

# National Committee Report - Germany



Established in January 2016 by the German SCOR committee

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- **Hermann Bange, GEOMAR, Kiel (co-chair)**
- Hartmut Herrmann, *TROPOS Leibniz-Institute for Tropospheric Res., Leipzig*
- Johannes Karstensen, GEOMAR, Kiel
- Andrea Koschinsky, *Jacobs Univ., Bremen*
- Mayhar Mohdati, *MARUM, Bremen*
- Tim Rixen, *ZMT, Bremen, and Univ. Hamburg*
- Karin Sigloch, *LM Univ. Munich*
- Katharina Six, *MPI for Meteorology, Hamburg*

## Associated Members:

- Rena Czeschel, GEOMAR, Kiel
- Joachim Segschneider, Univ. Kiel

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## Integrated German Indian Ocean Study (IGIOS)

- From the seafloor to the atmosphere -

A possible German contribution to the  
International Indian Ocean Expedition 2 (IIOE-2) programme

- A Science Prospectus -

H.W. Bange<sup>1</sup>, E.P. Achterberg<sup>1</sup>, W. Bach<sup>2</sup>, C. Beier<sup>3</sup>, C. Berndt<sup>1</sup>, A. Biastoch<sup>1</sup>,  
G. Bohrmann<sup>4</sup>, R. Czeschel<sup>1</sup>, M. Dengler<sup>1</sup>, B. Gaye<sup>5</sup>, K. Haase<sup>6</sup>, H. Herrmann<sup>6</sup>, J. Lelieveld<sup>7</sup>,  
M. Mohtadi<sup>4</sup>, T. Rixen<sup>5,8</sup>, R. Schneider<sup>9</sup>, U. Schwarz-Schampera<sup>10</sup>, J. Segschneider<sup>9</sup>,  
M. Visbeck<sup>1</sup>, M. Voß<sup>11</sup>, and J. Williams<sup>7</sup>

<sup>1</sup>GEOMAR, Kiel; <sup>2</sup>Univ. Bremen; <sup>3</sup>Univ. Erlangen-Nürnberg; <sup>4</sup>MARUM, Bremen; <sup>5</sup>Univ.  
Hamburg; <sup>6</sup>TROPOS, Leipzig; <sup>7</sup>MPI Chemie, Mainz; <sup>8</sup>ZMT, Bremen;  
<sup>9</sup>Univ. Kiel; <sup>10</sup>BGR, Hannover; <sup>11</sup>IOW, Warnemünde



Berichte aus dem GEOMAR  
Helmholtz-Zentrum für Ozeanforschung Kiel

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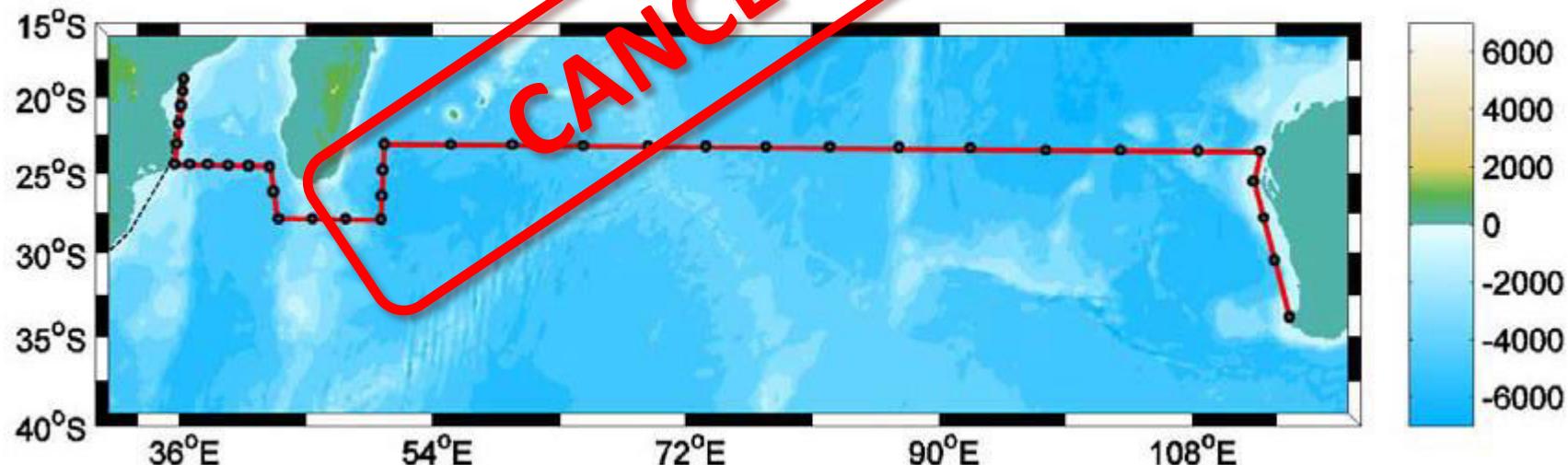
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# Research Initiatives & Cruises - Germany



## GEOTRACES – South Indian Ocean

F/S Sonne cruise by M. Frank, E. Achterberg and A. Koschinsky, Aug/Sept 2020.



# Research Initiatives & Cruises - Germany

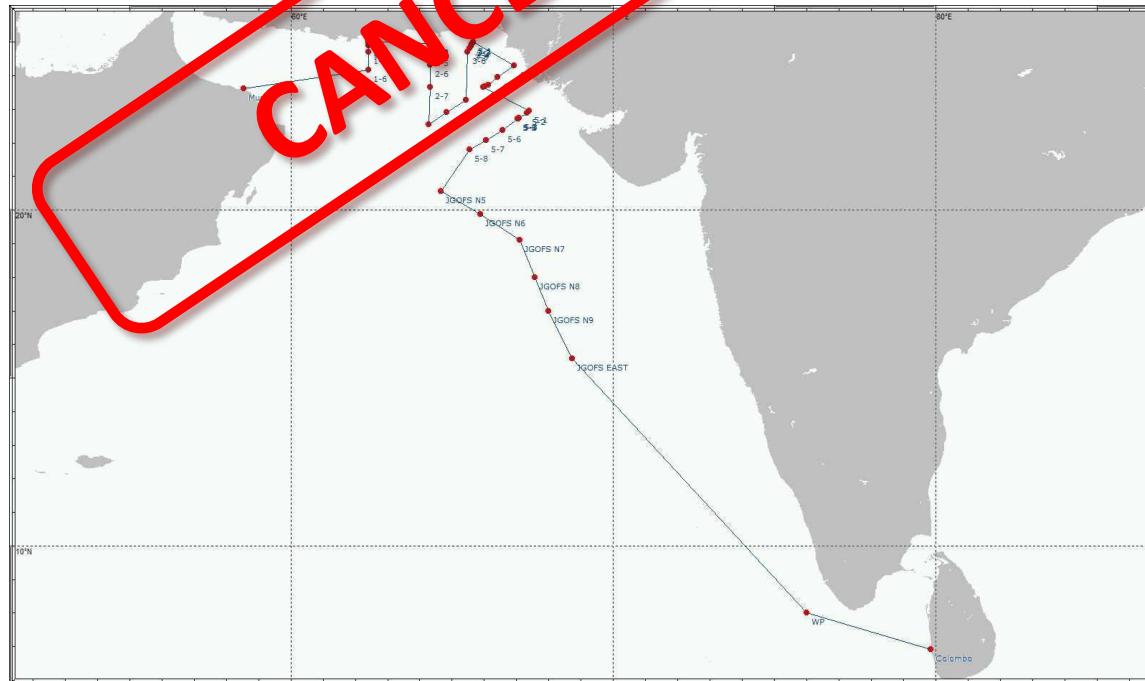


## BIOCAN-IIOE2

**Biogeochemistry of CArbon and Nitrogen in the Arabian Sea: A contribution to the International Indian Ocean Expedition 2**

F/S Sonne cruise by B. Gaye et al., Dec 2020/Jun 2021.

CANCELLED



# Research Initiatives & Cruises - Germany



## Bengal shelf cruise by V. Spiess (MARUM ) et al.

Interplay of monsoon, cyclones, tectonics, subsidence and anthropogenic impact: the Bengal shelf as critical land-ocean-atmosphere interface and archive.

-> R/V Sonne cruise, Jan/Feb 2021.

**CANCELLED**



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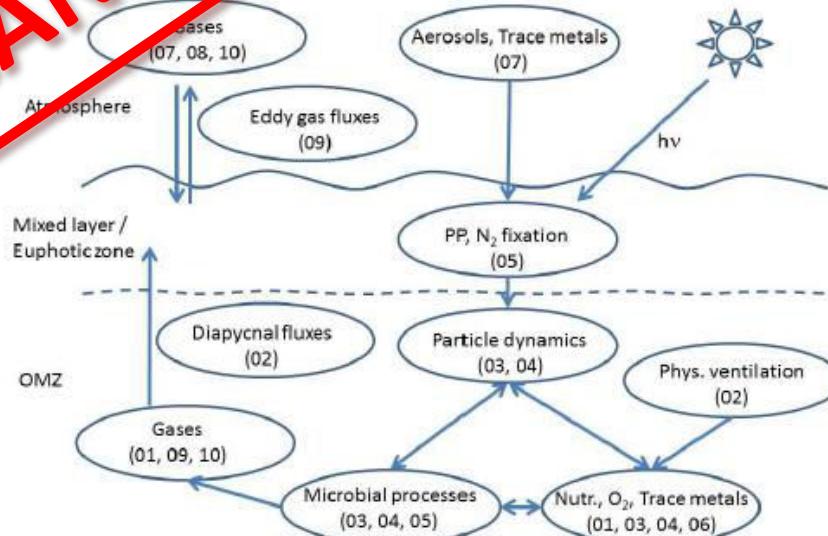
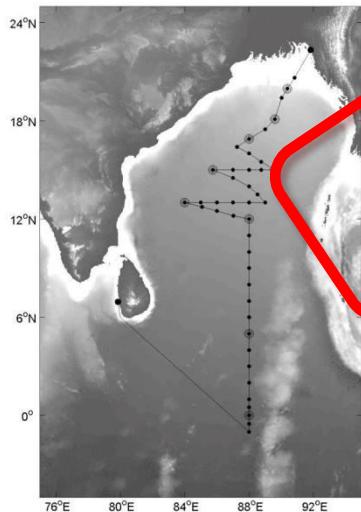


## BIOCAT-IIOE2

Biogeochemistry-Atmosphere Processes in the Bay of Bengal: A contribution to the International Indian Ocean Expedition 2

F/S Sonne cruise by H. Bange & B. Gaye, March/April 2021.

**CANCELLED**



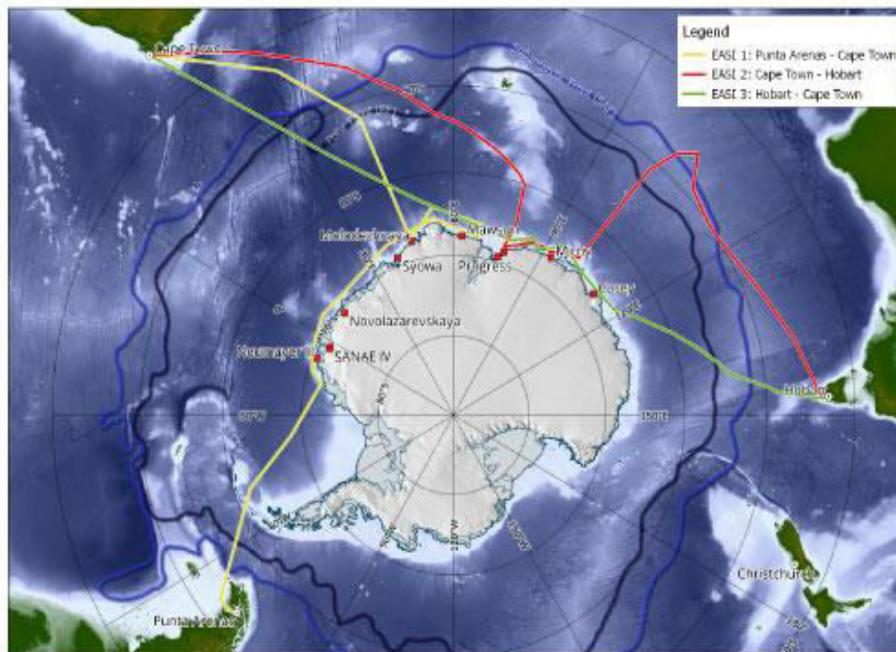
# Research Initiatives & Cruises - Germany



## EASI

### East Antarctic Ice Sheet Instabilities

F/S Polarstern cruise, 3 legs by R. Tiedemann (AWI), M. Gutjahr (GEOMAR), R. Schneider (CAU, Kiel): Jan/Feb 2022 & Dec 2023 - Mar 2024.

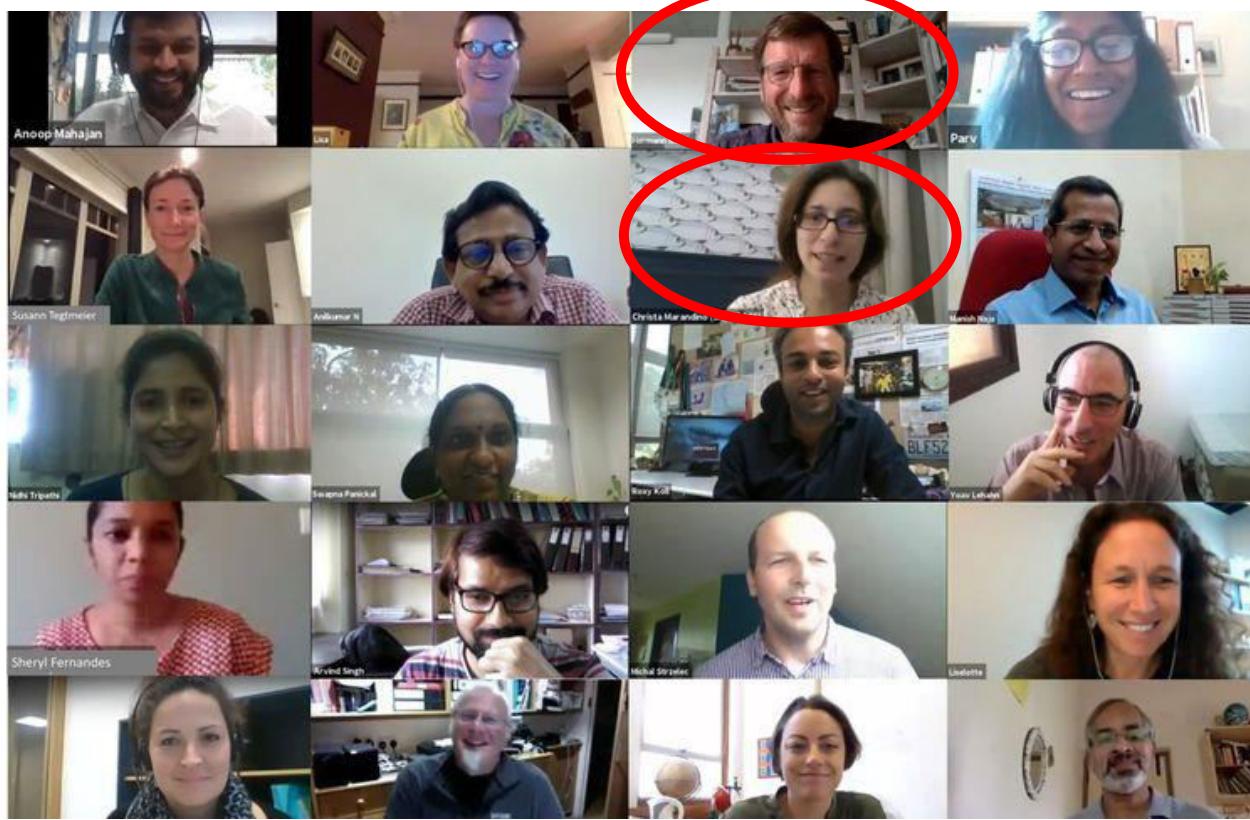


# National Committee Report - Germany



Other activities/contributions:

SOLAS virtual IO meeting, 30 September, invited speakers: H.W. Bange, Ch. Marandino



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## New publications from/related to IIOE-2:

### IIOE-2 SI in BG/OS/ACP:

- Rixen, T., Cowie, G., Gaye, B., Goes, J., do Rosário Gomes, H., Hood, R. R., Lachkar, Z., Schmidt, H., Segschneider, J., and Singh, A.: Reviews and syntheses: Present, past, and future of the oxygen minimum zone in the northern Indian Ocean, *Biogeosciences*, 17, 6051-6080, 2020.
- Tegtmeier, S., Marandino, C., Jia, Y., Quack, B., and Mahajan, A. S.: Atmospheric gas-phase composition over the Indian Ocean, *Atmos. Chem. Phys. Discuss.*, 2020. in review.

### IO Book (C Ummenhofer and R Hood, eds.), to be published by Elsevier

- Bange, H. W., Arévalo Martínez, D. L., Bikkina, S., Marandino, C. A., Sarin, M., Tegtmeier, S., and Vasala, V.: Air-sea exchange and its impacts on biogeochemistry in the Indian Ocean. In: *The Indian Ocean and its role in the global climate system*, Ummenhofer, C. C. and Hood, R. R. (Eds.), submitted.
- Mohtadi, M., et al., Paleo evidence to understand Indian Ocean variability across a range of timescales, in preparation.

### AQABA Project (MPI for Chemistry, Mainz, Germany)

- Since 2019: Several articles on atmospheric chemistry in *Atm. Chem. Phys.*



Die Route der AQABA-Mission. | Ship track of the AQABA expedition.

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New publications related to IIOE-2:



**10** WEDNESDAY 2 JANUARY 2024  
NEW ENGLAND  
**LONG STORY**  
REPORTAGE | TALKING POINTS | IDEAS | INSIGHT | THE BOTTOM LINE

## THE CURIOUS CASE OF THE GLOWING BEACHES

Bioluminescent algae have caused a stir along the Arabian Sea. But the sparkle could be a climate warning sign.



**WHAT**  
Recent months, bioluminescent blooms have been appearing along the coastlines of the Arabian Sea, from Oman to India. In December, researchers from the National Institute of Ocean Technology in Sri Lanka, as well as the Max Planck Institute for Marine Microbiology in Bremen, found that the blooms were caused by a species of dinoflagellate called Noctiluca scintillans. This is the same species that caused the famous 'red tides' off the coast of Florida in the 1980s. The blooms are particularly problematic because they can produce potent neurotoxins that can cause paralysis and even death if consumed. The researchers believe that the blooms are likely triggered by warming waters caused by climate change. They also found that the blooms are more prevalent in areas where there is less oxygen in the water, which is another symptom of climate change. The researchers are now studying the blooms to better understand their impact on marine ecosystems and human health.

**BUT**  
While the blooms are a concern, they are also a source of beauty and wonder. The glowing algae have been attracting tourists to the beaches, which has helped to boost local economies. However, the blooms are also a sign of environmental stress, and they may be a warning sign of further climate change. As the world continues to warm, we must take action to reduce our carbon footprint and protect our oceans for future generations.

**NOW**  
The researchers are continuing to study the blooms to better understand their impact on marine ecosystems and human health. They are also working to develop ways to mitigate the effects of the blooms, such as by reducing nutrient runoff from agriculture and wastewater treatment plants. The researchers are also studying the blooms to better understand their impact on marine ecosystems and human health. They are also working to develop ways to mitigate the effects of the blooms, such as by reducing nutrient runoff from agriculture and wastewater treatment plants.

**INTERVIEW**  
We interviewed Dr. Tim Rixen, a researcher at the Max Planck Institute for Marine Microbiology in Bremen, about the recent blooms and what they mean for the future of the Arabian Sea.

**Q: What are the main findings of your research on the bioluminescent blooms?**

**A:** Our research shows that the blooms are caused by a species of dinoflagellate called Noctiluca scintillans. This species is known for its bioluminescence, which it uses to attract prey. We found that the blooms are more prevalent in areas where there is less oxygen in the water, which is a symptom of climate change. We also found that the blooms are more prevalent in areas where there is more nitrogen and phosphorus in the water, which is another symptom of climate change. This occurs mainly in the Arabian Sea, where there is a lot of industrial activity and agricultural runoff. The blooms are also a source of beauty and wonder, which is good for tourism.

**Q: How do the blooms affect marine ecosystems?**

**A:** The blooms can have a negative impact on marine ecosystems. For example, they can release toxins that can harm fish and other marine life. They can also deplete oxygen in the water, which can be harmful to many marine organisms. However, they can also provide a food source for some marine organisms, such as small fish and crustaceans.

**Q: What are the long-term implications of the blooms?**

**A:** The long-term implications of the blooms are not fully understood. However, they are a sign of environmental stress, and they may be a warning sign of further climate change. As the world continues to warm, we must take action to reduce our carbon footprint and protect our oceans for future generations.

Tim Rixen, ZMT (Bremen), was interviewed for an article in 'mint'.

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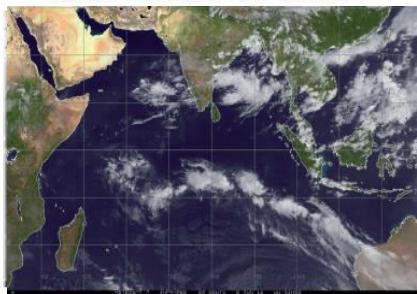
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