

GlobalHAB Annual Report to SCOR



**GlobalHAB - the International SCOR-IOC Science Program
on Harmful Algal Blooms**

**Activities 2023-2024
and Plans for 2024-2025**

Clarissa Anderson - GlobalHAB Chair

Scripps Institution of Oceanography, University of California, San Diego

Director, Southern California Coastal Ocean Observing System
Director, NOAA Cooperative Institute for Marine, Earth, and Atmospheric Systems

GlobalHAB Scientific Steering Committee + Friends

Steering Committee Members

- Clarissa Anderson, USA, Chair
- Hae-Jin, Jong, Korea
- Aifeng Li, China
- Luisa Mangialajo, France/Italy
- Jorge Mardones, Chile
- Silvia Nascimento, Brazil
- Malin Olofsson, Sweden
- Heather A. Raymond, USA
- Raffaele Siano, France
- Aletta Yñiguez, Philippines

Scientific Steering Committee members who rotated off:

- Elisa Berdalet, Spain, Former Chair (Current Advisor)
- Bengt Karlson, Sweden
- Neil S. Banas, United Kingdom
- Po Teen Lim, Malaysia, Vice-chair

Liaisons

- Dave Clarke ,Ireland, ICES representative (since 2020)
- Raphe Kudela, USA, liaison to GOOS Bio & Eco Panel (since 2017)
- Vera L. Trainer, USA, ISSHA and PICES representative (since 2016)
- Philipp Hess, France, IPHAB representative (since 2023)
- Maggie Broadwater, USA, IPHAB representative (since 2023)
- Joe Silke, Ireland, IPHAB representative (2019-2023)
- Marc Suddleson, liaison to NOAA, USA (since 2021)
- Henrik Enevoldsen, IOC UNESCO, IOC Science and Communication Centre on Harmful Algae at the University of Copenhagen, Denmark (since 2016)
- Emily Twigg, Scientific Committee on Oceanic Research, USA (since 2023)
- Yun Sun, Junior Professional Officer, IOC Secretariat (2021-2023)



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July 18, 2024

2023-2024 GlobalHAB Science Highlights

Fish-Killing Algal Blooms and Ichthyotoxins: Prevention, Mitigation and Control



- FINAL publication of the white paper on fish-killing algal blooms that was presented at the International Conference on Harmful Algae (ICHA2023, November 5-10, 2023) - *strategies for technological and scientific approaches to mitigate impacts of fish killing algal blooms*
- DIRECT outcome of the "Advanced International Colloquium and Technical Workshop", held in October 8-11, 2019 in Puerto Varas, Chile, under the auspices of IOC-IPHAB and GlobalHAB
- THANKS to support of the government of Chile through CORFO and collaboration of CREAM-IFOP
- TEN participants: D.M. Anderson, A.D. Cembella -WG chair-, O. Espinosa, L. Guzman, G.M. Hallegraeff, P.J. Hansen -acting chair-, H. Hégaret, T.O. Larsen, J. Mardones, M. Iwataki, L. MacKenzie

Venue: Puerto Varas, Chile

Dates: 8th – 11th October, 2019

2023-2024 GlobalHAB Science Highlights

Synergistic activities and Communications at international scientific events:

The 2nd UN Ocean Decade Regional Conference and the 11th WESTPAC International Marine Science Conference (22-25 April 2024, Bangkok, Thailand)

- Co-convened by Aletta T. Yñiguez (Marine Science Institute, University of the Philippines Diliman, Philippines/ GlobalHAB, IOC WESTPAC-HAB and IPHAB), **80 participants**
- “Mitigation and Management of Harmful Algal Blooms (HABs)” – highlighted the current status of HABs in countries such as China, Indonesia, Japan, Malaysia, the Philippines, Russia, and Singapore
- “Establishing Decision-support tools for Eutrophication and Harmful Algal Blooms (EuHABs) Management” - centered on the use of remote-sensing and modeling tools for HABs and eutrophication, addressing satellite data limitations, the potential of drone platforms for monitoring, and tuning locally developed marine ecosystem models for managing nutrient loads



2023-2024 GlobalHAB Science Highlights

Synergistic activities and Communications at international scientific events:

United States National HAB Observing Network Community of Practice & Webinar Series - 12 webinars

WELCOME

NHABON CoP Webinar #11:

Synergies in HAB Observations across UN Ocean Decade Programmes

June 26, 2024

For technical issues contact medmondson@ucar.edu

This webinar is being recorded and will be available at <https://ioosassociation.org/nhabon/nhabon>



Dr. Clarissa Anderson
Co-chair NHABON CoP,
Executive Director, Southern
California Coastal Ocean
Observing System



Dr. Quay Dortch
Co-Chair NHABON
CoP, Senior HAB
Scientist Consultant
to CSS for NOAA

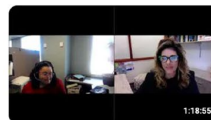
IOOS
ASSOCIATION



NHABON Webinar #11: Synergies in HAB Observations across UN Ocean Decade...
73 views • 2 weeks ago



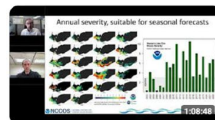
NHABON Webinar #10: Observing Needs for Tracking & Responding to Sargassum
43 views • 3 months ago



NHABON Webinar #9: HAB Observing Data Needs for Socio-Economic Analysis
92 views • 9 months ago



NHABON Webinar 8
63 views • 1 year ago



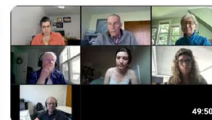
NHABON Webinar #7: Linking HAB Observations to Forecasts
111 views • 1 year ago



NHABON Webinar #6: Operating Imaging FlowCytobots
192 views • 1 year ago



NHABON Web. 5: Remote Sensing, Observing & Forecast Using Drones...
42 views • 1 year ago



NHABON Webinar #4: Monitoring HABs for Aquaculture
29 views • 1 year ago



NHABON Community of Practice: Making Community Science Work
109 views • 2 years ago



HAB OG Webinar: Emerging Data Science Tools for Managers and Scientists
92 views • 2 years ago



HAB OG Pilot Webinar: Implementation Strategy for a National Harmful Algal Bloo...
67 views • 2 years ago

2023-2024 GlobalHAB Science Highlights

Synergistic activities and Communications at international scientific events:

U.S. National HAB Observing Network Town Hall at AGU Ocean Sciences Meeting


JOIN US FOR OUR TOWN HALL AT OSM'24
ROOM: R09, SECOND FLOOR (NOLACC)

(TH33E) Better Together: Building the National Harmful Algal Bloom Observing Network (NHABON)

WEDNESDAY, FEBRUARY 21ST AT 12:45PM CST

Come join us for a community discussion on building the nation's HAB observing capabilities moderated by:

PANELISTS:

 CHARLES STOCK Geophysical Fluid Dynamics Laboratory (GFDL), NOAA	 ERICA OMBRES NOAA Ocean Acidification Program (NOAA OAP)	 SUSANNE CRAIG NASA GSFC Ocean Ecology Laboratory	 ANDREA VANDER WOUDE NOAA/OAR, Great Lakes Environmental Research Laboratory
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SHELLY TOMLINSON
National Centers for Coastal Ocean Science, NOAA

CLARISSA ANDERSON
Southern California Coastal Ocean Observing System

For more information, please contact meumundson@ucar.edu

IQQS
ASSOCIATION

- Over **70 people attended** the NHABON Town Hall at the AGU Ocean Sciences Meeting in New Orleans, LA in February 2024
- Panelists discussed the NHABON Community of Practice, providing examples of how regional pilot projects coordinated through a national network are supporting technologies and monitoring programs to detect blooms, distribute forecasts and early warnings, and provide data and information products.

2023-2024 GlobalHAB Science Highlights

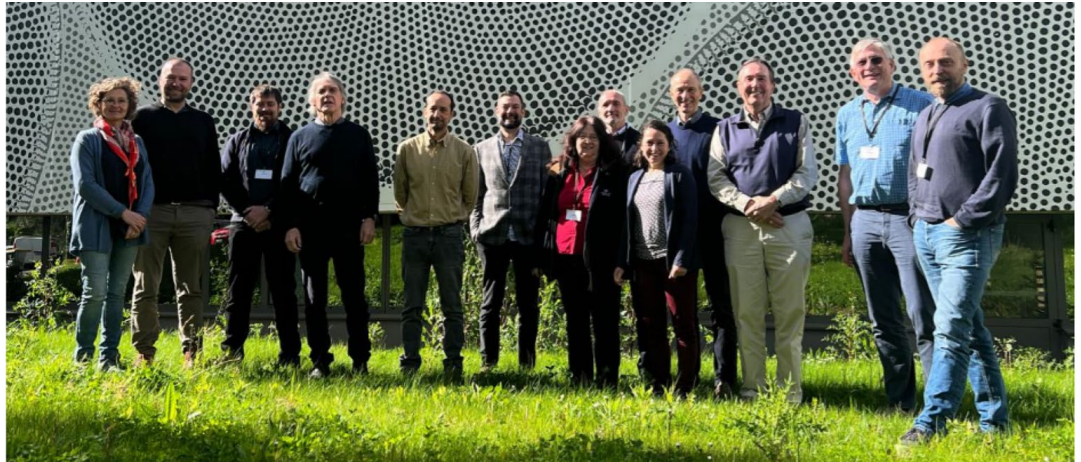
Synergistic activities and Communications at international scientific events:

GlobalHAB and the UN Ocean Decade HAB Solutions (HAB-S) Programme represented at the UN Informal Consultative Process on Oceans and the Law of the Sea

- Philipp Hess (IPHAB liaison) discussed the biological and chemical diversity of HABs in a changing climate and related risks to food safety and security; Maggie Broadwater (NOAA liaison) discussed the impacts of HABs on the environment, societies and economies; and Don Anderson (former GEOHAB SSC member) shared technologies and approaches to HAB early warning, mitigation, and control.

ICES-IOC Working Group on Harmful Algal Bloom Dynamics (WGHABD) Annual Meeting IFREMER, Nantes, France April 16th-18th April

- A presentation overview of GlobalHAB recent activities, changes in SSC membership and future plans of GlobalHAB was presented by Dave Clarke (WGHABD co-chair/GlobalHAB SSC)



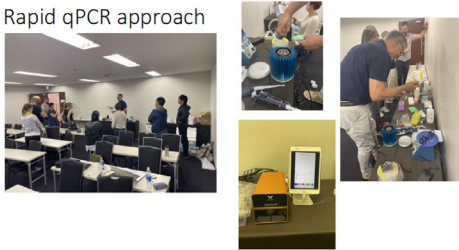
ICES-IOC WGHABD members - Annual meeting

2023-2024 New GlobalHAB Activities

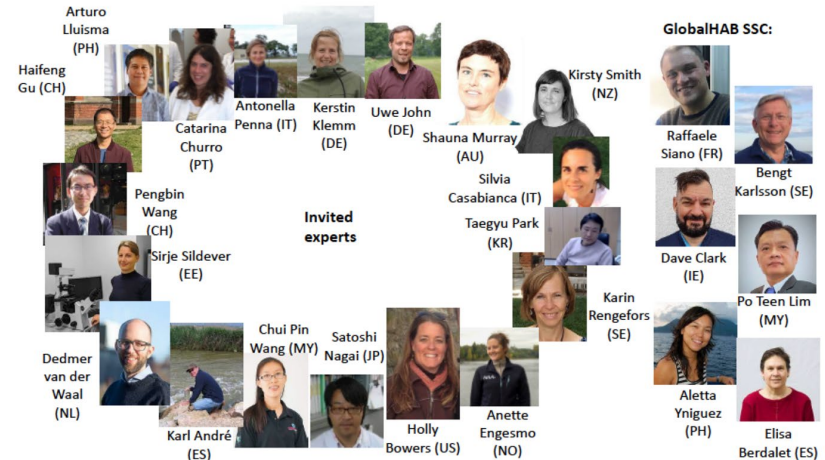
A quantitative PCR (qPCR) workshop

- Organized by Raffaele Siano (GlobalHAB), aimed to foster the integration and the application qPCR/dPCR methodologies to improve HAB monitoring and to develop early risk alert systems
- **Four virtual workshops** were conducted during the last year by international experts on application of these molecular tools on HAB research and monitoring; **in-person workshop** in Hiroshima (Japan) on November 3-5, 2023, prior to the International Conference on Harmful Algae ([ICHA2023](#), November 5-10, 2023).

Rapid qPCR approach



**A position paper summarizing the achievements and conclusions of the workshop is in preparation



Participants were: Raffaele Siano (GlobalHAB SSC), Karl B. Andree, Holly Bowers, Silvia Casabianca, Catarina Churro, Dave Clarke (GlobalHAB SSC), Anette Engesmo, Haifeng Gu, Bengt Karlsson (GlobalHAB SSC), Kerstin Klemm, Uwe John, ChuiPin Leaw, Po TeenLim (GlobalHAB SSC), Arturo Lluisma, Shauna Murray (GlobalHAB), Satoshi Nagai, Tae-GyuPark, Antonella Penna, Karen Rengefors, KirstyF. Smith, Aletta T. Yñiguez (GlobalHAB), Pengbin Wang, Elisa Berdalet (GlobalHAB SSC Chair).

2023-2024 New GlobalHAB Activities

GlobalHAB International Workshop on Solutions to Control HABs in Marine and Estuarine Waters <https://iocaribe.ioc-unesco.org/en/event/1112>



(Left to right) **Front row:** Nobuharu Inaba, Dail Laughinghouse, Javier Paredes Mella, Michelle Lepori-Bui, Colleen Kellogg, Ruoyu Guo, Natsuko Natayama, HoGeun Jang, Vera Trainer

Center row: Pengbin Wang, Misty Peacock, *Natasha Melo Buckiewicz*, Svetlana Esenkulova, Heather Raymond, Quay Dortch, Genki Terauchi, Kathy Coyne, Jorge I. Mardones, Taegy Park, Yoichi Miyake.

Back row: Megan Schulz, Takafumi Yoshida, Don Anderson, Marc Suddleson and West Bishop (remote), Kevin Claridge, Andrew Ross, Charles Trick.



- Two-day workshop at the PICES 2023 conference in Seattle, WA, USA, jointly sponsored by GlobalHAB, NOAA, and PICES
- Provided a forum for international dialogue to foster *in situ* experimentation, and support assessments of social, economic, and environmental costs and benefits of various approaches to controlling HABs in marine and estuarine waters
- Follow-on **writing workshop** focused on summarizing the worldwide approaches in HAB control as both a commentary and a scientific report in **peer-reviewed scientific journals**

2023-2024 New GlobalHAB Activities

Research on *Sargassum* Influxes – new macroalgal HAB problem worldwide

GlobalHAB, in collaboration with GESAMP and the EuroSea European project, collaborated on a White Paper on the current fundamental scientific understanding of *Sargassum* population dynamics and research gaps to complement the UNEP “SARGASSUM WHITE PAPER: Turning the crisis into an opportunity”

- Intended to provide valuable support and scientific input for the growing programmes of *Sargassum* monitoring and management
- Dr. Shelly-Ann Cox was selected to lead the paper after an open IOC-SCOR GlobalHAB call launched in November 2022
- **Currently being laid out, expected to be released October 2024**



Sargassum White Paper. Addressing the influxes of the holopelagic *Sargassum* spp. in the equatorial and subtropical Atlantic: recent scientific insights in their dynamics.

Synergistic Activities with the UN Decade on the Ocean

Collaboration with the Harmful Algal Bloom Solutions (HAB-S) Programme



The Harmful Algal Bloom Solutions Programme HAB-S

A Proposed Action for the UN Decade of Ocean Science for Sustainable Development
Led by the FAO-IOC Intergovernmental Panel on Harmful Algal Blooms (IPHAB)



Food and Agriculture
Organization of the
United Nations



Intergovernmental
Oceanographic
Commission



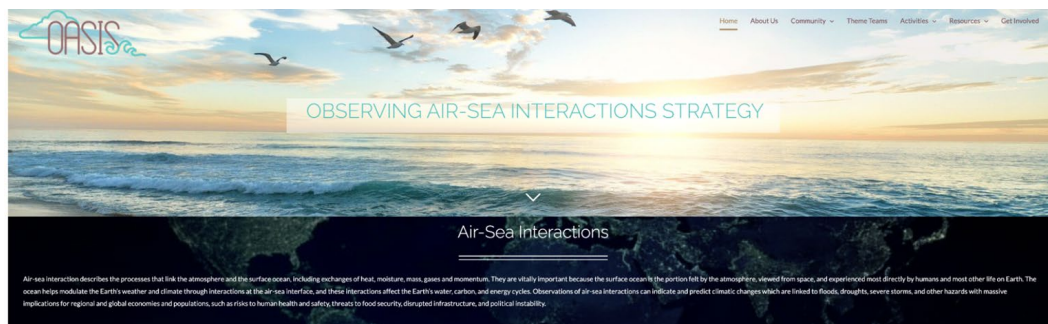
NATIONAL CENTERS FOR
COASTAL OCEAN SCIENCE

- Newly endorsed Programme for the UN Decade of Ocean Science for Sustainable Development
- **Led by the IOC-FAO** Intergovernmental Panel on Harmful Algal Blooms (IPHAB)
- Aims to provide novel and transformational science-based solutions for sustainable management and use of marine resources and ecosystem services affected by HABs in a changing world.
- HAB-S initiatives include:
 - 1) Preventing, controlling & mitigating HAB events (PCM)
 - 2) Advancing HAB observing tools & technologies
 - 3) Making HAB data equitable & accessible
 - 4) Improving HAB literacy

With GlobalHAB, HAB-S will **advance the overarching goal of GlobalHAB to improve understanding and prediction of HABs in aquatic systems, and management and mitigation of their impacts.**

Synergistic Activities with the UN Decade on the Ocean

Collaboration with the Observing Air-Sea Interactions Strategy (OASIS) Programme



OASIS is a **former SCOR Working Group and Decade Programme** – working to harmonize observational strategies and develop a practical, integrated approach to observing air-sea interactions through capacity development, leveraging of multi-disciplinary activities, and advancement of understanding

- **GlobalHAB has been an endorsed project of OASIS since the beginning**, given the critical importance of establishing observational nodes throughout the global ocean that measure physical, chemical, and biological variables simultaneously with the aim of understanding the impacts of air-sea gas exchange and the carbon cycle on processes driving changes in marine life, starting with the plankton.
- GlobalHAB Chair Anderson presented on the first day of the **OASIS Face-to-Face Workshop** and included discussion of GlobalHAB as an important partner in planning observational arrays



OASIS Face-to-Face Workshop reception at the Holiday Inn, New Orleans, LA, 17 February 2024. Local Brazilian dancers (friends of C. Anderson) entertained the workshop attendees with a lively Samba performance at the reception and brought the spirit of New Orleans alive for the week ahead.

THE YEAR AHEAD: GlobalHAB Activities 2024-2025

- 1) **GlobalHAB-Endorsed Workshop in Qingdao, China: PCM-HABs training for South East Asia mariculture stakeholders** — led by GlobalHAB member Aifeng Li; GlobalHAB Chair Clarissa Anderson and IPHAB liaison Philipp Hess attending
- 1) qPCR workshop on Benthic HABs – already supported by the NOAA Beaufort Laboratory
- 1) A **scientific publication on the monitoring of *Ostreopsis*** carried out within the framework of RAMOGE, during the last decade (2010-2024) – led by Elisa Berdalet (former GlobalHAB Chair) and Luisa Mangialajo (GlobalHAB member)
- 1) GlobalHAB will participate in the OOSC (One-Ocean Science Congress, <https://one-ocean-science-2025.org/>) in Nice, France 4-6 June 2025
- 1) **Webinar series on drinking water/recreational water impacts from CyanoHABs** - led by Heather Raymond & Aletta Yniguez (GlobalHAB members)

THE YEAR AHEAD: GlobalHAB Activities 2024-2025

6) **GlobalHAB Scientific Steering Committee In-person Meeting** held 24-25 September 2024 at Scripps Institution of Oceanography, San Diego, California

FINAL DELIVERABLES:

- Develop a peer-reviewed publication to illustrate the emerging HAB threats observed worldwide over the last five years through regional story-telling
- Write a synthesis report on GlobalHAB achievements to present to SCOR in Fall 2025
- Draft a proposal for the next 10-year science programme for presentation to IPHAB in March 2025
- In-person GlobalHAB Scientific Steering Committee Meeting at the ICHA Meeting in Punta Arenas, Chile, 19-24 October 2025, co-hosted by GlobalHAB member, Jorge Mardones (Chile)!



Thank you, SCOR



Scripps Institution of Oceanography, La Jolla, California USA

