



FS/RV SONNE
FAHRTBERICHT SO173/2
CRUISE REPORT SO173/2
SEDUCTION

SO173/2
CALDERA - CALDERA. AUGUST 8 - SEPTEMBER 2, 2003



116

GEOMAR REPORT



**FS/RV SONNE
FAHRTBERICHT SO173/2
CRUISE REPORT SO173/2**

SEDUCTION

**PART A:
SEISMOGENESIS AND TECTONIC EROSION
DURING SUBDUCTION: MIDDLE AMERICA MARGIN**

**PART B:
SENSORY MECHANISM IN MESOPELAGIC FISH**

**SO173/2
CALDERA - CALDERA. AUGUST 8 - SEPTEMBER 2, 2003**

**Edited by
Wilhelm Weinrebe and Cesar R. Ranero (Part A)
and Jochen Wagner (Part B)
with contributions of cruise participants**

**Investigations in the frame of SFB 574
„Volatiles and Fluids in Subduction Zones:
Climate Feedback and Trigger Mechanisms for Natural Disasters“**

Contribution 48 of SFB 574

GEOMAR
Forschungszentrum
für marine Geowissenschaften
der Christian-Albrechts-
Universität
zu Kiel

KIEL 2003
GEOMAR REPORT 116

GEOMAR
Research Center
for Marine Geosciences
Christian Albrechts University
in Kiel

Redaktion dieses Reports:
Wilhelm Weinrebe und Cesar R. Ranero (Part A)
Jochen Wagner (Part B – Kap. 2.3, 5.4, 6.5)
Umschlag und Titelei: Gerhard Haass

GEOMAR REPORT

Editors of this issue:
Wilhelm Weinrebe and Cesar R. Ranero (Part A)
Jochen Wagner (Part B – Chapter 2.3, 5.4, 6.5))
Cover and prelims: Gerhard Haass

GEOMAR REPORT

GEOMAR
Forschungszentrum
für marine Geowissenschaften
Wischhofstr. 1-3
D - 24148 Kiel
Tel. (0431) 600-2555, 600-2505

GEOMAR
Research Center
for Marine Geosciences
Wischhofstr. 1-3
D - 24148 Kiel
Tel. (49) 431 / 600-2555, 600-2505

Table of contents

1	Summary	1
2.1	Geophysical objectives of the cruise	2
2.2	Tectonic settings of the area and previous studies	8
2.3	Biological objectives of the cruise	28
3	Participants	30
3.1	Scientists	30
3.2	Crew	30
3.3	Addresses of participating institutions	31
4	Agenda of the cruise	35
5.1	Computer facilities for bathymetry, magnetic, and seismic data processing	38
5.2	Magnetometer	39
5.3	Seismic instrumentation	40
5.4	Biological equipment and methods of investigation	43
5.4.1	Nets	43
5.4.2	The visual systems of mesopelagic fish with special emphasis on the visual pigments of lanternfish (Myctophidae) and their role in the detection of bioluminescence	44
5.4.3	Electrophysiological recordings from fish and crustacean eyes	50
5.4.4	Antioxidative defence mechanisms and bioluminescence in deep sea fish	52
5.4.5	Microscopic equipment	56
5.4.5	Study of the world's most frequently used sensory system: lateral lines in the deep-sea	56
5.4.6	Melatonin as a mediator of biological rhythms in mesopelagic fish	58
5.4.7	Comparative Studies of Inner Ear Morphology and Ultrastructure in Mesopelagic Deep-Sea Fishes	59
5.4.8	Retinal ganglion cells in deep sea fish retinae	60
5.4.9	Sensory brain areas in mesopelagic fish	60
5.5.1	Navigation	61
5.5.2	Simrad EM-120 multibeam system	61
5.5.3	Parasound	65
6		67
6.1	Multibeam bathymetric mapping	67
6.2	Magnetic survey off Middle America, 88°W to 93° W	75
6.3	Dredges of Mound Quetzal	79
6.4	Seismology	87
6.5	Deep sea fish trawls	93
6.5.1	Results of the trawls	93
6.5.2	The visual systems of mesopelagic fish with special emphasis on the visual pigments of lanternfish (Myctophidae) and their role in the detection of bioluminescence	95
6.5.3	Electrophysiological recordings from fish and crustacean eyes	101
6.5.4	Antioxidative defence mechanisms and bioluminiscence in deep sea fish	104
6.5.5	Melatonin as a mediator of biological rythms in mesopelagic fish	109
6.5.6	Comparative Studies of Inner Ear Morphology and Ultrastructure in Mesopelagic Deep-Sea Fishes	110
6.5.7	Study of the world's most frequently used sensory system: lateral lines in the deep sea	112