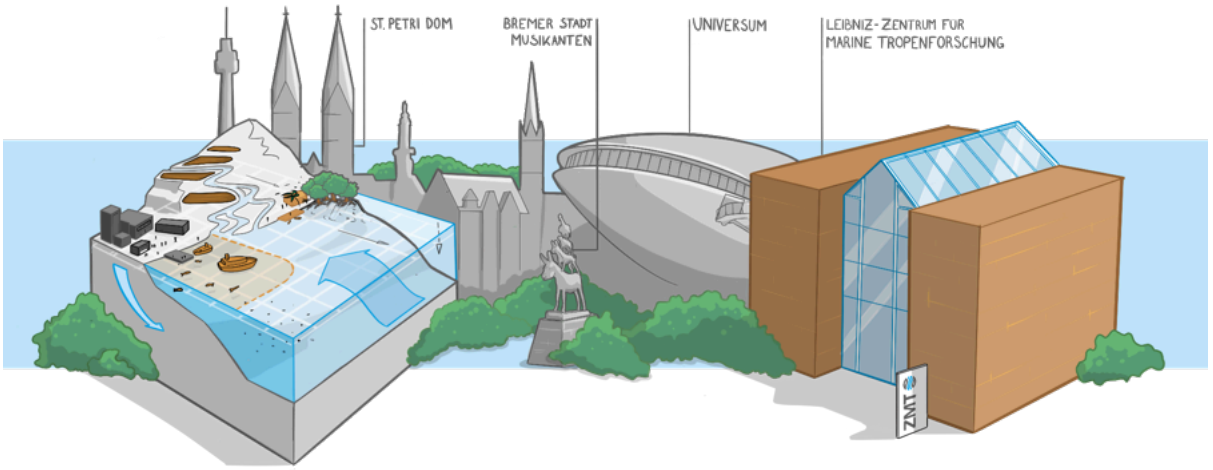
ZMT LEIBNIZ CENTRE for Tropical Marine Research

AGENDA

TropEcS Symposium

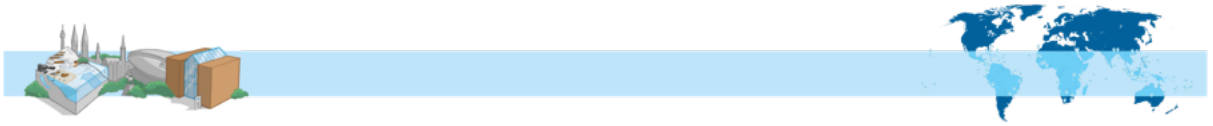
Coupling Tropical Coastal Ecosystems to Earth System Models
Bremen, Germany | 22.09.25 – 25.09.25



🧊 **Monday, 22 September, 18:15 – 21:00,** Icebreaker Reception at Universum® Bremen, Wiener Straße 1a

Welcome addresses by **Raimund Bleischwitz** (Scientific Director, ZMT) and **Kathrin Moosdorf** (Senator for Climate, Environment and Science of the State of Bremen).

Musical performance by Biyotob and science quiz with Tom & Darren.



Day 1 – Strengths and Limitations of Existing Earth System Models

Tuesday, 23 September 2025 – Atlantic Hotel Universum,
Wiener Straße 4

8:45 – Opening by Raimund Bleischwitz (Scientific Director, ZMT)

09:00–09:30 – Catalyst Talk: Bjorn Stevens (MPI-M, Germany)
09:30–10:00 – Catalyst Talk: Veronika Eyring (DLR & Uni Bremen)

Session 1: Global Coupled Earth System Models

This session analyses the current generation of global Earth System Models (ESMs), with emphasis on their capacity to represent land–ocean–atmosphere interactions and their potential for incorporating tropical coastal processes. The session explores the architectures and coupling strategies of ICON-ESM, ACCESS, Tai-ESM, POEM and IITM-ESM, examining the extent to which they support integration of physical, biogeochemical, and ecological components. It highlights how such models handle interactions across spatial and temporal scales, from large-scale circulation to regional and nearshore dynamics, and addresses the treatment of socio-ecological feedbacks and coastal boundary complexities. While some ESMs now enable limited nesting or coupling to higher-resolution modules, considerable challenges remain in resolving coastal–terrestrial exchange, biophysical feedbacks, and fine-scale bathymetric features. Guiding question: How can global coupled models capture land–atmosphere–ocean interactions, and what near-term steps would most improve their relevance for coastal dynamics without compromising large-scale skill?

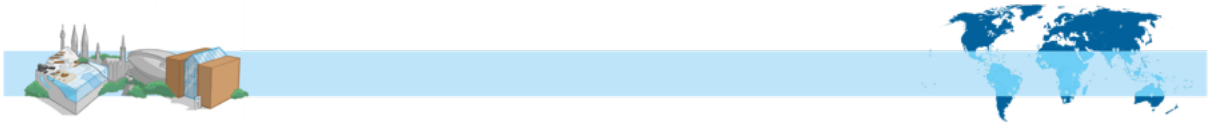
Chair: Bjorn Stevens (MPI-M, Germany)

10:00–10:15 – Jan Härter (University of Potsdam, Germany)
10:15–10:30 – Nils Brüggemann (MPI-M, Germany)

☕ 10:30–11:00 – Morning Coffee Break

11:00–11:15 – Georg Feulner (PIK, Germany)
11:15–11:30 – Praveen Veluthedathekuzhiyil (IITM, India)
11:30–11:45 – Yolandi Ernst (Global Change Institute, South Africa)
11:45–12:00 – Knut Klingbeil (IOW, Germany)
12:00–12:15 – Tilo Ziehn (CSIRO, Australia)

🍽 12:15–13:30 – Lunch Break (lunch provided on site)



Session 2: Regional Models

This session examines the development and application of regional and nested ocean and biogeochemical models as a means to improve the representation of coastal and nearshore processes. It emphasises downscaling strategies, regional nesting of global models, and hybrid approaches that combine dynamical and statistical techniques to overcome resolution and boundary-condition constraints. The session addresses scientific and technical challenges, including data limitations, computational efficiency, and the need for realistic forcings and boundary interactions in highly dynamic coastal regions. The role of new modelling platforms (e.g. MPAS-Ocean, ICON-Coast), more established models (e.g. WRF-NEMO), and regional reanalyses is reviewed, along with emerging strategies to represent fine-scale physical and ecological features. Guiding question: How can regional models be more effectively nested within ESMs, and what benchmarks are most useful for representing tropical coastal and nearshore dynamics?

Chair: *tba*

13:30–14:00 – Keynote: Yu-Heng Tseng (NTU, Taiwan)
14:00–14:15 – Bodo Ahrens (Goethe University Frankfurt, Germany)
14:15–14:30 – Dante Espinoza (IMARPE, Peru)
14:30–14:45 – Mia Sophie Specht (MPI-M, Germany)

☕ 14:45–15:15 – Afternoon Coffee Break

15:15 –16:00 – Wrap-up Panel Discussion / Q&A Stevens, Eyring, Tseng, *tba*

Poster Presentations by ZMT's TropEcS Senior Scientists:
Alexandra Klemme, Murugan Ramasamy, Subhendu Chakraborty, Michael Kriegl, Esteban Acevedo-Trejos, Stefan Königstein

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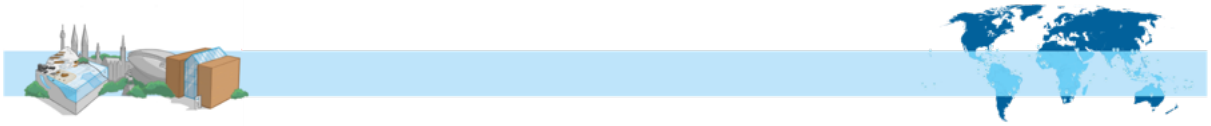
Day 2 – Coupling Components

Wednesday, 24 September 2025 – Atlantic Hotel Universum, Wiener Straße 4

Session 1: Integrating Ecological Models with Physical and Biogeochemical Processes

This session focuses on modelling approaches for marine and coastal higher trophic levels, their use of ocean and biogeochemical model output, and advancing the integration of ecological processes into coastal models. Key themes include trophic feedbacks, habitat–species interactions and environmental driving of biological dynamics, and assessing anthropogenic impacts through fisheries and climate change. It examines the integration of ecological models with physical and biogeochemical components, with special attention to cross-scale interactions (e.g. larval dispersal to living marine resource productivity), ecological thresholds, and the calibration of models to empirical data and



their projection into the future. These models provide important decision support in resource and ecosystem-based governance and societal adaptation to climate change. Guiding question: Which ecological drivers and resolutions are most critical for linking coastal ecosystems with large scale processes, and how can such coupled models best be validated against empirical data?

Chair: Kenny Rose (University of Maryland, USA)

09:00–09:30 – Keynote: Edward Gross (GEI Consultants, USA)
09:30–09:45 – Alonso Del Solar Escardó (ZMT)
09:45–10:00 – Kenny Rose (University of Maryland, USA)
10:00–10:15 – Patrice Brehmer (IRD / SRFC, Senegal)
10:15–10:30 – Ken Andersen (Technical University of Denmark)

☕ 10:30–11:00 – Morning Coffee Break

Session 2: Forces, Fluxes, and Exchange at the Land–Sea Interface

This session addresses the physical and biogeochemical linkages between terrestrial and marine systems in tropical coastal zones. It explores how sediment, freshwater, nutrient, and pollutant fluxes shape nearshore oceanography and coastal state and exchange, and how these dynamics are influenced by anthropogenic alterations such as land-use change, deforestation, and coastal development. It emphasises empirical approaches, including observational networks and remote sensing, and their integration into regional and coupled process modelling frameworks. A central aim is to assess the representation of coastal–terrestrial coupling in existing physical–biogeochemical models and to identify strategies for better capturing these fluxes and exchanges across scales and data regimes. Guiding question: How do land–sea and air–sea exchanges shape tropical coasts, and which improvements at these interfaces would most reduce uncertainties from coastal to basin scales?

Chair: Joke Lübbecke (University of Bremen, Germany)

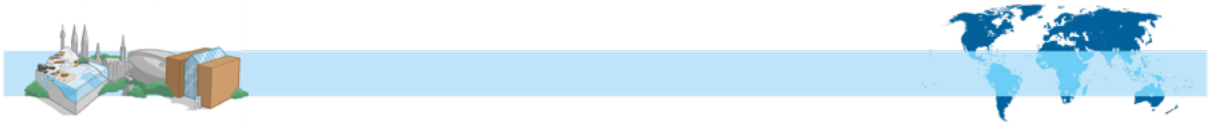
11:00–11:30 – Keynote: Moninya Roughan (UNSW, Australia)
11:30–11:45 – Kirsten Thonicke (PIK, Germany)
11:45–12:00 – Sabine Mathesius (PIK, Germany)
12:00–12:15 – Marie-Christin Wimmler (TU Dresden, Germany)

🍽 12:15–13:30 – Lunch Break (lunch provided on site)

13:30–13:45 – Andrés Fernando Osorio Arias (UNAL, Colombia)
13:45–14:00 – Sinikka Lennartz (University of Oldenburg, Germany)
14:00–14:15 – Siny Ndoye (Université Amadou Mahtar Mbow, Senegal)
14:15–14:30 – Joke Lübbecke (University of Bremen, Germany)
14:30–14:45 – Lívia Sancho (University of Rio de Janeiro, Brazil)

☕ 14:45–15:15 – Afternoon Coffee Break

15:15 –16:00 – Wrap-up Panel Discussion / Q&A Rose, Gross, Lübbecke, Roughan



Day 3 – Spatio-Temporal Scales and Socio-Economic Perspectives

Thursday, 25 September 2025 – Leibniz Centre for Tropical Marine Research (ZMT), F 6, Fahrenheitstraße 6

Session 1: Cross-Scale Modelling of Physical–Ecological Interactions in Tropical Coastal Systems

This session examines how physical and ecological processes interact across scales at the tropical land–sea interface. It highlights modelling approaches that integrate extreme weather, hydrodynamics, biogeochemistry and ecological response, spanning groundwater and nutrient fluxes, sediment and salinity dynamics, and vegetation–climate feedbacks under anthropogenic and climatic pressures. Emphasis is placed on modular, cross-scale integration frameworks that enable realistic, process-based predictions of ecosystem states and indicators. The session links empirical observations (including remote sensing) to model development in under-represented tropical regions and defines transferable validation metrics and decision-relevant benchmarks. Guiding question: How can we connect large-scale atmospheric and terrestrial forcing to coastal and ecological outcomes, and what approaches are most transferable across regions?

Chair: Nils Moosdorf (ZMT)

09:00–09:30 – Keynote: Erma Yulihastin (BRIN, Indonesia)
09:30–09:45 – Maxime Colin (ZMT)
09:45–10:00 – Ming Li (University of Maryland, USA)
10:00–10:15 – Ronny Peters (TU Dresden, Germany)

☕ 10:15–11:00 – Morning Coffee Break

11:00–11:30 – Keynote: Julia Moriarty (University of Colorado, USA)
11:30–11:45 – Yuley M. Cardona Orozco (CEMarin, Colombia)
11:45–12:00 – Florian Schütte (GEOMAR, Germany)

🍽 12:00–13:15 – Lunch Break (lunch provided on site)

Session 2: Human Dimensions in Tropical Coastal Processes

This session interprets the physical–ecological cascade in socio-economic terms, assessing how tropical countries and their coastal ecosystems may be impacted by climate change and other environmental pressures and what this implies for macroeconomic indicators, sectoral impacts, and socio-political stability. It reviews how macro- and meso-scale models can anticipate these changes, alongside strategies to mitigate greenhouse gases and adapt to evolving risks where an ocean–climate nexus is central. Guiding question: Which socio-economic indicators and case studies are most useful for linking coastal and ocean dynamics with economic impacts and resilience planning?

Chair: Michael Obersteiner (University of Oxford, UK)

13:15–13:45 – Keynote: Shardul Agrawala (OECD, France)
13:45–14:00 – Fredrick Kayusi (Pwani University, Kenya)
14:00–14:15 – Alvaro Calzadilla (UCL, UK)
14:15–14:30 – Jun Rentschler (World Bank, Belgium)
14:30–14:45 – Michael Obersteiner (University of Oxford, UK)

☕ 14:45–15:15 – Afternoon Coffee Break

15:15–15:30 – Bruno Meirelles de Oliveira (AZTI, Spain)
15:30–15:45 – Alistair Smith (Cambridge Econometrics, UK)

15:45–16:30 – Wrap-up Panel Discussion / Q&A Moosdorf, Yulihastin, Moriarty, Obersteiner, Agrawala

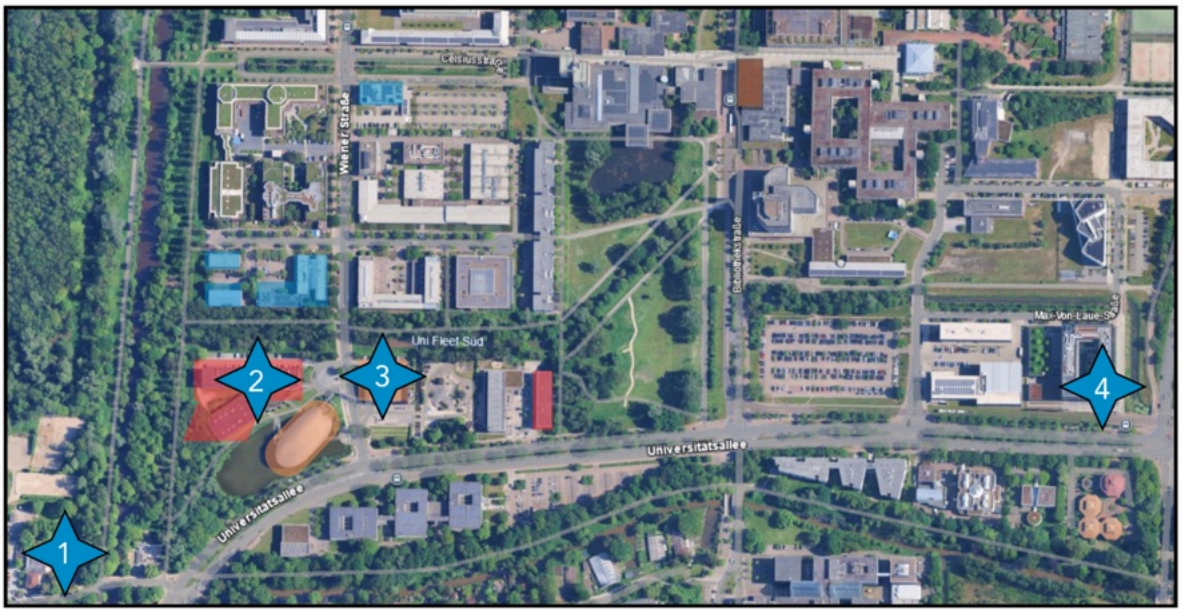
16:30 – Closing remarks by Raimund Bleischwitz (Scientific Director, ZMT)

Map of Campus

Map Legend:

- Universum Bremen: Wiener Straße 1a, 28359 Bremen
- Atlantic Hotel Universum Bremen: Wiener Straße 4, 28359 Bremen
- 7 Things Hotel: Universitätsallee 4, 28359 Bremen
- ZMT F6 Main Bulding - Reception & Seminar Room: Fahrenheitstraße 6, 28359 Bremen
- ZMT F8 & F10 - Administration: Fahrenheitstraße 8 & 10, 28359 Bremen
- ZMT W 7 - Management: Wiener Straße 7, 28359 Bremen

Restaurants close to Campus



1 Haus am Walde
Kuhgrabenweg 2, 28359 Bremen

Hours: Mon - Sun 09:00 - 23:00

2 Atlantic Hotel Universum
Wiener Straße 4, 28359 Bremen

Hours: Mon - Fri 12:00 - 22:30
Sat 17:00 - 22:30
Bar:
Mon - Sat until 00:00

3 Kubus
Wiener Straße 3, 28359 Bremen

Hours: Mon - Sun 10:00 - 17:00

4 Bellini im Tresor
Universitätsallee 14, 28359 Bremen

Hours: Mon - Sun 09:00 - 00:00