GeoBio-Center[LMU]-News Flash, June 2003

Important Dates / Activities

March, 10th. 2003: 1st. annual **GeoBio-Center[LMU]**-members meeting was held in Palaeontology building of LMU. 32 members and guests were present. Major outcomes are:

a. 3 representatives of extraordinary members selected by the attending extraordinary members (Martin Nose, Palaeontology, Christine Ehrhart, Botany LMU, Frank Glaw, ZSM).
b. List of persons created for the Curatorium / Advisory Board of **GeoBio-Center[LMU]**
   Prof. Dr. J. Lipps, Berkeley (confirmed)
   Prof. Dr. W. Schopf, UCLA (confirmed)
   Prof. Dr. J. Thiede, AWI Bremerhaven (confirmed)
   Prof. Dr. N. Jürgens, Uni. Hamburg, Botanik
   Prof. Dr. A. deRicqlès, Paris
c. Fruitful discussion of potential major research fields for **GeoBio-Center[LMU]**:
   1. Origin of life and evolutionionary trends during earths' history.
   2. Ecology and geobiology of modern and ancients reefs.
   3. Response of terrestrial ecosystems under human occupation.

March 15th – April 17th: RV Meteor-Expedition with **GeoBio-Center[LMU]** participation to the Benguela upwelling area:
During the cruise **GeoBio-Center[LMU]** -members Prof. Altenbach and Dr. Struck sampled anaerobic sediments and the water column off Namibia for paleoclimatological and micropalaeontological investigations.

June 6th – January 16th, 2004: New special exhibition in Paleontology Museum:

Das Paläontologische Museum München und das GeoBio-Center[LMU]
laden Sie und Ihre Freunde ein
zur Besichtigung der Sonderausstellung

Riffe - Oasen der Weltmeere
seit drei Milliarden Jahren

Ausstellungsdauer:
6. Juni 2003 - 16. Januar 2004

The Reef Exhibition is designed for, and in joint cooperation produced by, high schools from

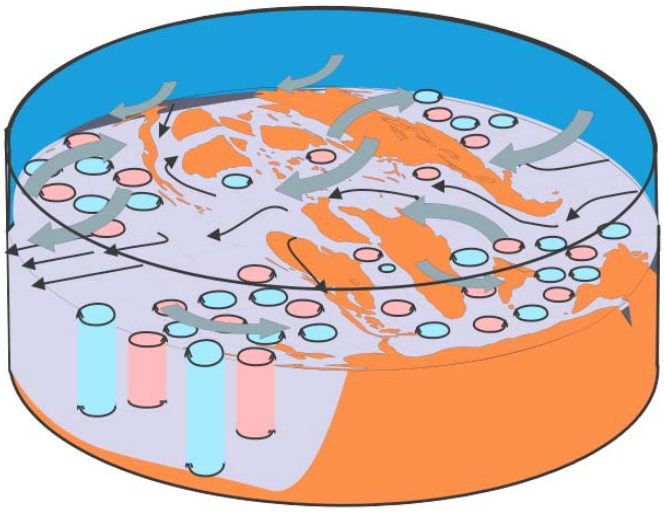
Bavaria, and now presented to the public. From 2004 onwords the exhibition can again be borrowed by schools for triggering and supporting educational reef projects for school education. At the opening event, Reinhold Leinfelder, speaker of the GBC, gave an introductional presentation (a web version of which is available under www.palaeo.tv/talks/reeftalks.html) and StD Hartwig Pöschel from the Willibald-Gluck-Gymnasium at Neumarkt/Opf., provided a fasctinating presentation on his personal experience of initiating school projects with the reef exibition. Joint projects in biology, geography, chemistry, physics, art, german and english language were successfully established at Neumarkt. The exhibition was then opened by Hubert Miller, General Director of the Bavarian Natural History Collections.

The GeoBio-Center^{LMU} and the Palaeontological Museum Munich provide a lot of accompanying educational material, from a free working book (pdf-version), to teacher-produced work sheets, reef video, wall chart, web material, guided museum tours and practical courses for teachers and school students. More information at www.riffe.de/ausstelllung

June 11th 2003: Lecture about „Some speculations about the oceanic circulation in the Cretaceous“ by William W. Hay (Geomar, Kiel).

The modern global oceanic circulation is governed by (trade-)wind induced surface currents and a thermohaline deep water circluation the so called „salty conveyor belt“. In contrary according to model results, the Cretaceous circluation pattern might have been generated mainly by „eddies“ in different dimensions (figure). Eddy-dominated circulation patterns might be typical for „greenhouse“-episodes, but cannot yet be modeled with numeric global circulation models, all of which are strongly biased by using modern ocean circulation as a standard.

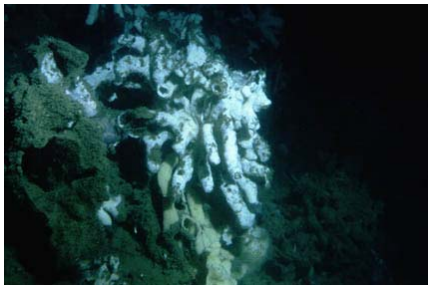
Figure: Eddy type circulation pattern in the cretaceous ocean (graph kindly provided by: William W. Hay (Geomar, Kiel).



Research of GeoBio-Center[LMU] members highlighted

PD. Dr. Manfred Krautter,

Institut für Geologie und Paläontologie, Universität Stuttgart, Herdweg 51, D-70174 Stuttgart. (for more details see members list at „www.geobio-center.de“

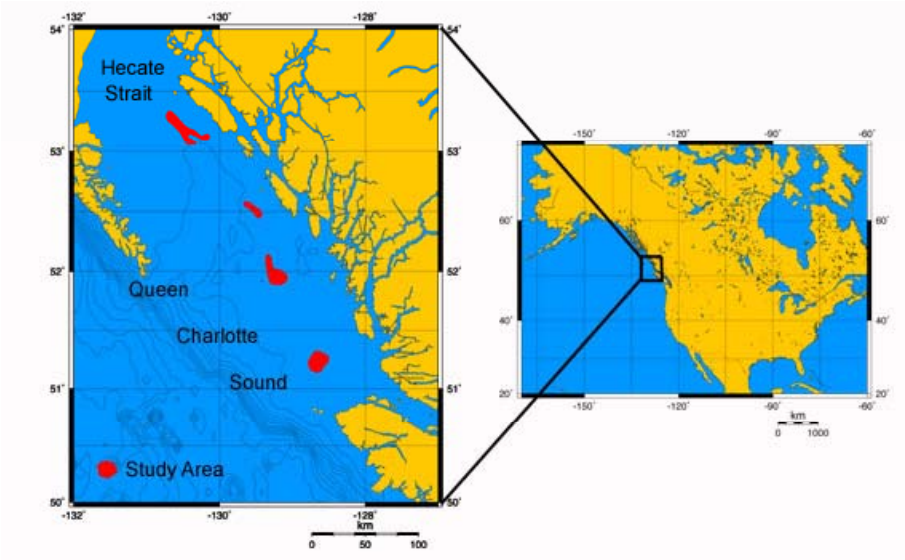



Photos: Left, Manfred Krautter, right, siliceous sponge species *Heterochone calyx* (Hexactinellida: Hexactinosida) under investigation.

Siliceous sponge reefs or mudmounds occur several times in Earth history and they culminate in the Late Jurassic where they formed a discontinuous deeper water reef belt extending more than 7000 km. This reef system was the largest biotic structure ever built on earth. The largest reef of today, the Great Barrier Reef in Australia (2000 km), is relatively small compared to the Jurassic sponge reef belt.

Paleogeographic situation during Late Jurassic (150 million years ago).
(Map used and modified after Blakey, 2002)

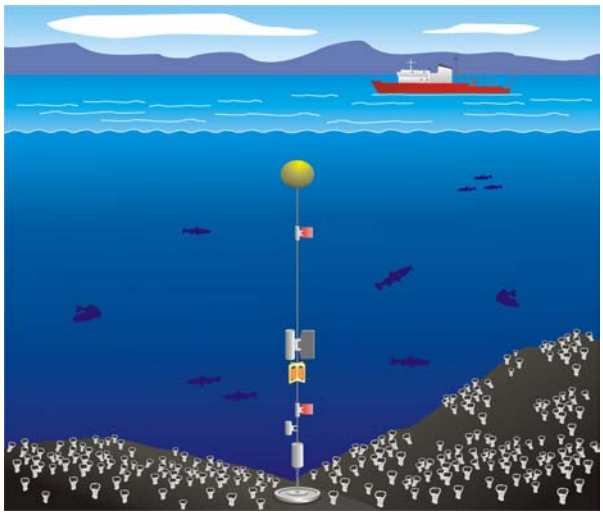
In 1991 a group of Canadian scientists (J.Vaughn Barrie, Kim Conway, John L. Luternauer and Bill Austin) described a modern analogue to the fossil reefs from the shelf off the west coast of Canada for the first time *(Conway, K.W., Barrie, J.V., Austin, W.C. & Luternauer, J.L. (1991): Holocene sponge bioherms on the western Canadian continental shelf. - Continental Shelf Research, 11:771-790; London)*. Prior to this work it was presumed that this type of reef had died out a long time ago. The only known occurrence of these hexactinellid sponge reefs, worldwide, is off British Columbia, Canada (see map below).



Hexactinellid sponges form extensive mudmounds on the low angle, sediment starved continental shelf off western Canada. The reefs occur in water depths between 160 and 250 m and are often situated along iceberg furrows carved into the seafloor during late Wisconsinan glaciation (13000 years ago). Today the sponge reefs cover an area of about 1000 km2.

The largest sponge mounds are up to 21 m high and show remarkably steep slopes, up to 90°, on the flanks. In addition to the mound, or biohermal structures, there are also large biostromal structures which cover many square kilometres of seafloor. These reach thicknesses from 2 to 10 m in southern and central Queen Charlotte Sound.

In 1999 a team of German and Canadian scientists explored these unique reefs-for the first time anywhere by direct observation. The submersible *Delta* and the research vessel *CCGS JOHN P. TULLY* were employed to examine the geology and biology of the sponge reefs. Two more multi-parameter survey cruises to the sponge reefs were undertaken in 2001 and 2002 in order to collect more data . During all cruises, we used different geological, geophysical, and oceanographic methods to examine the sponge reefs and their physical and oceanographic environment.
In 2002 three were deployed on the seabed equipped with Baker sediment traps, two current meters and „sponge nursery“. This device with four vanes made from different materials to seewhich is most attractive sponge larvae looking for a substrate to settle: glass, ceramic tile, slate and sponge skeletons.



Moorings were deployed on the seafloor equipped with several monitoring measuring systems.


Henry Reiswig, the Nestor of hexactinellid sponge biology, with the sponge nursery.

A detailed investigation of these modern reefs will help to provide a means of understanding the paleoecology and structure of the fossil reefs, as well as provide a window to observe the paleoenvironment which supported incredibly prolific sponge reefs during the Age of Dinosaurs. The project will use the present day shelf off B.C. as a key to the past environments that existed during the time of formation of the vast sponge reef belt during the Age of Dinosaurs. The present is the key to the past, and the past is the key to our future.

Why are the Hexactinosan sponge reefs so fascinating?

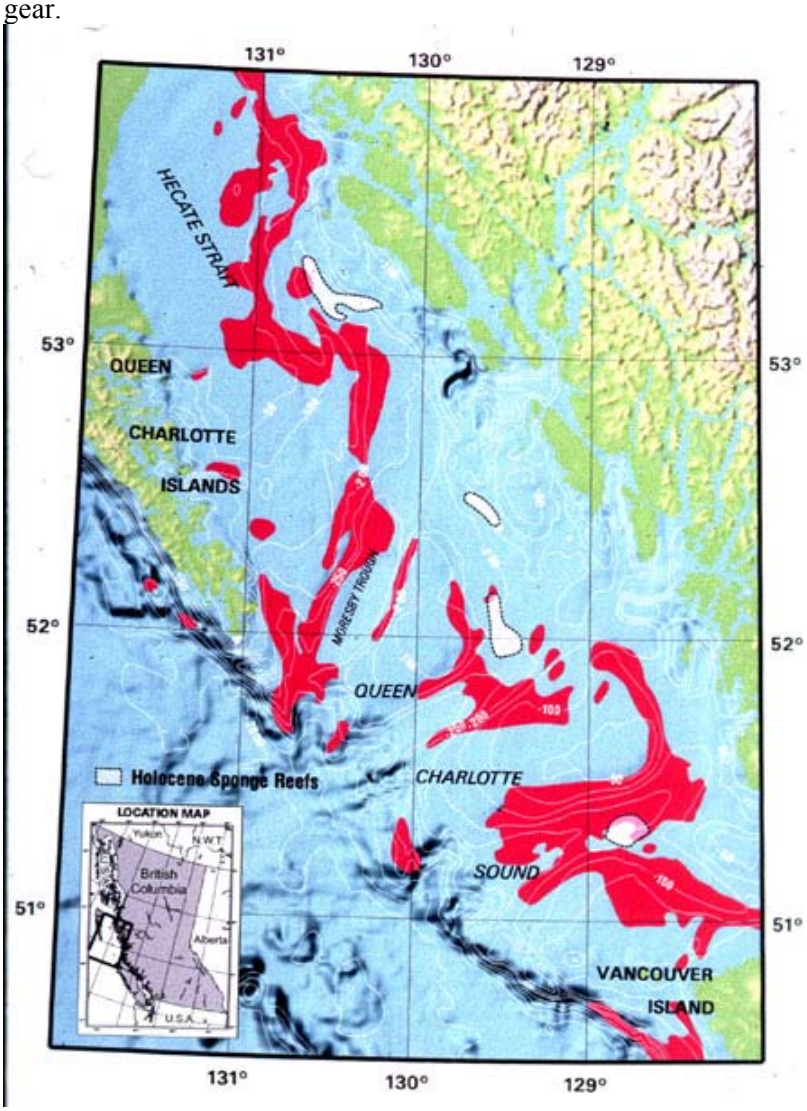
Known since the Late Proterozoic, the siliceous sponge group Hexactinellida are the very first metazoans which can be related to an extant animal group. The first representatives of the Subclass Hexactinosa appeared in the Devonian and during the Mesozoic these sponges became important reef building organisms in deeper water due to their fused rigid skeleton.

In the Late Jurassic, siliceous sponges facies was widely spread throughout the the north tethyan realm as mentioned above. Outcrops are known from the Caucasian Mountains, from Romania, Poland, Germany, Switzerland, France, Spain, Portugal, off Newfoundland and Oklahoma. After Jurassic time there is a dramatically decline in the distribution of these reefs and today they have completely disappeared, world wide, with one very remarkable exception off the coast of British Columbia, Canada.


The Reussenstein ruin (Swabian Alb/Germany) is situated on a Kimmeridgian (Late Jurassic) sponge reef.


Detail of a siliceous sponge reef. Sponges are the thin pancake-like structures (outcrop near Hohen-stadt, Swabian Alb/Germany).

These globally unique modern sponge reefs are very similar to those of the Late Jurassic. A thorough study of the modern reefs will provide us with detailed information about the biological, sedimentological, ecological and paleoenvironmental processes going on in these reefs today and in the geological past. Recent investigations by manned sumersible, remotely operated vehicle (ROV) and high resolution geophysical surveying, (Swath Multibeam Bathymetry, Sidescan Sonar, Huntec Seismic System) reveal that large areas of these reefs are being heavily impacted by the mobile fishing gear.



In summer 2002 we finally succeeded in our effort protecting the reefs. After an intense media campaign (in newspapers, radio stations, and TV), the Canadian Minister of Fisheries and Oceans Robert Thibault finally closed the reef areas for trawling:

„VANCOUVER The Honourable Robert G. Thibault, Minister of Fisheries and Oceans, confirmed the implementation of measures to preserve unique sponge reefs in waters off central and northern British Columbia. Bruce Turris, representing both the Canadian Groundfish Research & Conservation Society and the Groundfish Trawl Advisory Committee, has also confirmed support from these organizations for this initiative. Effective July 19, 2002, groundfish trawl fishing in the four sponge reef areas will be closed.“

Without protection from this damage the prospects for survival of these unique reefs would be bleak. The last known occurrences in the evolution of this ultra-conservative reef type may well be destroyed by human activities on the continental shelf. So, today we have an exceptional opportunity and maybe a last chance to learn more about these "living fossil reefs" and their (paleo)environment **and therefore we should use it!**
Source: www.porifera.org