biologists, *Alvin* dives in the New England Seamounts by Woods Hole marine biologists, *Johnson-Sea-Link* dives off Florida and North Carolina by American deep-sea biologists, nuclear

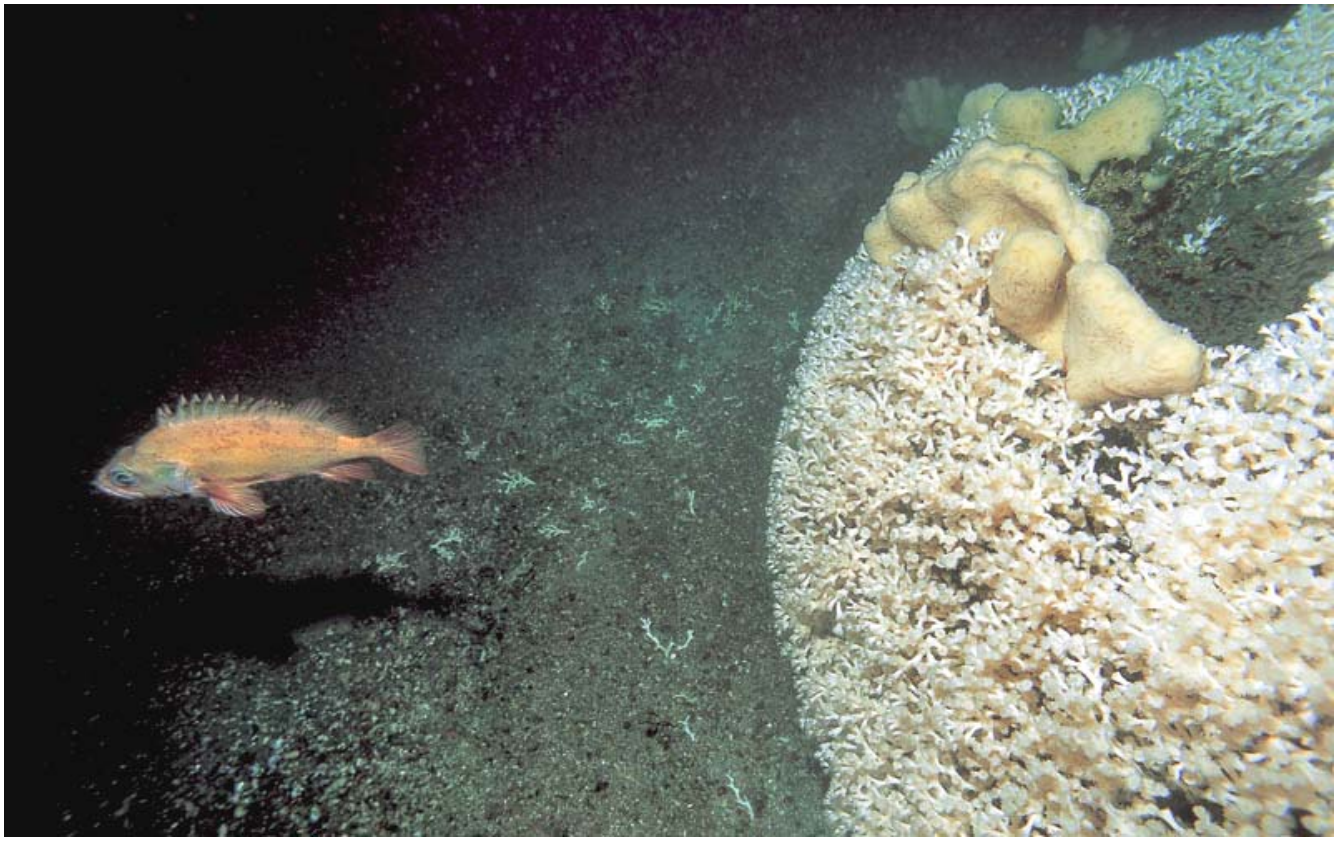

Fig. 1. The Scandinavian deep-sea coral redfish *Sebastes marinus* associated with *Lophelia* reefs off Norway and Sweden. (Photo by Erling Svensen, Norway)

submersible observations in the western Gulf of Mexico's carbon mounds by Alabama geologists and most recent *Alvin* dives by Alaskan Fisheries biologists, French research in the Bay of Biscay and work in the Darwin Mounts north of Scotland by British deep-sea oceanographers, recent research off Brazil on deep-sea *Lophelia* reefs by

South American scientists), we now have a wealth of knowledge as evident from the 1st International Deep-Sea Coral Symposium in Halifax, Canada in 2000 and 2nd International Deep-Sea Coral Symposium in Erlangen, Germany in 2003. As a member of the International Steering Committee of The Deep-Sea Coral Symposia Series, I offered a new definition of reefs in Erlangen at the Institute of Palaeoecology during the steering committee meeting: "Reef is any submarine feature that interferes with boat or submersible traffic" This new definition (see Fig. 1) brings to light the ecological significance of deep-sea coral and sea-mount ecosystems in the world oceans.

Oregon SoC for deep-sea MPAs vs SPAs

The 10th Deep-Sea Biology Symposium included two sessions, one on Human Impact on the deep-sea and the other on Deep-Sea MPAs (Marine Protected Areas), chaired by Prof. Hjalmar Thiel and Prof. Robert George. As a consequence of the follow-up discussions, a Statement of Concern (SoC) was prepared and signed by 107 participants and further endorsed by 37 participants in the 2nd International Deep-Sea Coral Symposium in Erlangen, Germany. The SoC was submitted to UN (see Thiel's article in this newsletter). What came up in the Oregon SoC is a clear distinction between HS MPAs (deep-sea beyond 200 miles as defined by US Magnusson-Stevens Act of US Congress) and HS SPAs (Science Priority Areas), the former includes canyons, sea mounts and deep-sea coral beds and the later includes soft bottom sea bed in the abyssal plain or continental rise in areas where we have good baseline data.

What is next?

From American perspectives plans are now in progress for protecting the ocean within the EEZ and adjacent high seas all around the North American continent. This new initiative is in tune with the recommendations of PEW Ocean Commission Report (released in June 2003) and the US Ocean Commission Report by Admiral James Watkins (to be out soon). US National Research Council has also come out with recommendations from the National Academy of Sciences to reorganize US Ocean policies to combat the critical issues of declining fisheries, pollution, dumping and climate change as a joint interagency venture under the executive domain of a non-governmental contractor to protect, conserve and manage the seas within and outside EEZ.

Two symposia are now planned for early 2004. During the American Geophysical Union (AGU) annual meeting in Portland, Oregon (26–30 January 2004), the Minerals Management Service (MMS) of the Department of the Interior will sponsor a deep-sea corals symposium primarily to focus on impact of oil exploration activities on deep-sea carbonate mounds (Banco de Campeche slope and De Soto slope in the Gulf of Mexico).

During its annual meeting in Seattle, the American Association for the Advancement of Science (AAAS) will hold a symposium on 15 February 2004 on "Forgotten Forests: Deep-Sea Coral and Sponge Beds", organized by Lance Morgon of the Marine Conservation Biology Institute (MCBI) and Bob George of the George Institute for Biodiversity and Sustainability (GIBS). The 7 invited speakers (Appendix 1) represent Alaska, the US West Coast, Gulf of Mexico, US East Coast south of Cape Hatteras, the Gulf of Maine and the Canadian Atlantic Coast. The goal is to arrive at the status of health of deep-sea coral beds all around the North American continent. See **www.AAAS.org** and click on "meeting" for details and abstracts.

In Table 1, the deep-sea fishes of potential commercial exploitation now and in the future are listed with the hope of protecting these species from further depletion by swift ecosystem-based management strategies that take into con-sideration habitat destruction by trawling and trapping activities. The wreckfish off the Charles Bump (300 m) off South Carolina has already become a target of overfishing, just as the orange roughy in the New Zealand seamounts. Deep-sea *Lophelia* reefs that occur over the Blake Plateau are known as nursery areas of the wreckfish.

In addition to deep-sea fishes there are several commercially important crustaceans that are identified as inhabitants on or near the deep-sea coral reefs and seamounts. The decapods (crabs) include the red crab *Chaceon quinquedens* and the golden crab *Chaceon fenneri*,. Recently large pods of Alaskan red king crabs were discovered in submersible dives as huge heaps in the day time near deep-sea sponge and coral beds off Alaska (personal communications, Dr. Braxton Dew and Dr. Richard Stone, NMFS, Juneau, Alaska). The fact that these crabs aggregate in the day and disperse in the night may become a behavior conducive for fishermen to catch them in the daytime while they congregate in huge pods. It is crucial such habitats must be protected. The commercially

important decapods also include the rock-shrimp fisheries off Florida Atlantic coast *Hymanopenuaus robustus* and the royal red-shrimp *Plesipenaus edwardsianus* that can reach as long as 9 inches but its distribution and biology still remain obscure.

Table 1. Commercially important deep-sea fishes associated with seamounts and *Lophelia* reefs in the continental margin (shelf break and slope).

Common Name	**Scientific Name**	**Deep-Sea Habitat**	**Area of Abundance**
Orange roughy	*Hoplotethus atlanticus*	Seamounts	Off New Zealand and Tasmania
Wreckfish	*Polyprion americanus*	*Lophelia* reefs	Off South Carolina, USA
Rattail fish	*Coryphaenoides armatus*[1]	*Lophelia* reefs	Off North Carolina, USA
Atka mackerel	*Pleurorammus monopterygus*	Gorgonian forests	Off US West Coast
Rockfish	*Sebastes ruberrinus*	Hydrocoral habitats	Off US West Coast[2]
Shortspine thornyhead rockfish	*Sebastolobus alascanus*	Octocoral beds	Off Alaska
Scandinavian redfish	*Sebastes marinus* (Fig. 1)	*Lophelia* reefs	Trondheim Fjord, Norway
Ling cod	*Molva molva*	*Lophelia* reefs	Off Norway and Sweden
Tusk or wolf fish	*Bromse bromse*	*Lophelia* reefs	Off Norway and Sweden

[1] *Coryphaenoides rupestris* is more common on the Mid-Atlantic Ridge.

[2] A total of 96 different rockfish spp. are known from the US West Coast as opposed to just 4 spp. on the US Atlantic coast where scleractinian corals are more common.

The international steering committee, headed by Prof. Andre Freiwald of Erlangen University in Germany and Dr. Murray Roberts of Scottish Marine Biological Association, decided in their last meeting in September 2003 to hold the 3rd International Deep-Sea Coral Symposium in USA in 2005. I serve on this committee. A decision was made upon my request not to hold the deep-sea coral symposium to coincide with the tri-annual deep-sea biology symposia (next one scheduled for 2006 in Southampton). The committee unanimously approved to break the tri-annual cycle of the deep-sea coral symposia and will organize the next one in 2005. I might add here that it was tough or impossible for several deep-sea biologists to attend both the Oregon and Erlangen symposia in 2003. Such concurrent symposia will not occur again in the same year.

Charleston, South Carolina is now proposed as the venue for the 3rd International Deep-Sea Coral Symposium in September 2005. I am pleased to announce that we will also hold a workshop for a full day, following this 4-day symposium, to recommend to UN General Assembly several deep-sea MPAs and SPAs from different oceans with an agenda for implementation from 2006 to 2012. Deep-sea biologists with any scintillating ideas or well-conceived proposals on potential deep-sea areas for consideration as either MPA or SPA, please contact me at the e-mail below.

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Appendix 1

AAAS Symposium: "The Forgotten Forests: Deep-Sea Coral and Sponge Beds". 15 February 2004, Seattle, Washington.

Deep-Sea Corals: A Global Perspective. Lance Morgan, MCBI, California. — Deep-Sea Scleractinian Coral Hills and Gorgonean Forests off the Southeastern United States. Robert Y. George, GIBS, North Carolina. — Depth Distribution, Fisheries Interactions and Habitat of Deep-Sea Corals in the Aleutian Islands of Alaska. Bob Stone, NMFS, Juneau, Alaska. — Deep-Sea Corals in the Gulf of Mexico. Will Schroeder, University of Alabama Dauphin Island Sea Lab. — The Discovery and Conservation of Corals in Nova Scotia. Martin Willison, Dalhousie University, Halifax, Canada. — Historical Records and Current Distribution of Deep Sea Corals in the Gulf of Maine. Anne Simpson, University of Maine. — International Conservation Initiatives. Lee Kimball, IUCN, Washington, D.C.

THE BATHYAL GREENLANDIC BLACK CORAL REFOUND: ALIVE AND COMMON

It is a long established tradition that officials, doctors, teachers and other laymen in Greenland bring strange specimens they come across to the attention of the Zoological Museum in Copenhagen. On such an occasion late in 1870, Christian Lütken, at that time professor of zoology, was greatly surprised. The director of the Greenland Trade Company sent the skeleton of a black coral from Rodebay, north of Ilulissat (Jacobshavn at the time), West Greenland. Furthermore, the finding place was odd: the stomach of a shark, *Somniosus microcephalus*. Obviously, Lütken was very enthusiastic about the unusual catch, and he immediately described it as *Antipatharia arctica* (Fig. 1) (Lütken 1871, in Danish, translated into English 1872). The description came in time to be referred to in Lütken (1875), the first survey of the Greenland invertebrate fauna since that of Fabricius (1780).

Fig. 1. *Bathypathes arctica* (Lütken, 1871). The specimen is 11 cm high.

The second find was by the British Expedition with *Valorous* in 1875, during which a small fragment of a skeleton was sieved from the sediment of a sample from 750 m depth, at 64°5'N, 56°47' W (St. 6) in the Davis Strait (Norman 1876).

Antipatharia arctica was again found in stomach contents of sharks several times during the following decades (1881, 1894, 1905, 1913 and 1931) in different places in West Greenland (Jungersen 1915, Kramp 1932).

The first record of specimens with polyps and tissues was by the Danish *Ingolf* Expedition in 1895, from a depth of 1071 m at 63°30'N, 54°24'W (St. 25), published by Jungersen (1915). The second and most recently published record of living specimens was by Kramp (1932), from the *Godthaab* Expedition 1928, from a depth of 1200 m at 63°36'N, 55°15'W (St. 179).

In a wider context, *A. arctica* was at first met with some doubt by Brook (1889), who revised the whole group when writing about the antipatharians of the *Challenger* Expedition. He placed it in an *incertae sedis* position, accepted it as a good species but refrained from including it in any of the known genera because of the lack of knowledge about the polyps at the time. Jungersen (1915), in his contribution to the third survey of the Greenlandic fauna, *Conspectus Faunae Groenlandicae*, without comments on the polyps accepted both the species and the generic position. Pax (1932) analysed details of the few specimens that had been caught alive and concluded that *A. arctica* should be transferred to the genus *Bathypathes*. When compiling the list of North Atlantic antipatharian species, Van der Land & Opresko (2001) agreed on this taxonomic position.

As part of our work on a "Catalogue of the Marine Benthic Invertebrates of Greenland" some of the unidentified collections in the Zoological Museum in Copenhagen were investigated. Quite a number of samples containing *Bathypathes arctica* were found, originating from shrimp test-trawlings by the Greenland Institute for Natural Resources (Nuuk, Greenland) with the *Shinkai Maru* in 1991 (Fig. 2):

Haul 7, 63°34.9'N, 54°38.8'W, 1120 m, 6 Aug 1991 (1 skeleton). – Haul 15, 63°27.5'N, 56°09.9'W, 1241 m, 7 Aug 1991 (1 colony and some fragments, both with polyps). – Haul 18, 64°05.6'N, 54°55.0'W, 1140 m, 8 Aug 1991 (1 colony with polyps). – Haul 19, 63°57.3'N, 55°22.2'W, 1153 m, 8 Aug 1991 (1 fragment with polyps). – Haul 21, 63°35.7'N, 55°18.5'W, 1196 m, 8 Aug 1991 (1 fragment with polyps). – Haul 23, 64°07.8'N, 54°02.2'W, 739 m, 9 Aug 1991 (1 fragment with polyps). – Haul 28, 64°25.9'N, 55°39.7'W, 1040 m, 10 Aug (1 colony with polyps). – Haul 40, 63°43.0'N, 57°08.3'W, 1424 m, 12 Aug 1991 (1 colony with polyps). – Haul 41, 63°48.9'N, 56°53.1'W, 1204 m, 12 Aug 1991 (1 fragment with polyps). – Haul 92, 68°22.8'N, 56°40.8'W, 461 m, 22 Aug 1991 (1 fragment with polyps).

One further sample was taken in 1992, also by the *Shinkai Maru*: Haul 47, 63°34'N, 53°54"W to 63°32'N, 53°53'W, 1082–1072 m, 3.3°C, 7 Dec 1992 (1 large colony with polyps, Fig. 3). See also Appendix 1.

Antipatharians are widely distributed in the deep sea but are generally rare animals, at least as judged from samples and photographs (Hersey 1967, Heezen & Hollister 1971, Pasternak 1977, Tyler & Zibrowius 1992). Many species and higher taxa are poorly delimited (Pasternak 1977, Grasshoff 1981a, b).

Bathypathes arctica is known only from the area west of Greenland (Fig. 2). It has been recorded from 63°30'N to ca. 72°N, at depths from 461 to 1424 m, with 8 of the 14 records where the sampling depth is known being between 1000 and 1200 m. From the few temperature measurements taken at the time of the catch and from the general distribution of water masses off West Greenland, it appears that *B. arctica* lives in Atlantic Water of 3–5°C, viz. the Irminger Water (IW) and the underlying Northeast Atlantic Deep water (NEAD) (Nielsen 1928, Buch 1991). The record from about 72°N, off Upernavik (Kramp 1932), is from a shark stomach, and the depth where it lived is, accordingly, not known.

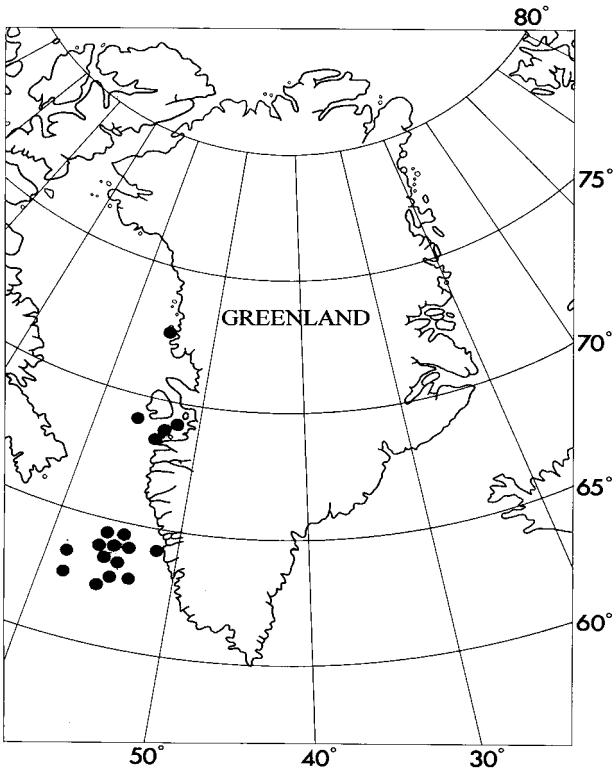

Fig. 2. The distribution of *Bathypathes arctica* off West Greenland.

The temperature around 500 m depth is between 2 and 3°C, so the species may here be at its distribution limit, or the specimen may have been transported by the shark from further south.

One record outside the Greenland distribution area has been somewhat debated. Thomson (1909) reported on a 1-m-high antipatharian which was said to have been caught by a trawler northeast of the Faroes. Thomson identified the specimen as *Parantipathes larix* (Esper, 1792), a species both at the time and especially nowadays known to be widely distributed in the East Atlantic bathyal zone at 300–1500 m depth, from the Bay of Biscay to the Cape Verde Islands, including Tenerife and the Azores (Grasshoff 1981b, 1985). Pax (1932) simply declared that he disagreed with Thomson in the identification and that the Faroese specimen was a *B. arctica*. He seems not to have seen the skeleton described by Thomson. From the descriptions, Thomson's opinion seems to be the more reasonable to the non-specialist, and possibly also the accuracy of the stated finding place can be questioned. It is noteworthy that during the intensive Inter-Nordic investigations around the Faroes (BIOFAR) and Iceland (BIOICE), running since 1987, *B. arctica* has so far not been found. For the time being the species is to be considered endemic to the relatively small geographic area off West Greenland, but the final answer to that question will only be found when more is known about the antipatharian species of the northern and western Atlantic continental margin.

Bathypathes arctica seems to occur regularly off Southwest Greenland, although not taken in all catches and never in large quantities. It is relatively small, probably at most about 30 cm high, and is fixed to a hard substrate with a basal disc. On otherwise soft bottoms it may occupy a special habitat, dropstones. That a number of specimens are reported from the stomach of *Somniosus* may reflect the omnivorous habit of the shark; probably they were swallowed together with some more attractive prey living among the branches of the coral.

Fig. 3. The colony of *Bathypathes arctica* from *Shinkai Maru* 1992, tow 47. Photo Tammes Menne.

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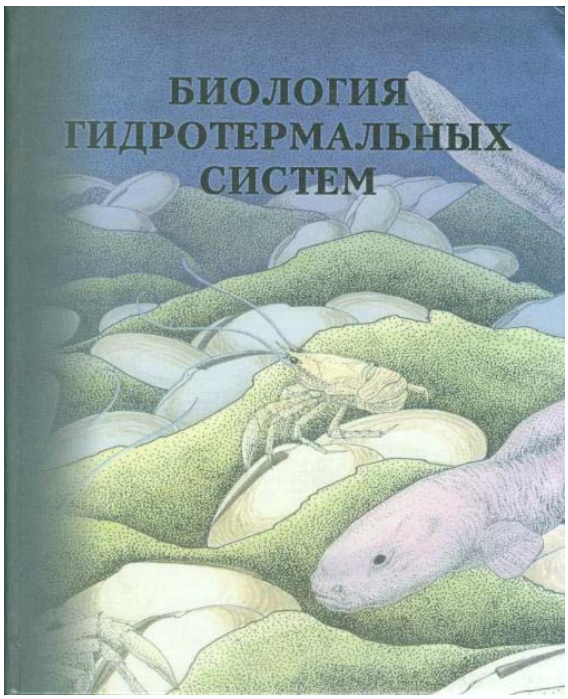
Appendix 1

Previous records of *Bathypathes arctica* (all material in ZMUC)

Rodebay, N of Jacobshavn, W. Greenland, 1870, from the stomach of a shark (1 colony). – 64°5'N, 56°47'W, 750 m, *Valorous*, 1875 (1 fragment). – "Greenland", 1881, from the stomach of a shark (1 colony). – Jacobshavn, W. Greenland, 2 March 1894, from the stomach of a shark (1 colony). – 63°30'N, 54°25'W, 1096 m, 3.3°C, 26 June 1895, *Ingolf* St. 25 (several large colonies). – Godthaab, W. Greenland, 1913, from the stomach of a shark (1 colony). – 68°37'N, 51°44'W, Ikamiut, 1905 (1 colony). – Near S. Upernavik, 72°09'N, W. Greenland, from the stomach of a shark (1 colony). – 63°36'N, 55°15'W, 1200 m, 3.3°C, 5 October 1928, *Godthåb* St. 179 (several colonies).

The order Antipatharia, Black Corals, comprises about 200 nominal species, characterised by colonial organisation with a rigid skeleton and small polyps with 6–24 non-retractile tentacles. They live in all the three large oceans, most commonly in the tropics at depths below 100 m. Some of the large species growing 1–2 m high and provided with a thick central skeleton are in demand for jewelry and are threatened by tangle-net fishing, divers and even ROV-collecting.

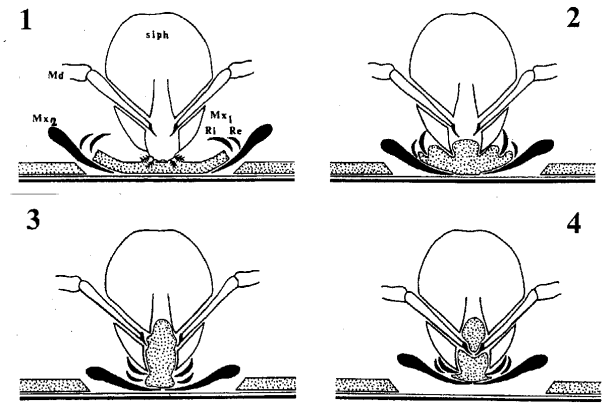
A RUSSIAN BOOK ON HYDROTHERMAL VENTS



BIOLOGY OF HYDROTHERMAL SYSTEMS.
Review of A. Gebruk (ed.). 2002.
KMK Press, Moscow. 543 pp.
500 copies printed. ISBN 5-87317-099-1.

I must state at the beginning that I am not a hydrothermal vent biologist, although I am generally familiar with vents and their fauna. I am a deep-sea ichthyologist, and am not in a position to assess the accuracy, completeness, or point of view of the literature on hydrothermal vents. When Torben asked me to review *The Biology of Hydrothermal Systems* (primarily because I can read Russian) and compare it to Van Dover's *The Ecology of Deep-Sea Hydrothermal Vents*, I agreed reluctantly because I felt uncomfortable reviewing a book not in my field and in a foreign language in which I cannot say I am fluent. However, having looked through it in detail, I believe I can provide useful information about the book to those of you who are interested in this topic.

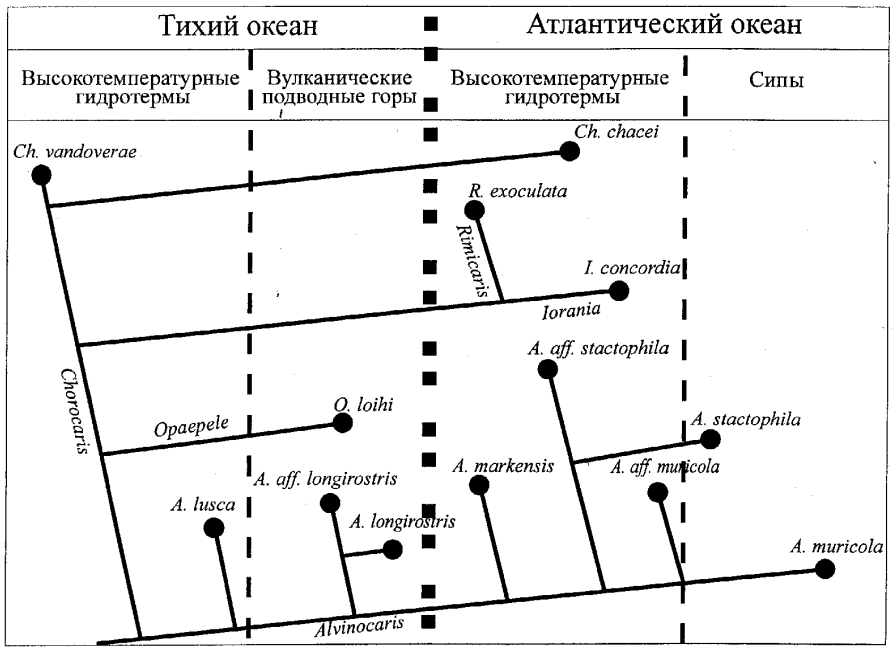
This is an attractive book: the covers show an artist's color drawing of vent organisms *in situ*, and I was pleased to see a zoarcid fish shown prominently on the front! The quality of the printing, figures (including the color plates), and paper is high, although the inexpensive binding is unlikely to hold up well with usage. Except for the title page, table of contents, scientific names, and non-Russian literature citations, the book is entirely in Russian. It is composed of 16 chapters (and, within the taxonomic chapter, subchapters) by Russian specialists; Gebruk himself wrote or coauthored three of these in addition to the preface. It is well illustrated, with figures and photographs, including a section of color plates showing the *Mir*s, their support vessel, the *Akademik Mstislav Keldysh*, different vents and their faunas, and a chart of the world on which are plotted both hot vents and cold seeps in marine and fresh waters, spreading centers, subduction zones, and other information. Chapters vary in the number and kinds of figures provided, depending on appropriateness. The figures are useful; the majority are abstracted from either Russian or non-Russian sources, but many are new for this book (three of these are shown here). All literature cited is collected at the end, divided (as is usual for Russian publications) into Russian and then non-Russian alphabetized lists. In addition, there is a 12-page supplement listing invertebrate species associated with vents, their feeding type, distributions, and references for the information.



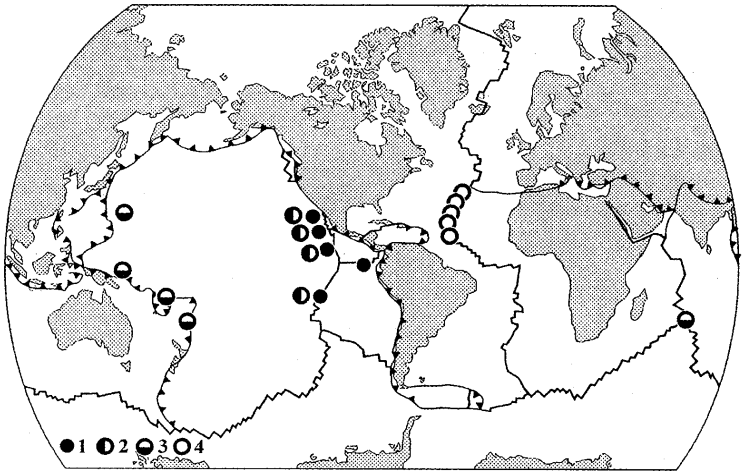
Supposed phases of feeding of [the copepod] *Aphotopontius mamillatus* [Dirivultidae, from the East Pacific]. 1 – cutting and start of undercutting of food substrate by maxillae with simultaneous seizure of it by upper and lower lips; 2 – beginning of formation of food bolus by use of maxillules; 3 – finishing formation of food bolus and its drawing into mouth cavity; 4 – cutting off of first part of bolus and its ingestion (M. V. Geptner & V. N. Ivanenko. "Copepoda". Ch. 7, p. 171, Fig. 4).

Included are chapters (and their authors) entitled (in order): 1. "Hydrothermal biotope and hydrothermal vent fauna: general remarks" (Gebruk & Galkin), 2. "Discovery and exploration of hydrothermal vents and cold methane and sulphide seeps in the world ocean" (Moskalev), 3. "Deep diving manned submersibles and studies of hydrothermal vents at the P. P. Shirshov Institute of Oceanology" (Sagalevich), 4. "Submarine hydrothermal vents as a habitat for marine organisms" (Bogdanov), 5. "Microorganisms in hydrothermal communities" (Gal'chenko),

and 6. "Thermophilic microorganisms in marine hydrothermal systems" (Bonch-Osmolovskaya). Chapter 7 "Hydrothermal fauna: composition, biology, and adaptations" is divided into subchapters on Polychaeta (Detinova), Copepoda (Geptner & Ivanenko), Cirripedia (Moskalev), Amphipoda (G. M. Vinogradov), Shrimps (Decapoda, Macrura, Natantia) (Vereshchaka & Gebruk), Pycnogonida (Turpaeva), Gastropoda (Moskalev), Bivalvia (Krylova), Octopoda (Nesis), Brachiopoda (Zezina), Vestimentifera (Galkin & Malakhov), and Pisces (Parin). The remaining chapters are entitled: 8. "Meiofauna of hydrothermal zones and other reducing biotopes" (Mokievskiy & Kamenskaya), 9. "Effect of hydrothermal vent fields on oceanic plankton" (G. M. Vinogradov & M. E. Vinogradov), 10. "Environment and biota of shallow-water hydrothermal vents of the west Pacific" (Tarasov), 11. "Role of bacterial production at active hydrothermal fields in the total balance of organic carbon in the ocean (Lein & Pimenov), 12. "Isotopes of carbon, sulphur, and nitrogen in hydrothermal systems" (Lein), 13. "Trophic structure of hydrothermal communities" (Gebruk, Galkin & Lein), 14. "Spatial-ecological structure and biogeography of hydrothermal communities" (Galkin), 15. "Geography of hydrothermal vent communities and obligate hydrothermal taxa" (Mironov, Gebruk & Moskalev), and last, 16. "Origin and evolution of hydrothermal vent ecosystems" (Kuznetsov).



Initial diagram of phylogeny of the benthic shrimp family Alvinocarididae in the world ocean (A. L. Vereshchaka & A. V. Gebruk. "Hydrothermal fauna – shrimps." Ch. 7, p. 196, Fig. 7).



Distribution of crabs of the obligate hydrothermal family Bythograeidae Williams, 1980. An example of the broad-zonal distribution of family distribution and linear (meridional) ancestral distribution. 1 – *Bythograea*, 2 – *Cyanograea*, 3 – *Austinograea*, 4 – *Segonzacia* (A. N. Mironov, A. V. Gebruk, & L. E. Moskalev. "Geography of hydrothermal vents…" Ch. 15, p. 436, Fig. 8). [Missing is *Allograea*, described 2002, from the SE Pacific.]

The different chapters approach the subject from historic, taxonomic, and ecological perspectives. I found this very useful, because (for instance) Chapter 2 by Moskalev, "Discovery and exploration of hydrothermal vents and cold methane and sulphide seeps in the world ocean" lists and discusses discoveries and research results from 1977 through 2000 in more or less chronological order and also has additional sections on "Fundamental Publications" 1980–86, 1987–1998, and 1999–2000. For a reader who is interested in the history of vent exploration and the development of our knowledge of their distribution, communities, and physiology, this is valuable. As a taxonomist, I was most interested in Chapter 7, Hydrothermal fauna: composition, biology, and adaptations, because I was able to get a good idea of the taxonomic, morphological and distribu-

tional diversity of the different groups without having to skim through the entire book. Naturally, the lengths of the sections frequently differ not only because of the available information, but because of the authorship and the emphasis on specific topics.

Comparison with C. Van Dover, 2000[1]: *The Ecology of Hydrothermal Vents*

These two books are remarkably different in their approach to describing hydrothermal vents and organisms. Gebruk is a compendium of linked articles on individual taxa and topics; Van Dover focuses more on the system, its physical characteristics, and its ecology; I understand that this was envisioned as more of a "textbook", and this approach is clearly reflected in the book's organization and content. The differences are reflected in chapter titles. Van Dover approaches vent communities from a synthetic perspective; her chapters are topics, not taxa: reproductive ecology, symbiosis, physiological ecology, microbial ecology, cognate communities and others. Her book begins with four separate chapters describing the non-vent deep sea, the geological setting, chemical and physical properties of vent fluids, and characteristics of vent plumes before a chapter discussing biology, whereas Gebruk's first chapter is entitled "Hydrothermal biotope and hydrothermal vent fauna: general remarks" and only one chapter (by Sagalevich) omits discussion of biology, and that is because it is a description of submersibles and their history of use in studying vents.

Looking at the literature cited in the two volumes was instructive: I found only one paper in Russian cited by Van Dover, and few Russian authors even in other languages; I found few citations of the chapter authors in Gebruk. Conversely, there were extensive citations of non-Russian authors in Gebruk. Of the 57 pages of references in the latter, 13 were Russian literature and 43 were non-Russian. This might simply reflect amount of literature on the subjects covered, but I suspect that it also reflects a more cosmopolitan outlook of Russian scientists, because they often have at least good reading knowledge of other languages, especially English. Thus, North American and western European researchers are less familiar with Russian work than the reverse. It seems to me that this is a problem for the former group that needs to be corrected. Of course, it also means that in the future, Russian investigators should try to publish more in English (this book is an example).

Utility

In conclusion, even though it is in Russian, I recommend this book to anyone with serious interests in vent organisms. I suggest selecting the part(s) most important to you and having it (them) translated! It is unfortunate that it's not in English, because the two volumes compared here complement one another. By reading both, you can acquire both a general and a specific understanding of the history of vent exploration, the history and function of the physical environment, the taxonomic structure and function of vent communities, and the evolution of the incredible animals that live associated with them.

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Note from the Editors:

Sasha Vereshchaka (P. P. Shirshov Institute of Oceanology, Moscow) kindly informed us that many Russian journals are fully translated into English and thus are available for the "English-reading" community. See: http://www.maik.rssi.ru for a list and free access to abstracts. Among these journals are the following:

Oceanology (Okeanologiya) – most important
Doklady Biological Sciences
Journal of Ichthyology
Microbiology
Russian Journal of Ecology
Russian Journal of Marine Biology
Russian Journal of Zoology – Since 2000, the English version of Zoologicheskii Zhurnal, the journal of the Russian Academy of Sciences.

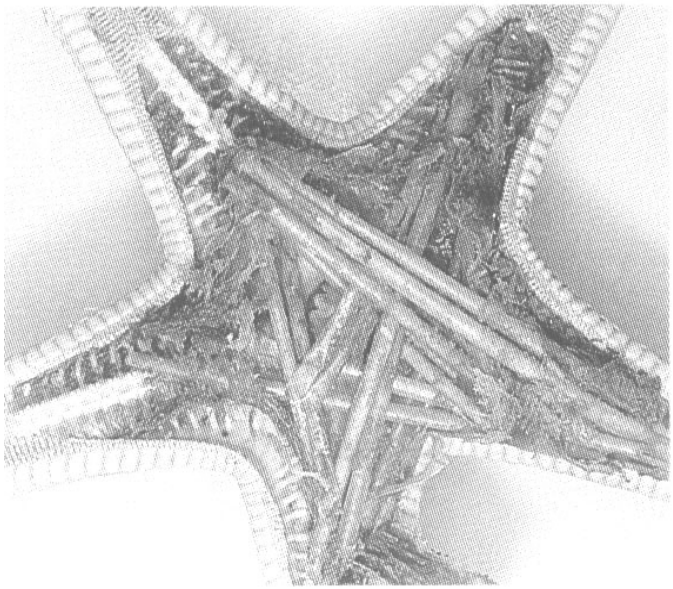
[1] Review by Daniel Desbruyères in Deep-Sea Newsletter No. 30: 24–25 (2001).

BLUE WATER, BLACK ABYSS

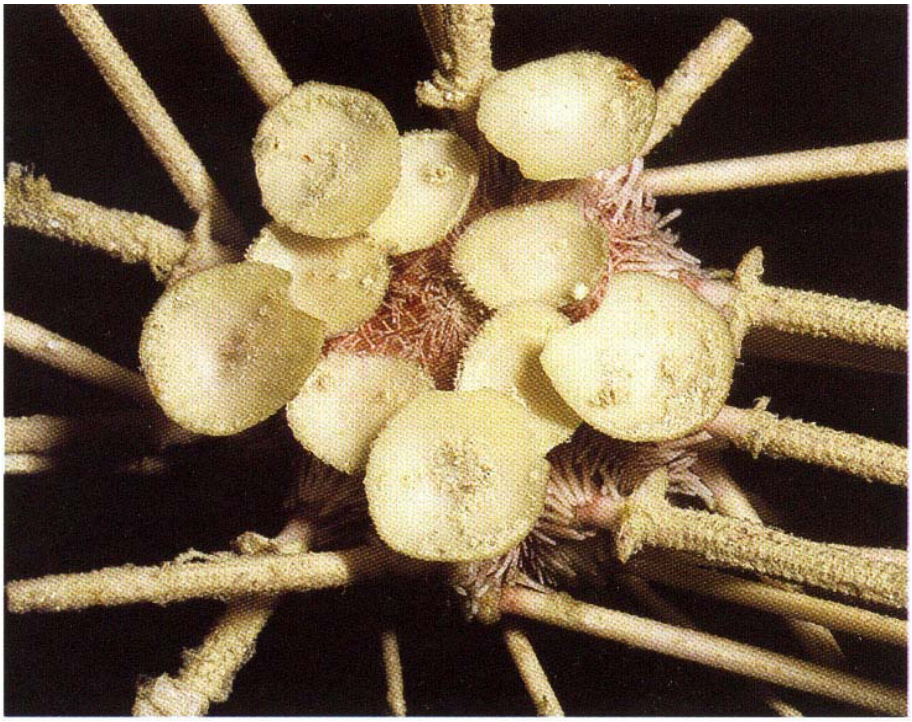
DEEP NEW ZEALAND – Blue water, black abyss.
Peter Batson. 2003.
Canterbury University Press, Christchurch, New Zealand.
240 pp., hardbound, US $45.00.
ISBN 1-877257-09-5.

Those present at the Coos Bay symposium who had an opportunity to leaf through the wonderfully illustrated book on marine life in the waters around New Zealand will probably agree with me in this statement: This popular-scientific book on animals in New Zealand high seas and ocean depths is no doubt the esthetically most exquisite publication on oceanic life issued so far.

The author is the remarkably young Ph.D. student Peter Batson, who participated and showed a poster on megafauna of the Otago Canyon at the symposium. Peter is himself a skilled draughtsman and, together with Craig McVie, an excellent photographer of preserved specimens. In addition, he has managed to draw upon some of the leading nature photographers, headed by Kim Westerskov, one of the world's top marine photographers and the only person to win five grand prizes in the prestigious Wildlife Photographer of the Year competition. For instance, his seascape- and underwater photos, from whalefish to jellyfish beauties, are formidable. The book's layout is most attractive, with many half- or full-page photos and otherwise a rather narrow edge space being available for figure legends and the smallest illustrations.

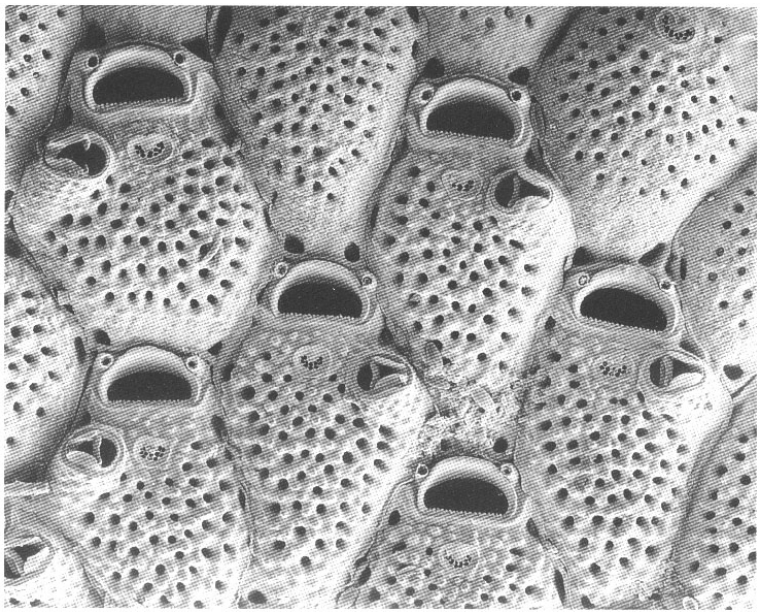


The bathyal *Proserpinaster neozelandicus* dissected, revealing rigid quill worm tubes that have been eaten whole, the deep equivalent of sword swallowing! Photo Steve O'Shea, NIWA.



The deep-water urchin *Goniocidaris parasol* has modified spines shaped like small umbrellas. Photo Mark Lavaleye.

The first of three introductory chapters on the environment deals with the fascinating bottom topography around New Zealand and the sediments. The second chapter covers the third dimension and includes bioluminescence and ocean currents with a very instructive three-dimensionally coloured chart. The third chapter, on ecology, brings inter alia hot news from the most recently discovered hydrothermal vents along the Kermadec Arc towards the north.



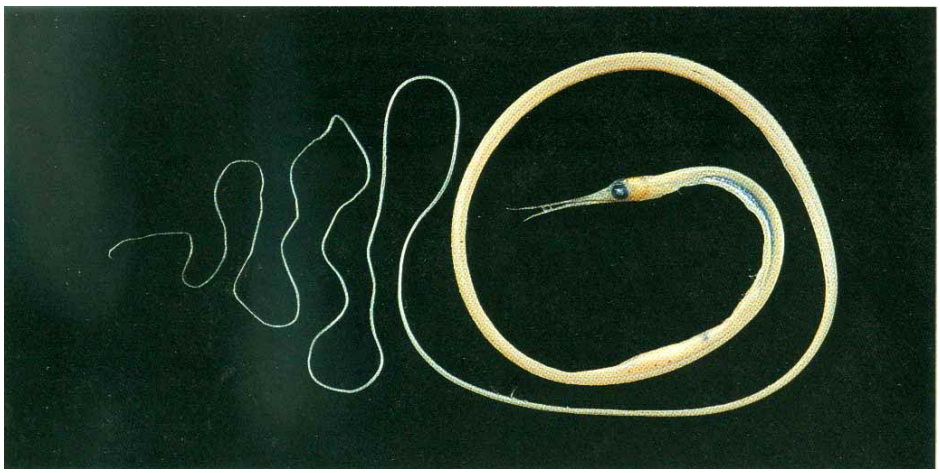
A horde of disgruntled toads? No, these are the zooids of the bryozoan *Microporella discors*, a species recorded from the Chatham Rise. Photo Abby Smith.

The main part of the book deals with biodiversity, being a well written account of organisms, with emphasis on the deep sea. The concluding chapter on fishing and over-exploitation, protection of vulnerable seamount faunas and the demand for seafloor sanctuaries is followed by a glossary, selected references and an index.

New Zealand is regarded as geographically remote. With his attractive and informative book Peter Batson has succeeded in bringing into focus an environment and a fauna which now appears much less distant than before.

Torben Wolff
Zoological Museum, University of Copenhagen

Deep-water by-catch: worldwide, millions of tonnes of non-target organisms are dumped at sea each year. Photo Craig McVie.



The proportions of a pale snipe eel, *Nemichthys scolopaceus*, invite comparison with a long shoelace. Photo Craig McVie.

Editors' note: Images on these pages are low resolution and cannot do justice to the books they are taken from.

THE DEADLINE FOR THE NEXT ISSUE OF D-SN IS 1 DECEMBER 2004

Contributions may be sent as e-mail attachments in Word (any version), WordPerfect 5.x to 6.0 (Windows), RTF or ASCII to: Torben Wolff or Mary E. Petersen (mepetersen@zmuc.ku.dk)

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