GeoBio-Center[LMU]-News Flash, December 2004

Important Dates / Activities

17. 03 – 10.04.2004: Scientific Cruise of **GeoBio-Center[LMU]**-members A. Altenbach and U. Struck with RV Alexander von Humboldt in the area of the Namibian Upwelling. Many samples from sediments and water column have been collected successfully.

April, 23rd. 2004: 2nd. annual **GeoBio-Center[LMU]**-members meeting was held in building of Bavarian Zoological Collection . 35 members and guests were present. Major outcomes are:

A number of joint project groups have been founded during the workshop and group organizers are selected:

a. Biodiversity research at Huinay Research Station in Chile. Speaker: G. Haszprunar
b. Remote sensing applied to monitoring marine environments. Speaker: F. Siegert
c. Microreefs (Oncoids). Speaker: R. Leinfelder
d. Research in Bavarian Lakes. Speaker: U. Struck

Speakers of project groups are supposed to organize joint research and prepare joint workshop of group members.

May 2004: GeoBio-Center[LMU] has been presented on the ANALYTICA2004-Exhibition in Munich.

20.05.-22.05.2004: In the Museum of Palaeontology the annual workshop of "Friends of Paleobotany" took place supported by **GeoBio-Center[LMU]**

Oncoid research in TV, BR3, 22.07.04, 19:30: A report of **GeoBio-Center[LMU]** -research on oncoids from the Bavarian river Alz was presented in television channel Bayern3 on Thursday 22nd of July, 19:30 in "Faszination Wissen".

September 2004: Prof. Heckl new Director General of the Deutsche Museum: Prof. Dr. Wolfgang Heckl, Winner of the Communicator Award of the DFG and founding member of the **GeoBio-Center[LMU]** will be the new Director General of the world renowned Deutsche Museum.

World's natural heritage, coral reefs: In German Radio Sender SWR a life discussion about human induced changes in coral reefs was held 24th of August 2004 including GeoBio-Center[LMU]-members R. Leinfelder and F. Brümmer (Stuttgart). This event is still available online: http://www.palaeo.de/tv/modern/coralextra/swr2.html

30.09.2004: First meeting of the The „Bavarian Lake Research Group“ of GeoBio-Center[LMU] in the Palaeontology building for an informational workshop. Attendants: H. Lehnert, M. Winklhofer, A. F. Davila, U. Struck, J. Reicholf, J. Overmann.

Coral Reefs, threatened natural environments: A round table discussion about human induced threats on coral reefs was shown in television channel Bayern Alpha with GeoBio-Center[LMU] member R. Leinfelder.

22-26.11.2004: **GeoBio-Center[LMU]** - ROV exhibited during Wissenschaftstage2004 in LMU main building (Geschwister Scholl Platz, see picture below).

Upcoming: 20.01.2005: Scientific Report about „Der blutende See“ in ARTE TV-channel (19:00h) featuring the **GeoBio-Center[LMU]** - ROV at the Alatsee near Füssen.

Announcement for Workshop in ZSM Buildings
On 12th of January 13:00,
a workshop will take place to plan and organize the future work in the shallow fjord ecosystem at Huinay field station in Chile. All interested members of the GeoBio-Center[LMU] are kindly asked to attend the workshop, which will be opened by an overview presentation of:
Dr. Vreni Häusermann, who will present her field work experience and possible research fields in this area.

A more detailed announcement for this event will be send to the GeoBio-Center[LMU] members soon.

Announcement for a scientific talk in Palaeontology Building:

We announce on
3rd. Feb. 2005
Hörsaal 12, Palaeontology Building, Richard Wagner Str. 10
16:00 ct

a scientific presentation about:

"Biodiversität und ökologische Stabilität in natürlichen Ökosystemen: Riffe im Phanerozoikum"

presented by:
Dr. Wolfgang Kiessling
Humboldt University Berlin

New members of GeoBio-Center[LMU]:

Prof. Dr. Franz Brümmer, Stuttgart University, Biology
Juan Carlos Gaviria, Centro Jardín Botánico, Fac. de Ciencias, Apartado 52, Mérida 5221, VENEZUELA

Guests of GeoBio-Center[LMU]

a. Dr. Falk Pollehne, Inst. F. Ostseeforschung Warnemünde, 11-14.10.2004, Alatseestudie
b. Sybille Zitzmann, RCOM-Bremen, stable isotopes in sediments off Namibia, 04.-08.10.2004
c. Fanni Aspetsberger, RCOM-Bremen, C-Aufnahmeexperimente in Schelfsedimenten, 27.-31.10.2004.
d. Dr. Christian Wild, MPI-Bremen, Tracerexperimente mit Korallen, 22.-27.09.2004.

New equipment in GeoBio-Center[LMU]

- For light intensity measurements in waters a **LI-COR LI-250A light meter** is now available! For use contact Dr. U. Struck (u.struck@lrz.uni-muenchen.de).
- **Electrical power supply (220 V AC, 3500 W)** is available for the use as transportable electrical power supply during field trips. For use contact Dr. U. Struck (u.struck@lrz.uni-muenchen.de).

GeoBio-Center[LMU] **- members highlighted**

PD Dr. Madelaine Böhme

Department on Earth- and Environmental Science, LMU (for details see member list on www.GeoBio-Center.de). Dr. Böhme is palaeontologist with main research interest about "neogene climate evolution and palaeobiology of lower vertebrates". She started her scientific carrier in Freiberg (Thüringen) and made her PhD in Leibzig on vertebrate palaeontology in Leibzig (1994-96). Since 1998 she works in the palaeontology section of the dept. of geoscience at Munich University. In 2003 she finished her "Habilitation" successfully. Below, a highlight oh Dr. Böhme's research is shown:

Photo by Georg Janßen, University of Munich.

Fishy predator gets its teeth into ancient climate history

Nature, 29 April 2004

QUIRIN SCHIERMEIER

In the horror film *Snakehead Terror*, released last month by Sci-Fi Pictures, killer fish mutate to monstrous proportions, devouring everything in reach. And some escaped northern snakeheads (*Channa argus*) did indeed cause a panic two years ago when they were caught by fishermen in Maryland. Bur German scientists believe these amphibious fish may serve a more benign purpose – as markers for past climate change.

Snakeheads (*Channidae*) are a group of predatory freshwater fishes native to Africa and Southern Asia. They can live out of water for extended periods, jump up to four metres high and cover large distances on land – hence the problem in Maryland, where they had apparently been released after being bought in a New

York fish market for a home aquarium. Fears of their uncontrolled spread even reached the late-night talk shows.

But a study by Madelaine Böhme, a palaeontologist at the University of Munich, to be published in next month's issue of *Geology,* could help salvage the snakehead's public image. She says that the fish's extensive migratory history could tell researchers about the climate of the past.
END of citation from Nature.

Böhme searched hundreds of fossil freshwater fish deposits, in collections from Bejing to Montpellier, for the presence or absence of snakeheads. She then used the information to reconstruct the species' migration and extinction history during the Miocene period, from 24 million to 5 million years ago. This provides a good indicator for summer precipitation, because the fish's present-day distribution suggests that snakeheads are limited to climates with at least one month of rainfall of 150 millimetres and a mean temperature of 20 °C.

"What we have here, is a major new proxy for Miocene precipitation and humidity – information that is otherwise extremely difficult to get," says William Hay, a palaeoclimatologist at the University of Colorado in Boulder. That information should prove useful in refining climate models, by comparing their predictions with the actual climate record, he says.

During the past 20 million years, snakeheads have twice migrated from their Himalayan origins to subtropical and temperate regions in Africa and Eurasia, Böhme reports (M. Böhme *Geology*, 32, 393-396; 2004).

Böhme's study suggests that the most extended migration events - at around 17.5 million years ago, and between 8 million and 4 million years ago – must have been linked with changes in atmospheric circulation in the Northern Hemisphere, which led to increased air humidity and summer precipitation in regions that were formerly dry in summer.

"The presence of snakehead fossils in central European deposits indicates that in a much warmer climate the region had come under the influence of moist northern trade winds," says Böhme. This, she adds, is likely to have been caused by a northward shift of the 'meteorological equator' – a weather trough that normally sits just north of the Equator.

Although this is the first time that migration of fish has been used as an indicator for palaeoclimate, the effect of climate change on population dynamics is already a hot issue. Research carried out on caribou and musk oxen on opposite coasts of Greenland, for example, revealed that animal populations of different species may respond synchronously to global climate change over large regions (E. Post and M. C. Forchhammer *Nature* 420, 168-171, 2002).

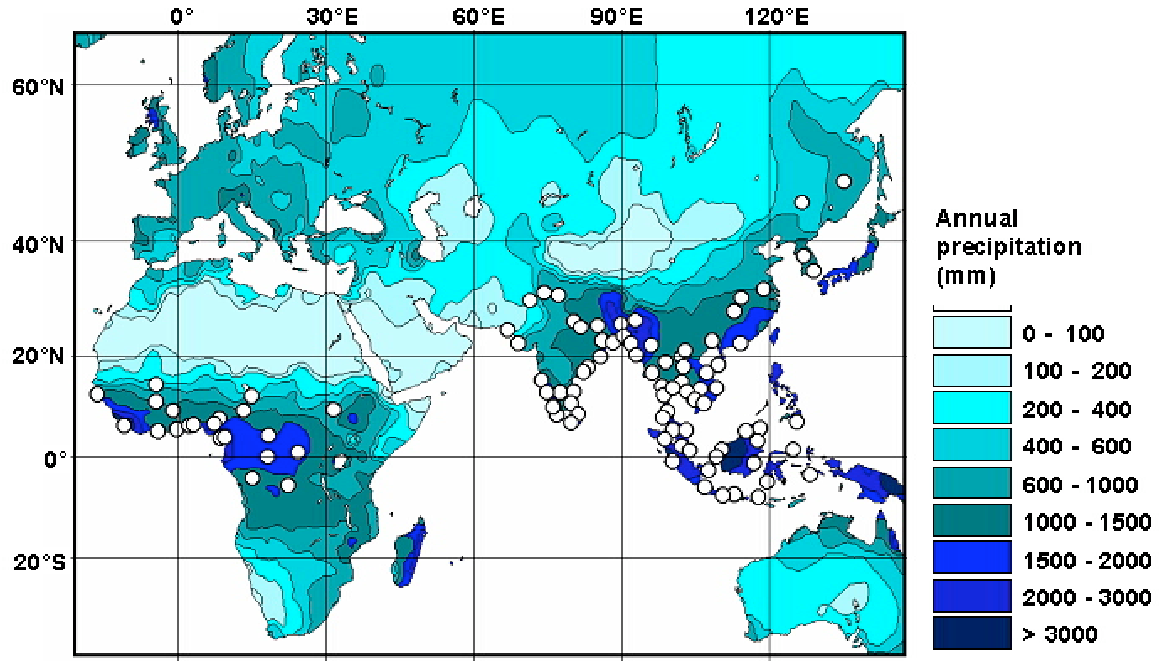
Snakeheads: Coming down the mountains

Science, 4 June 2004

STELLA HURTLEY

Snakeheads (Channidae) are air-breathing freshwater fish that can walk on the land and jump in the water. These large fish (0.3 to 1.8 m long) have heavy bones and sharp teeth. Unfortunately, they are predatory and have become a problem in North Americva, where they have been introduced accidentally and could decimate native species.

An excellent fossil record of this robust fish indicates an origin in Pakistan at least 50 million years ago (Ma). Böhme tracked their migration into western Eurasia about 17 Ma and into Africa about 8. In nature, extant snakeheads are restricted to African and Asian regions of hight precipitation with temperatures greater than 20 °C. Using this climate restrictions, the author inferred that their migration about 17 Ma fits with a northward shift of the Intertropical Convergence Zone, and their migration about 8 Ma fits with the development of the Asian monsoon – two climate shifts related to the uplift of the Alps, Pyrenees, and Himalayas. Thus, the mobility of the snakeheads trace paleoclimate and past tectonics.



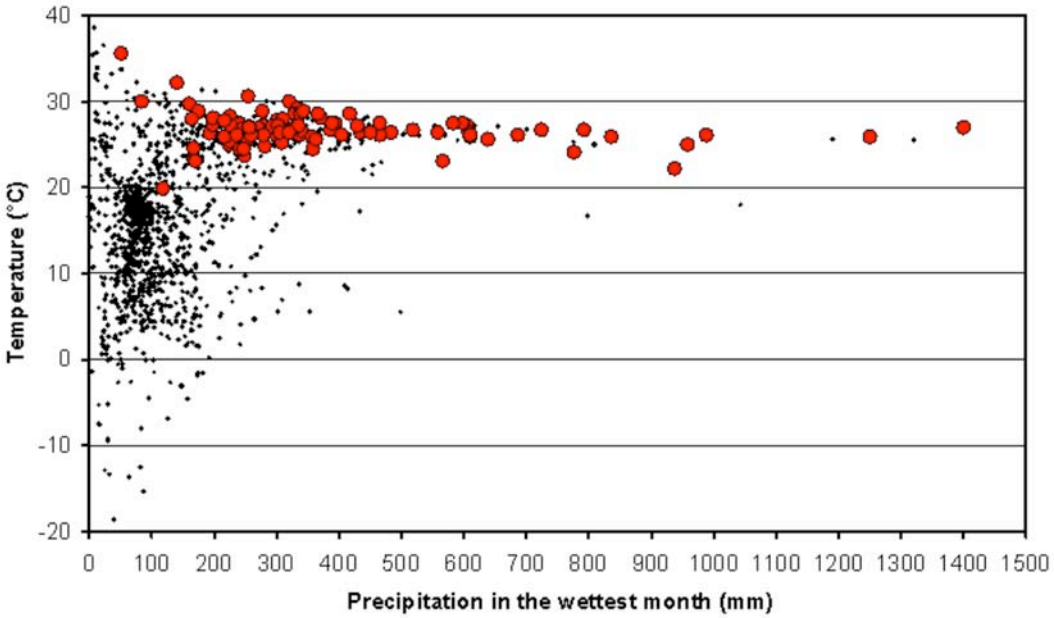
Annual precipitation map of Old World and extant distribution of snakeheads (Channidae) indicated by 96 selected climate stations (white dots).

Migration history of air-breathing fishes reveals Neogene atmospheric circulation patterns

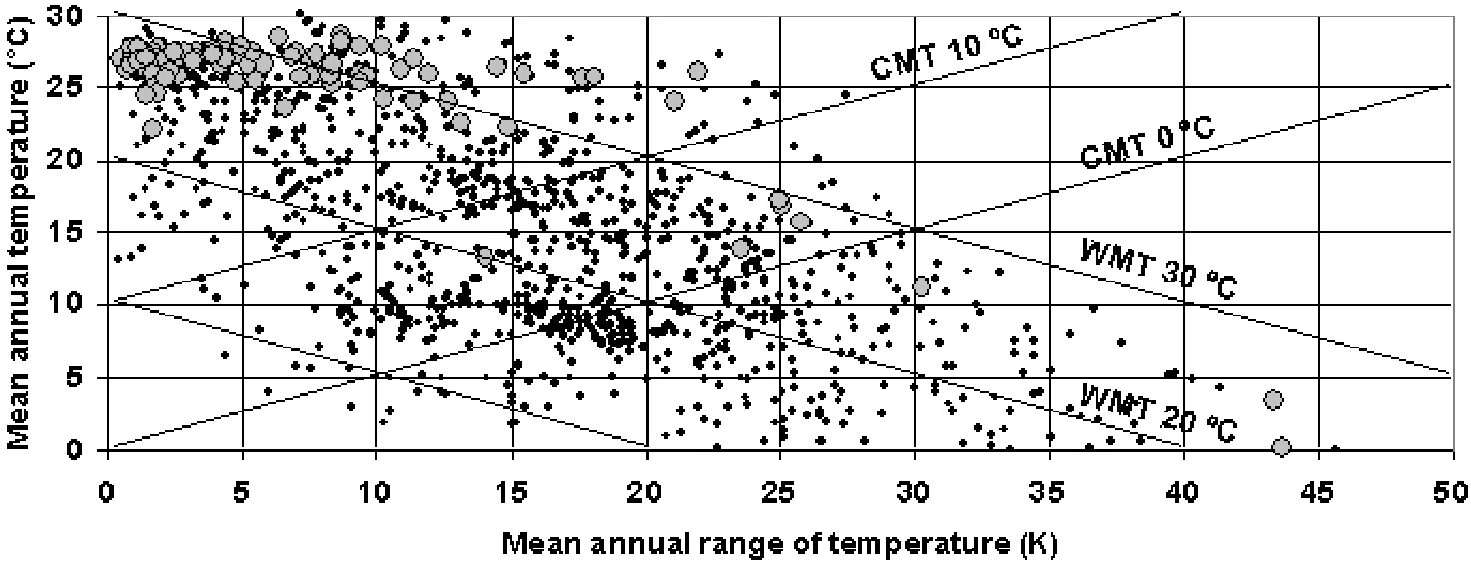
M. Böhme
GeoBio-Center-Member

ABSTRACT

The migration history of an air-breathing fish group (Channidae; snakehead fishes) is used for reconstructing Neogene Eurasian precipitation and atmospheric circulation patterns. The study shows that snakeheads are sensitive indicators of summer precipitation maxima in subtropical and temperate regions and occur regularly if the wettest month exceeds 150 mm precipitation and 20 °C mean temperature. The analysis of 515 fossil freshwater fish deposits of the past 50 m.y. from Africa and Eurasia shows two continental-scale migration events from the snakeheads' center of origin in the south Himalayan region, which can be related to changes in the Northern Hemisphere circulation pattern. The first migration at ca. 17.5 Ma into western and central Eurasia may have been caused by a northward shift of the Intertropical Convergence Zone (ITCZ) that brought western Eurasia under the influence of trade winds that produced a zonal and meridional precipitation gradient in Europe. During the second migration, between 8 and 4 Ma into Africa and East Asia, snakeheads reached their present-day distribution. This migration could have been related to the intensification of the Asian monsoon that brought summer precipitation to their migratory pathways in East Africa–Arabia and East Asia.

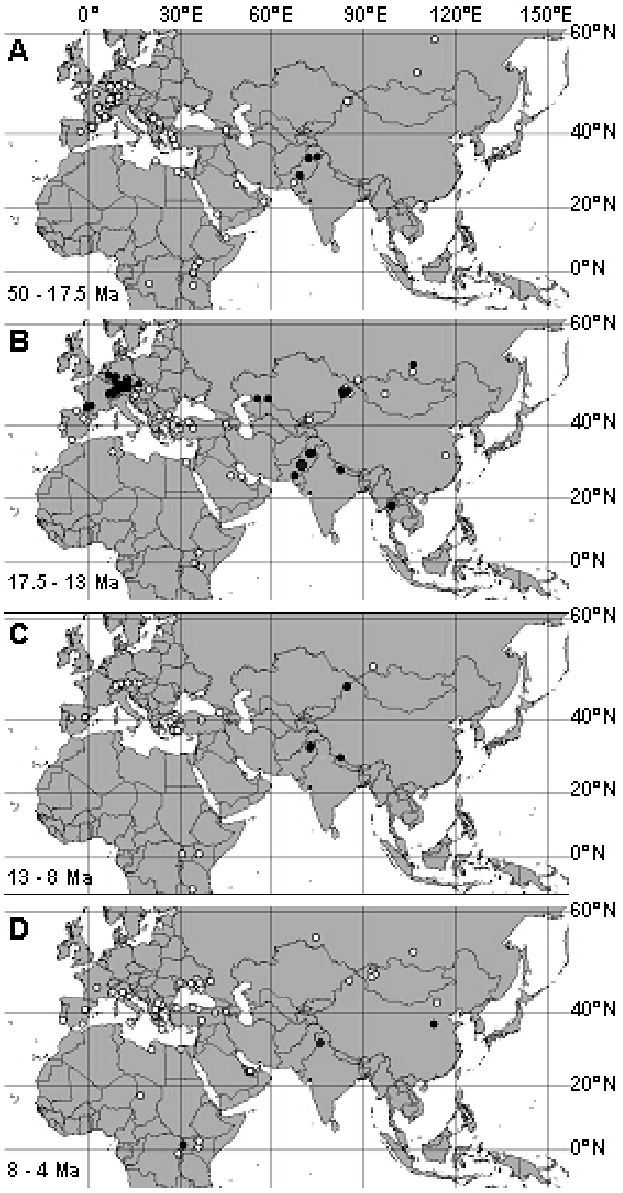


Distribution of extant snakeheads in a P_{wm} vs. T_{wm} climate space (P_{wm} = precipitation during wettest month, T_{wm} = mean temperature of wettest month) in which data from 1266 climate stations are plotted. Climate data from



M.J. Müller and D. Hennings The Global Climate Data Atlas, Climate 1 (www.climate-one.de) (accessed January 2004). Small black dots—climate stations without snakeheads (*n* = 1170); large gray dots—climate stations with snakeheads (*n* = 96).

Distribution of extant snakeheads in a mean annual temperature (MAT) vs. mean annual range of temperature (MART) climate space of 1266 climate stations. Small black dots—climate stations without snakeheads (*n* = 1170); large gray dots—climate stations with snakeheads (*n* = 96). WMT—warm-month temperature, CMT—cold-month temperature.



Distribution maps of fossil snakeheads (Channidae). Black dots—occurrences of snakehead fishes; white dots—freshwater fish localities without snakeheads. A: 50 to 17.5 Ma (latest early Eocene to late early Miocene; $n = 61$). B: 17.5 to 13 Ma (latest early to late middle Miocene; $n = 347$). C: 13 to 8 Ma (late middle to late Miocene; $n = 43$). D: 8 to 4 Ma (late Miocene to early Pliocene; $n = 64$; n = number of localities investigated.)