

Project: Mechanisms of Pacific Decadal Variability in ESMs

The Continuum of Northeast Pacific Marine Heatwaves and Their Relationship to the Tropical Pacific

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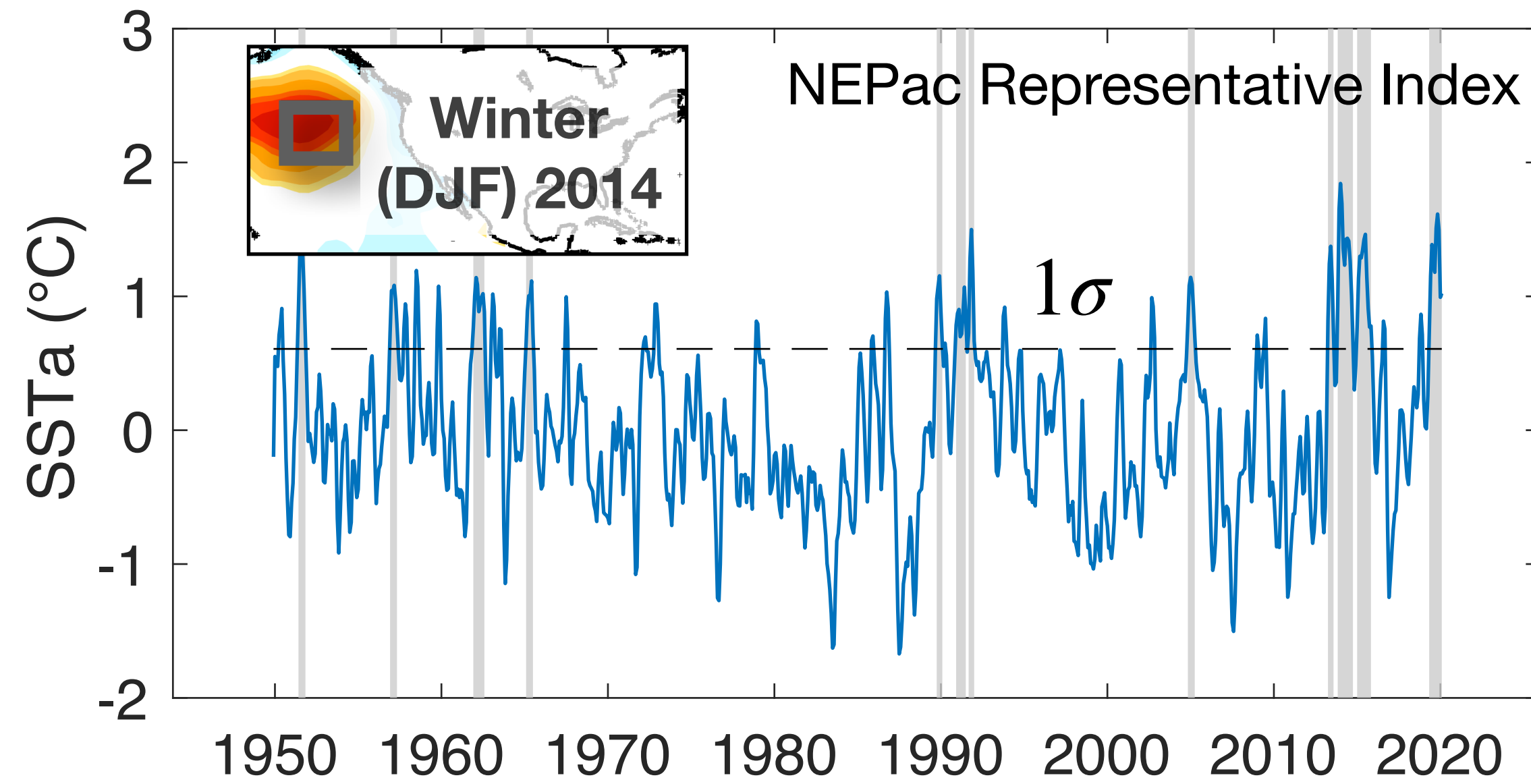
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Recurrence of Northeast Pacific Marine Heatwaves in observations and LIM simulation



Linear Inverse Model (LIM) (Penland, 1996):

$$\frac{d\mathbf{x}}{dt} = \mathbf{L}\mathbf{x} + \xi$$

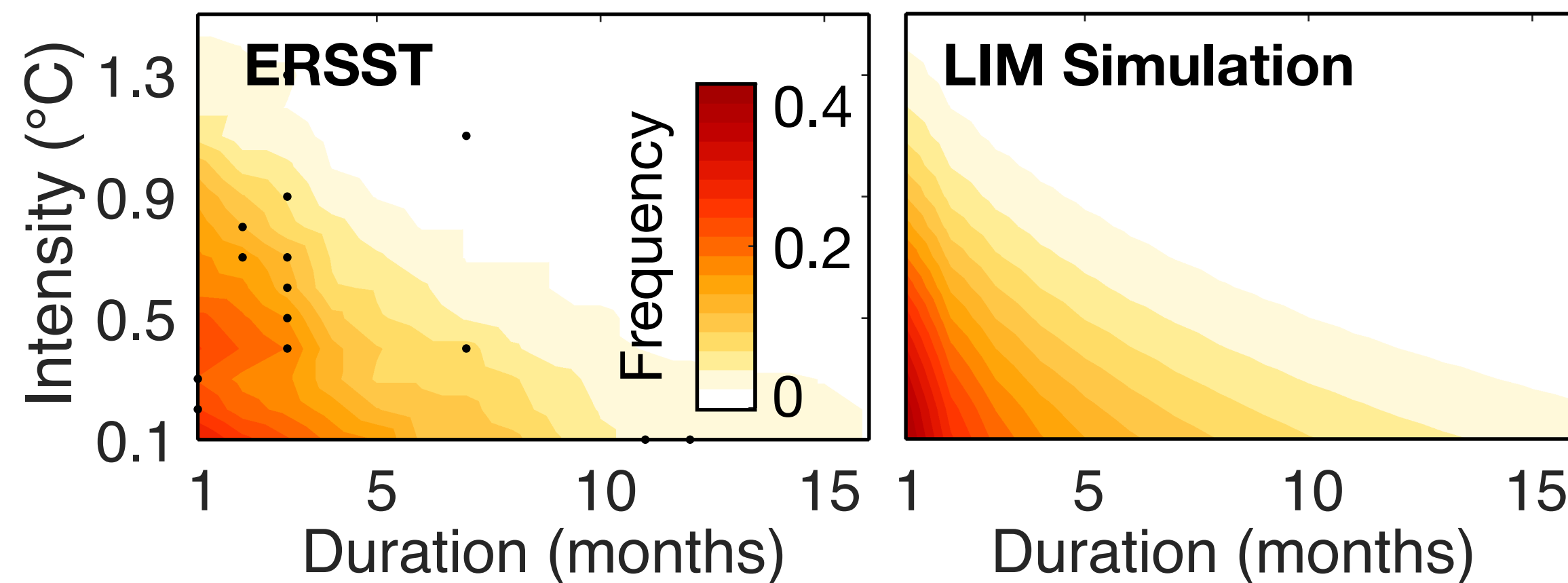
\mathbf{x} - the state variable, \mathbf{L} - linear dynamical operator, ξ - white noise (which can have spatial coherence).

70 years of observed SSTa

40,000 years of simulated SSTa

Key Points

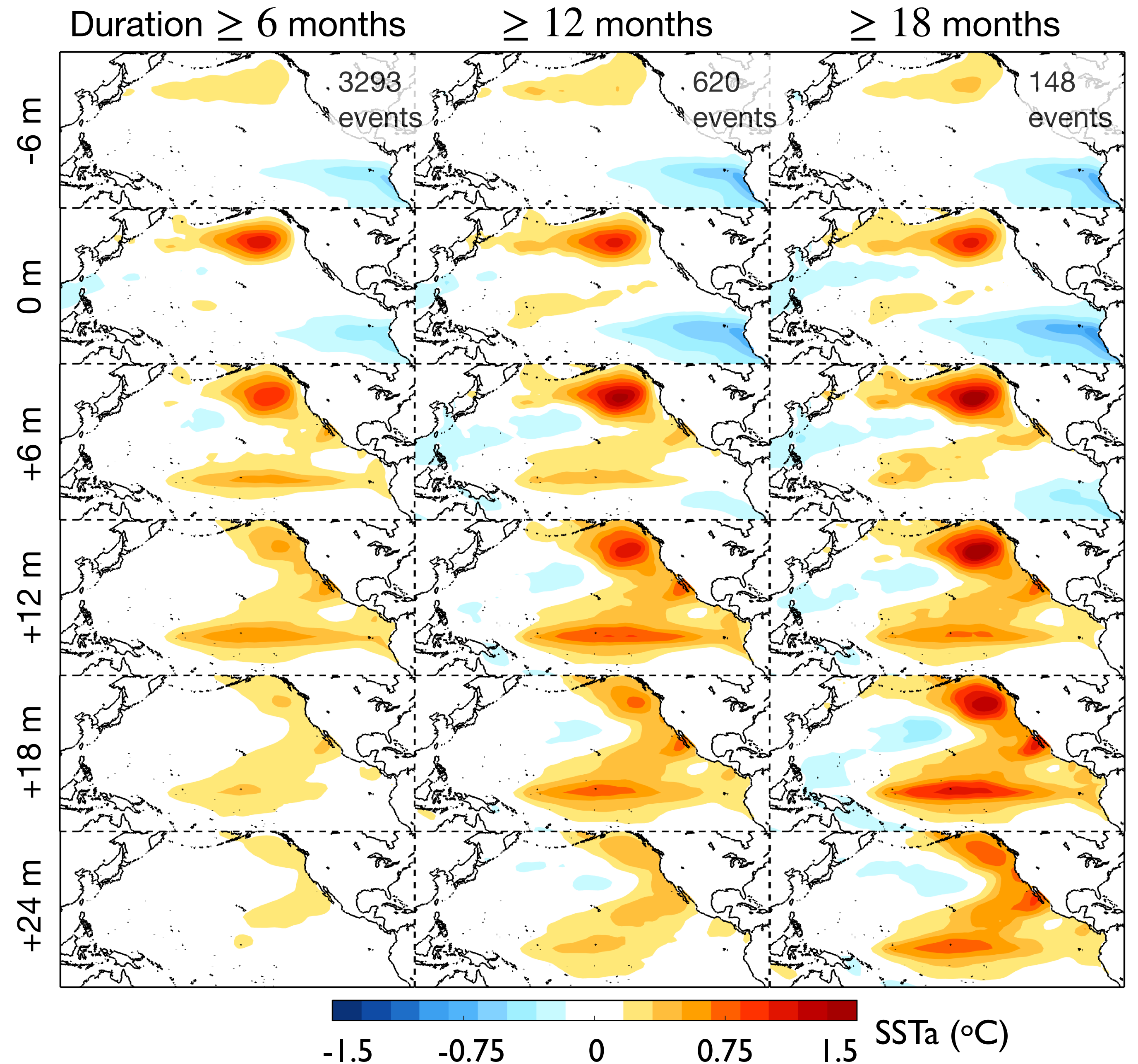
- Marine heatwaves are a recurrent phenomenon of North Pacific
- LIM simulation provides a full range of marine heatwave expression



Characteristics of Northeast Pacific Marine Heatwaves linked to the Tropical Pacific

Key Points

- Longer duration Marine Heatwaves:
 - ▶ MHWs had similar onset intensities, but greater maximum intensities
 - ▶ Equatorial Pacific cold anomalies were stronger and persisted longer
 - ▶ Central Pacific El Niño was slower to develop, reaching greater peak amplitude later



Characteristics of Northeast Pacific Marine Heatwaves linked to the Tropical Pacific

Key Points

- A key tropical role in driving more persistent Marine Heatwaves in the Northeast Pacific

