

WORKSHOP 11

Understanding Shelf Marine Heatwaves Through Long-Term Mooring Observations Across the North Pacific

October 25th, 14:00 – 17:35

Sponsors: AP-NPCOOS (POC, TCODE, MONITOR)

Conveners: Jae-Hyoung Park (Korea, corresponding), Charles Hannah (Canada), Jack Barth (USA), Hikaru Homma (Japan)

Workshop Format: Hybrid (in-person + online participation)

Join Zoom Meeting

<https://pknu.zoom.us/j/82865841797?pwd=Lbcmricsgqx1y5KgXRSF5aD1lXfQL9.1>

Meeting ID: 828 6584 1797

Passcode: 549108

1400-1410	Introductions (Convenors; Workshop structure and objectives)
1410-1530 (80 min)	Regional Presentations (4 presentations, 20 min each) - A brief overview of the major regional MHW characteristics - Three to five key findings from your analysis - Any particularly notable subsurface features that may be useful for cross-regional comparison
1530-1550	COFFEE
1550-1620 (30 min)	Discussion - Comparison of common and contrasting regional MHW characteristics - Integration of coastal and shelf MHW characteristics across the Pacific
1620-1730 (70 min)	Drafting the outline of synthesis paper
1730-1735	Closing remarks and next steps

Description:

Coastal and shelf regions are critically important due to their direct influence on human societies, yet they exhibit highly complex physical and biogeochemical variability across a wide range of spatial and temporal scales. This inherent complexity makes it challenging to assess long-term trends and diagnose extreme events, including marine heatwaves (MHWs). To address these challenges, several North Pacific nations have established and maintained long-term (>20 years) mooring networks and other fixed-platform observational systems. These platforms collect high-frequency measurements—typically at minute- to hourly-scale intervals—providing essential information for understanding processes occurring across multiple temporal scales, from tidal and synoptic variability to interannual and decadal change.

Marine heatwaves (MHWs) are becoming increasingly common in the North Pacific, profoundly altering marine ecosystems and affecting climate indicators such as ENSO and PDO. While the drivers of open-ocean MHWs are relatively well understood, the mechanisms that generate, sustain, or advect extreme thermal anomalies in shelf and coastal waters remain poorly understood due to the heterogeneous variability, tidal processes, wind events, freshwater inputs, and rapid water mass transitions, all of which complicate the detection and interpretation of extreme events. Notably, subsurface MHWs can persist for years after open-ocean events, underscoring the need for coordinated investigation using long-term mooring records.

The first half of the workshop will bring together updates from participating member countries, with the goal of completing an overview of available coastal and shelf mooring data—both surface and subsurface—and diagnosing regional sub/surface MHW characteristics. Building on these discussions, the workshop will develop a framework that integrates coastal and shelf MHW characteristics across the North Pacific. Such a framework would provide a foundation for basin-scale synthesis, improve scientific understanding of extreme coastal ocean conditions, and support ecosystem assessment and climate-resilience planning.

Suggested Workshop Format:

- (a) Regional presentations about the marine heatwave in the surface/subsurface layer
 - Identification of key scientific findings across regions (80 min)
- (b) Discussion for comparison of common and contrasting regional MHW characteristics (30 min)
- (c) Development of an outline for a collaborative synthesis paper (70 min)