CLIVAR news for WGSIP

Thanks to Gokhan Danabasoglu of CLIVAR SSG

CLIVAR/IOC-GOOS Indian Ocean Region Panel (IORP) formed a New Task Team (QIndOOS - Quantitative evaluation of the Indian Ocean Observing System to improve climate forecasts).

Terms of Reference:

- To evaluate the impacts of IndOOS data losses during COVID on model-based analyses, simulations, and forecasts of Indian Ocean Dipole (IOD), Madden-Julian Oscillation (MJO), and monsoons;
- To assess the optimization of the IndOOS using OSSEs;
- To collaborate with other CLIVAR panels and focus groups for coordinating scientific initiatives.

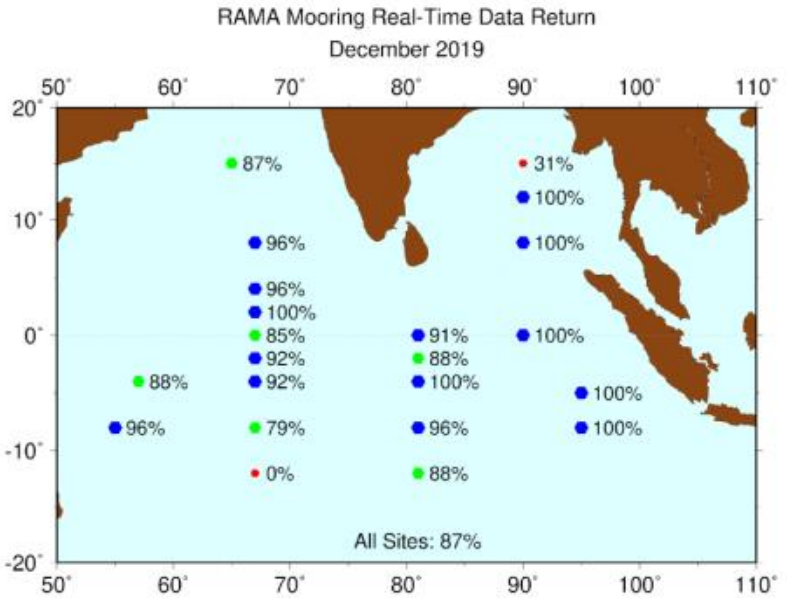
IORP led an article in *BAMS* documenting the challenges in sustaining IndOOS in the face of the ongoing pandemic and provided insights on the way forward.

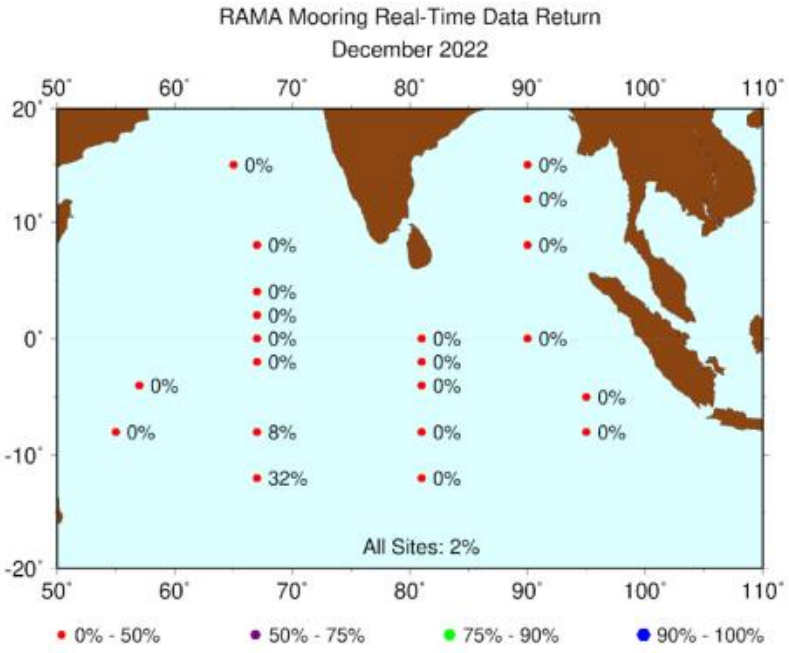
COVID Impacts Cause Critical Gaps in the Indian Ocean Observing System

Janet Sprintall, Motoki Nagura, Juliet Hermes, M. K. Roxy, Michael J. McPhaden, E. Pattabhi Rama Rao, Srinivasa Kumar Tummala, Sidney Thurston, Jing Li, Mathieu Belbeoch, and Victor Turpin

Online Publication: 15 Feb 2024

DOI: https://doi.org/10.1175/BAMS-D-22-0270.1





CLIVAR Tropical Basin Interactions Research Focus has been extended to 2025

The objectives of the CLIVAR TBI Research Focus include providing a concrete and robust estimate of the prediction **skill associated with TBI**; in particular, to **quantify the tropical Atlantic and Indian Ocean contribution to the prediction skill in the tropical Pacific**. The group also aims to identify factors that underpin low-frequency modulation of TBI and how they affect the **decadal modulation of ENSO**.

This is achieved by conducting TBIMIP which consists of pacemaker experiments in which SSTs are prescribed in selected basins to follow the observed values. The experiment design is detailed here: https://www.clivar.org/sites/default/files/documents/TBI_CoEx_design.pdf. A manuscript has been submitted to GMD. Analysis of the data is underway.

Participating models

Model	Center	Type of experiment	Status
CESM2	US NSF NCAR	pmaker hindcast	completed
CESM2	US NSF NCAR	standard pmaker	ongoing
CESM2	SCSIO, China	Tier 2 expmnts	ongoing
NorCPM	U. of Bergen	hindcast+standard	completed
SINTEX-F2	JAMSTEC	pmaker hindcast	ongoing
MIROC6	JAMSTEC, University of Tokyo/NIES	hindcast+standard	ongoing
ACCESS-CM2	CSIRO, Australia	standard pmaker	in preparation
ACCESS-CM2	CSIRO, Australia	Tier 3 expmnts	completed
IPSL-CM6A-LR	IPSL, France	standard pmaker	in preparation
KCM	GEOMAR, Germany PNU, Korea	standard pmaker	in preparation

Understanding the tropical Pacific decadal variability is important for an improved climate prediction (e.g., ENSO prediction skill is affected by the mean state which is linked to TPDV).

A review paper on Tropical Pacific Decadal Variability (**TPDV**) has been published in October 2023 as a major outcome of TPDV WG (PRP):

nature reviews earth & environment

https://doi.org/10.1038/s43017-023-00486-x

Review article

Check for updates

Mechanisms of tropical Pacific decadal variability

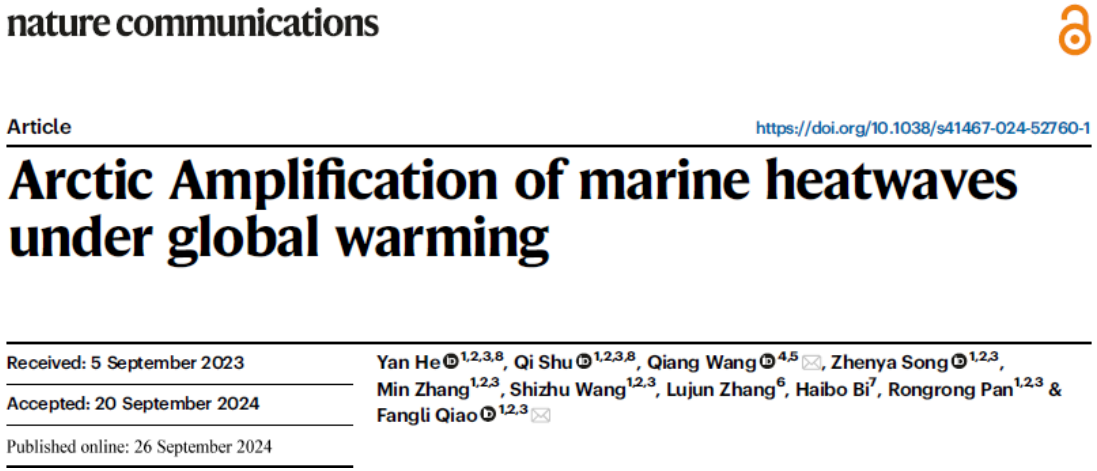
Antonietta Capotondi[1,2], Shayne McGregor[3,4], Michael J. McPhaden[5], Sophie Cravatte[6,7], Neil J. Holbrook[8,9], Yukiko Imada[10], Sara C. Sanchez[11], Janet Sprintall[12], Malte F. Stuecker[13,14], Caroline C. Ummenhofer[15,16], Mathias Zeller[17], Riccardo Farneti[18], Giorgio Graffino[19], Shijian Hu[20], Kristopher B. Karnauskas[1], Yu Kosaka[21], Fred Kucharski[18], Michael Mayer[22,23], Bo Qiu[13], Agus Santoso[16,24], Andréa S. Taschetto[16,24], Fan Wang[20], Xuebin Zhang[25], Ryan M. Holmes[26], Jing-Jia Luo[27], Nicola Maher[1,11,28,29], Cristian Martinez-Villalobos[30,31], Gerald A. Meehl[32], Rajashree Naha[3], Niklas Schneider[13,14], Samantha Stevenson[33], Arnold Sullivan[34], Peter van Rensch[3] & Tongtong Xu[1,2]

Sections

CLIVAR Research Focus on Marine Heatwaves (MHW) in Global Ocean wrote a review paper that has been accepted in Communications Earth & Environment (Capotondi et al. 2024). The paper reviews recent advances in marine heatwaves research, including the three-dimensional structure and evolution of MHWs, their drivers, their connection with other extremes in the ocean and over land, future projections, and **assessment of their predictability and current prediction skill.**

Capotondi, A., R. R. Rodrigues, A. Sen Gupta, J. A. Benthuysen, et al. 2024: A global overview of marine heatwaves in a changing climate. *Communications Earth & Environment*, accepted.

A study in a Nature Communications paper co-authored by a few CLIVAR members projects an intensification of MHW under greenhouse warming - a phenomenon coined the 'Arctic MHW Amplification'.



nature communications

Article

https://doi.org/10.1038/s41467-024-52760-1

Arctic Amplification of marine heatwaves under global warming

Received: 5 September 2023

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Yan He[1,2,3,8], Qi Shu[1,2,3,8], Qiang Wang[4,5] ✉, Zhenya Song[1,2,3], Min Zhang[1,2,3], Shizhu Wang[1,2,3], Lujun Zhang[6], Haibo Bi[7], Rongrong Pan[1,2,3] & Fangli Qiao[1,2,3] ✉

Other publications of interest:

- Swart, N. C., et al., 2023: The Southern Ocean Freshwater Input from Antarctica (SOFIA) Initiative: scientific objectives and experimental design. ***Geosci. Model Dev.***, 16, 7289-7309
- Watanabe, M., et al., 2024: Possible Shift in Controls of the Tropical Pacific Surface Warming Pattern. ***Nature***, doi: 10.1038/s41586-024-07452-7.
- Fan, H., C. Wang, S. Yang, G. Zhang, 2024: Coupling is key for the tropical Indian and Atlantic oceans to boost super El Nino. ***Science Advances***, 10, doi: 10.1126/sciadv.adp2281