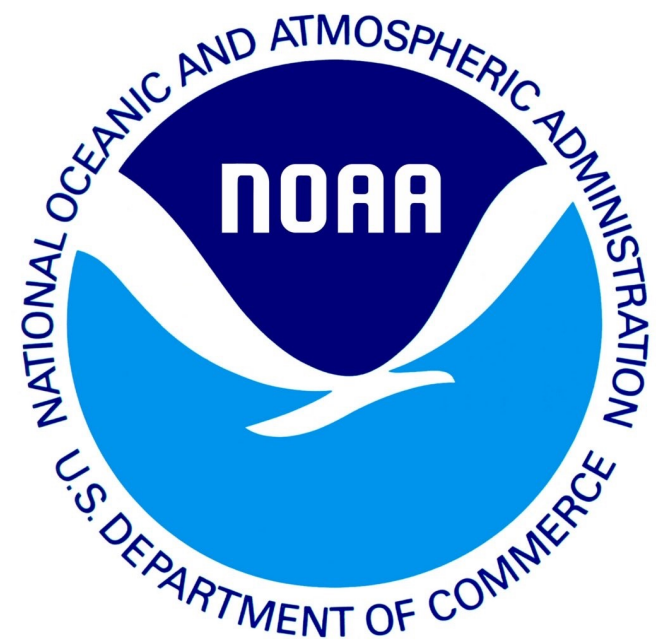


# Marine Heatwaves and Impacts on Fisheries

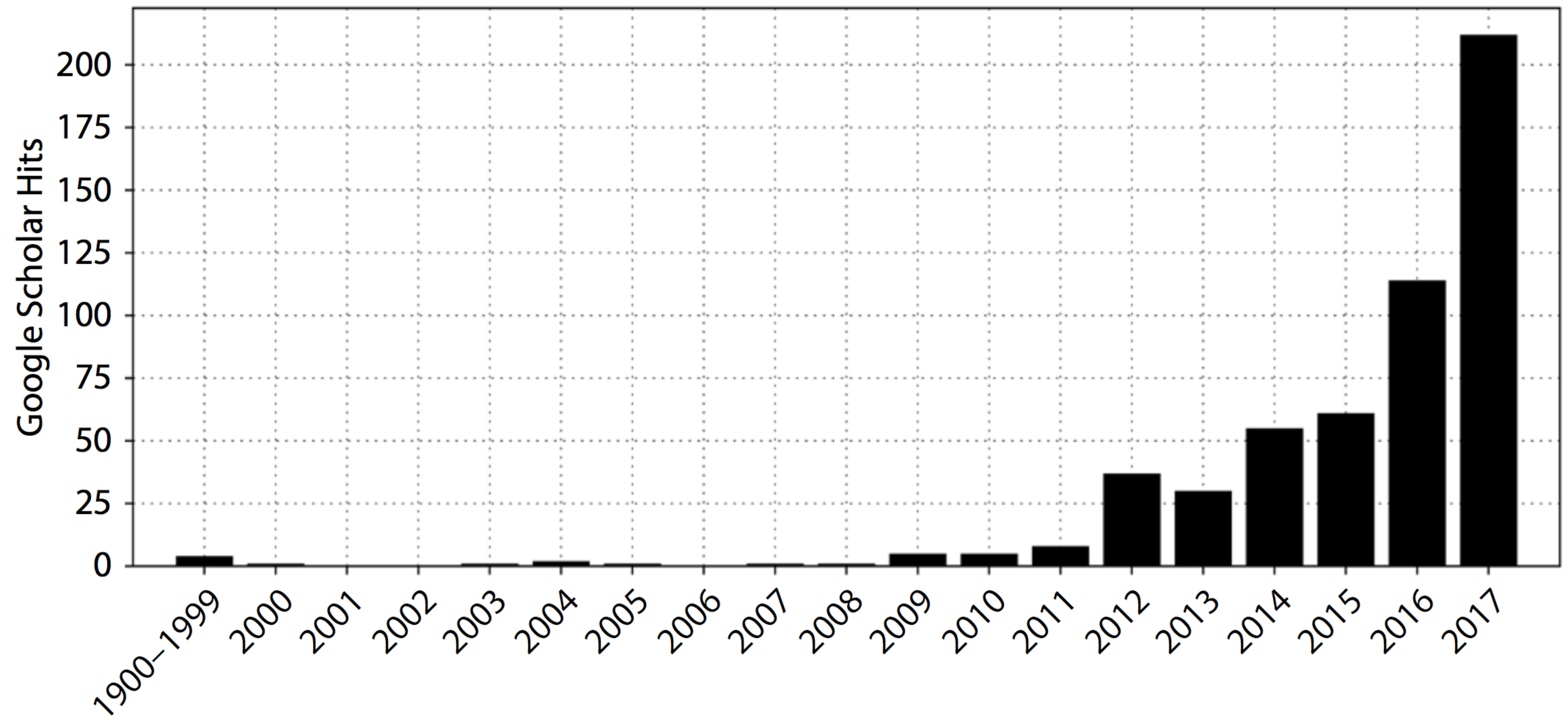
Mike Jacox and Toby Garfield  
NOAA Southwest Fisheries Science Center

Annual ESSM Community Workshop  
November 18, 2019

With contributions from Andy Leising, Chris Harvey, Nate Mantua, Eric Bjorkstedt, Greg Williams, Brian Wells, John Field, Kym Jacobson, Dale Robinson, Elliott Hazen, Dan Lawson, Dean Roemmich, Alex Tardy, Michael Milstein, and others

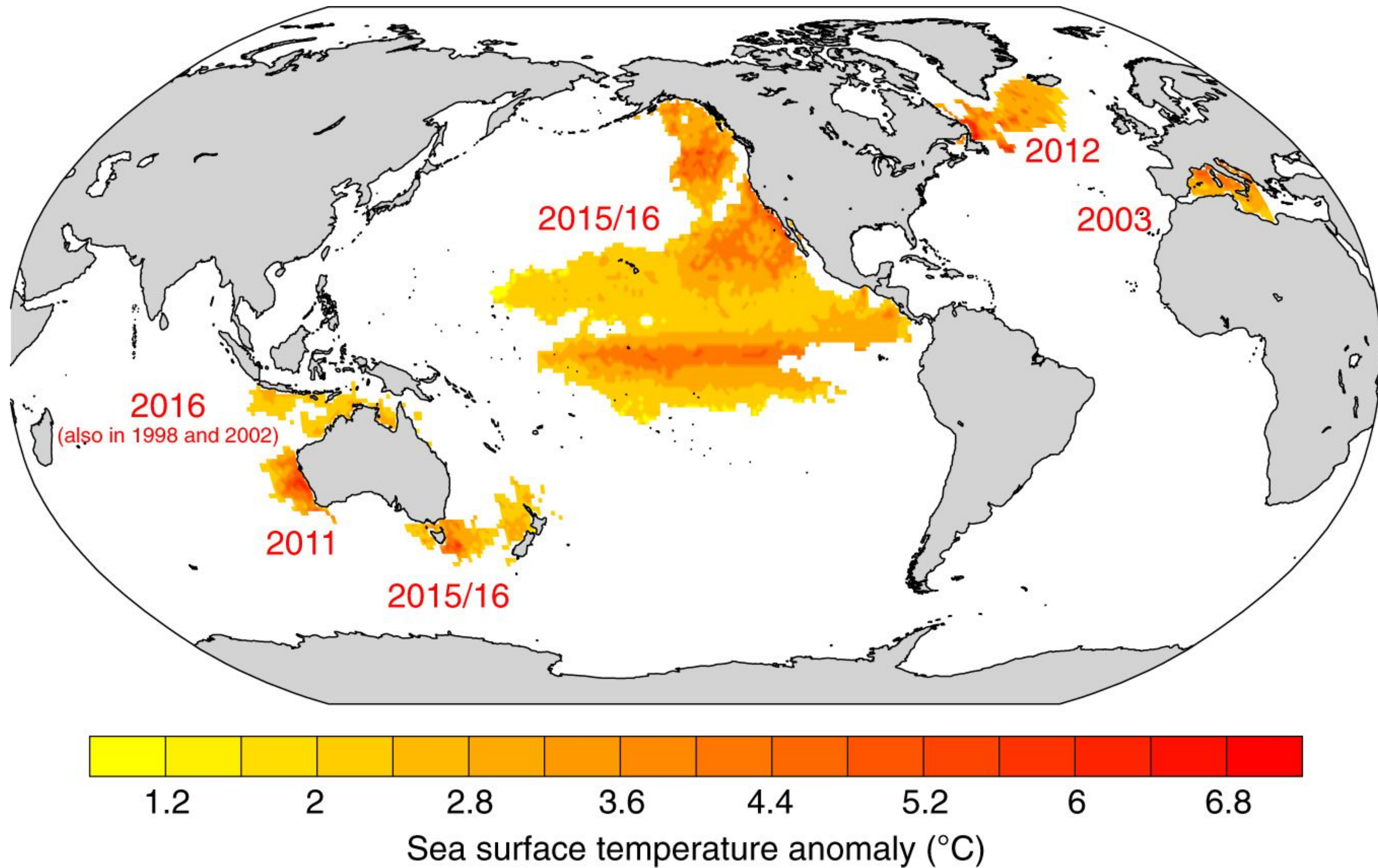


## Number of publications with terms “marine heatwave” or “marine heat wave”



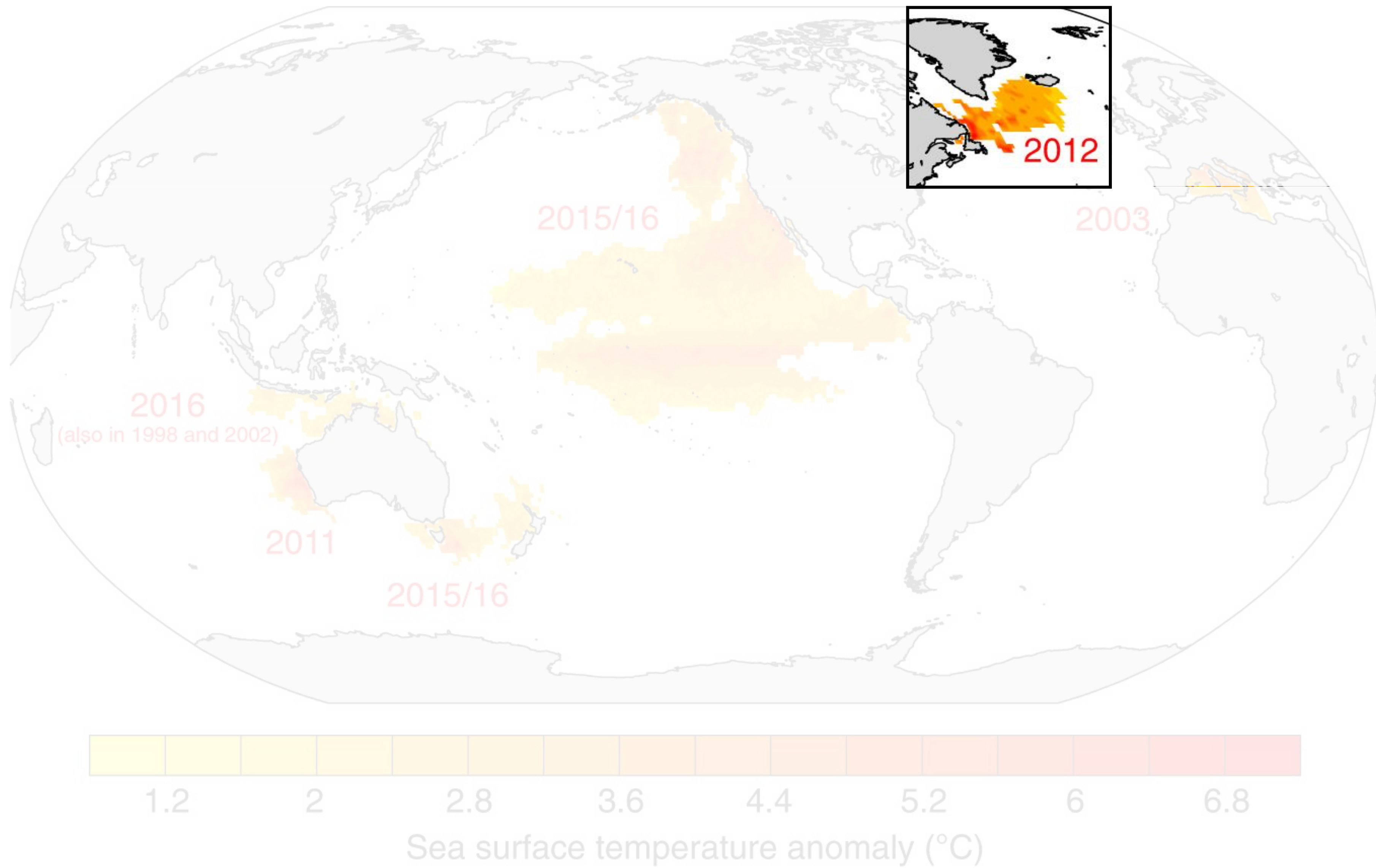
Hobday et al. (2018)



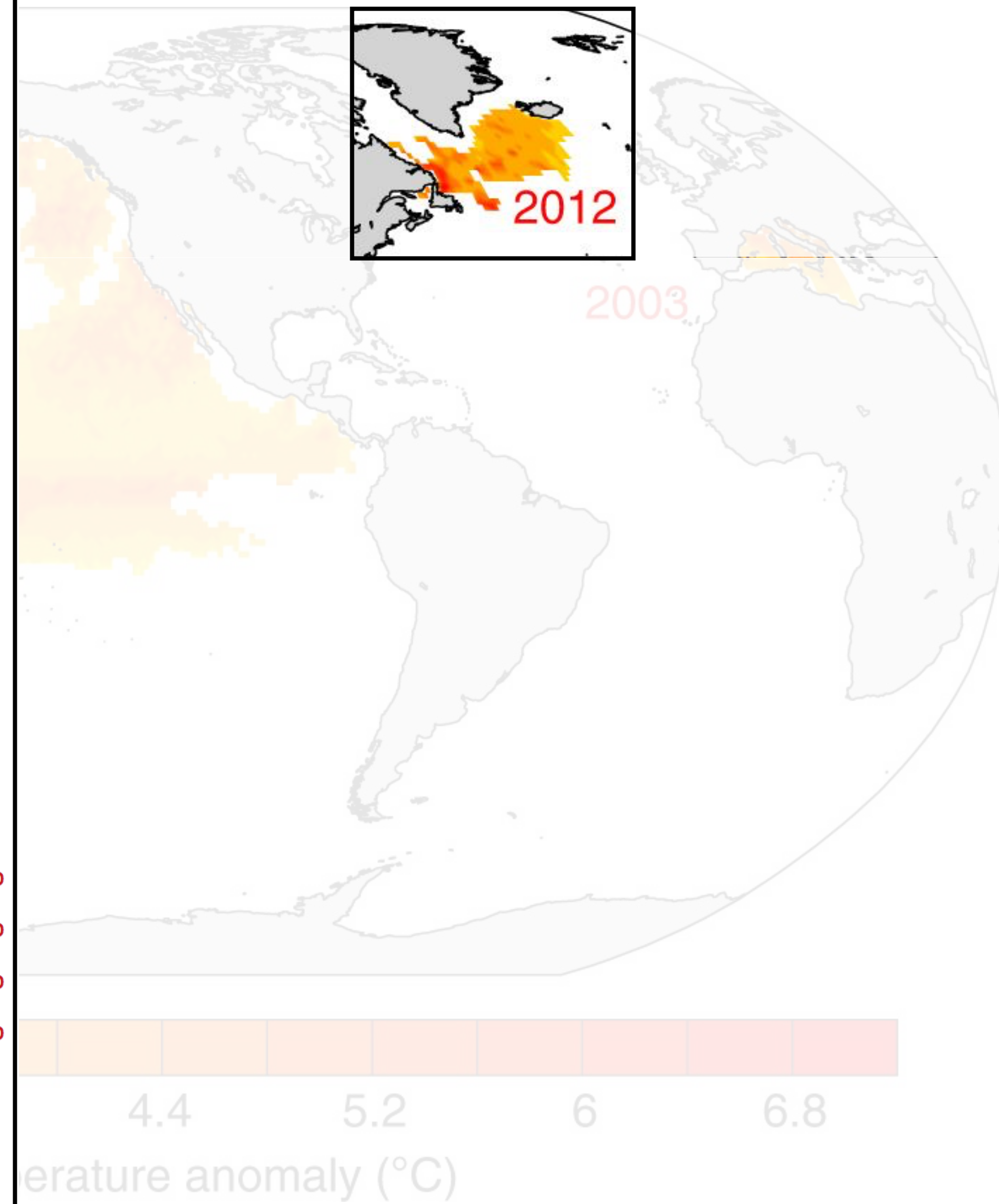
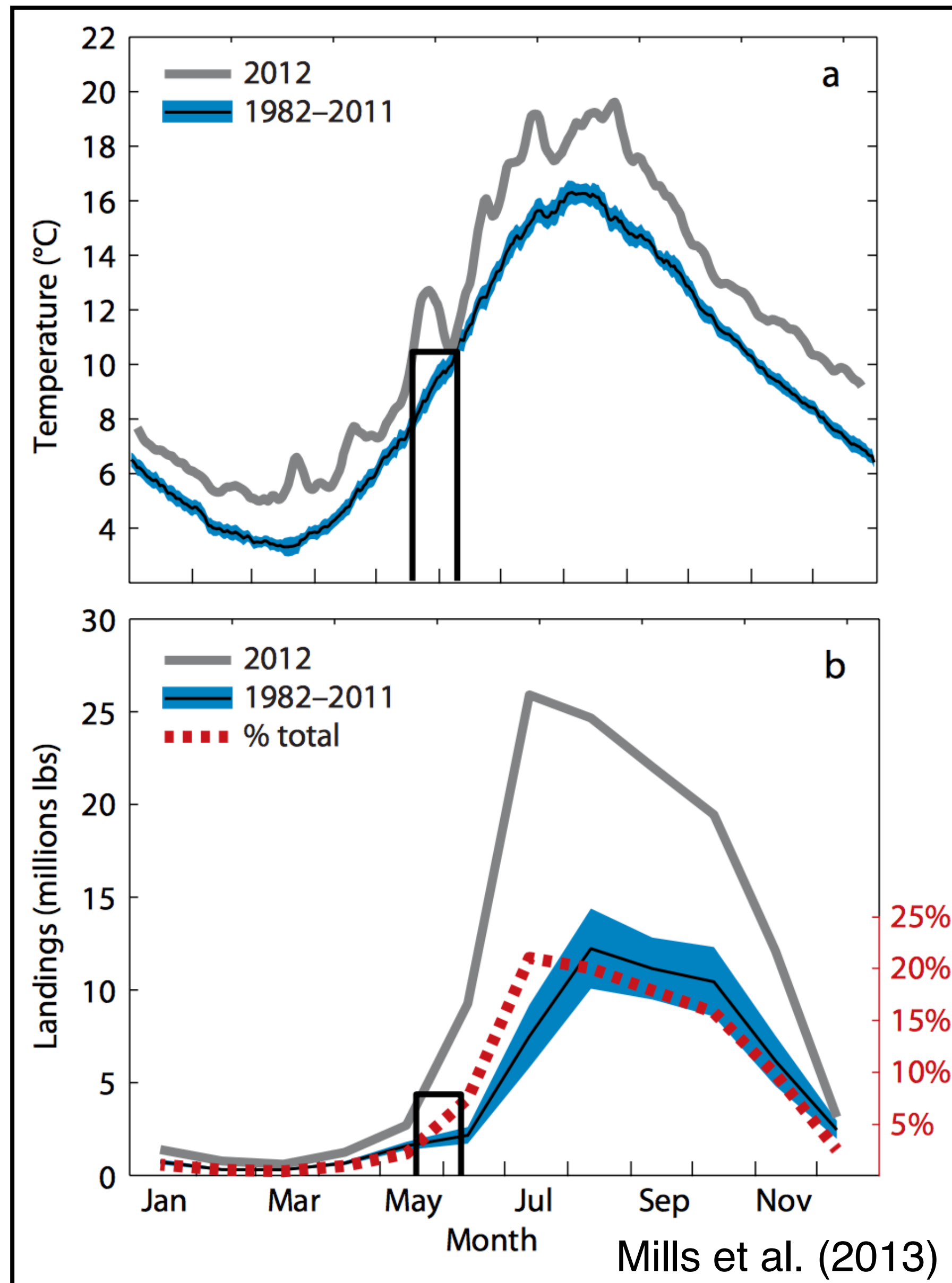


Frolicher and Laufkotter (2018)



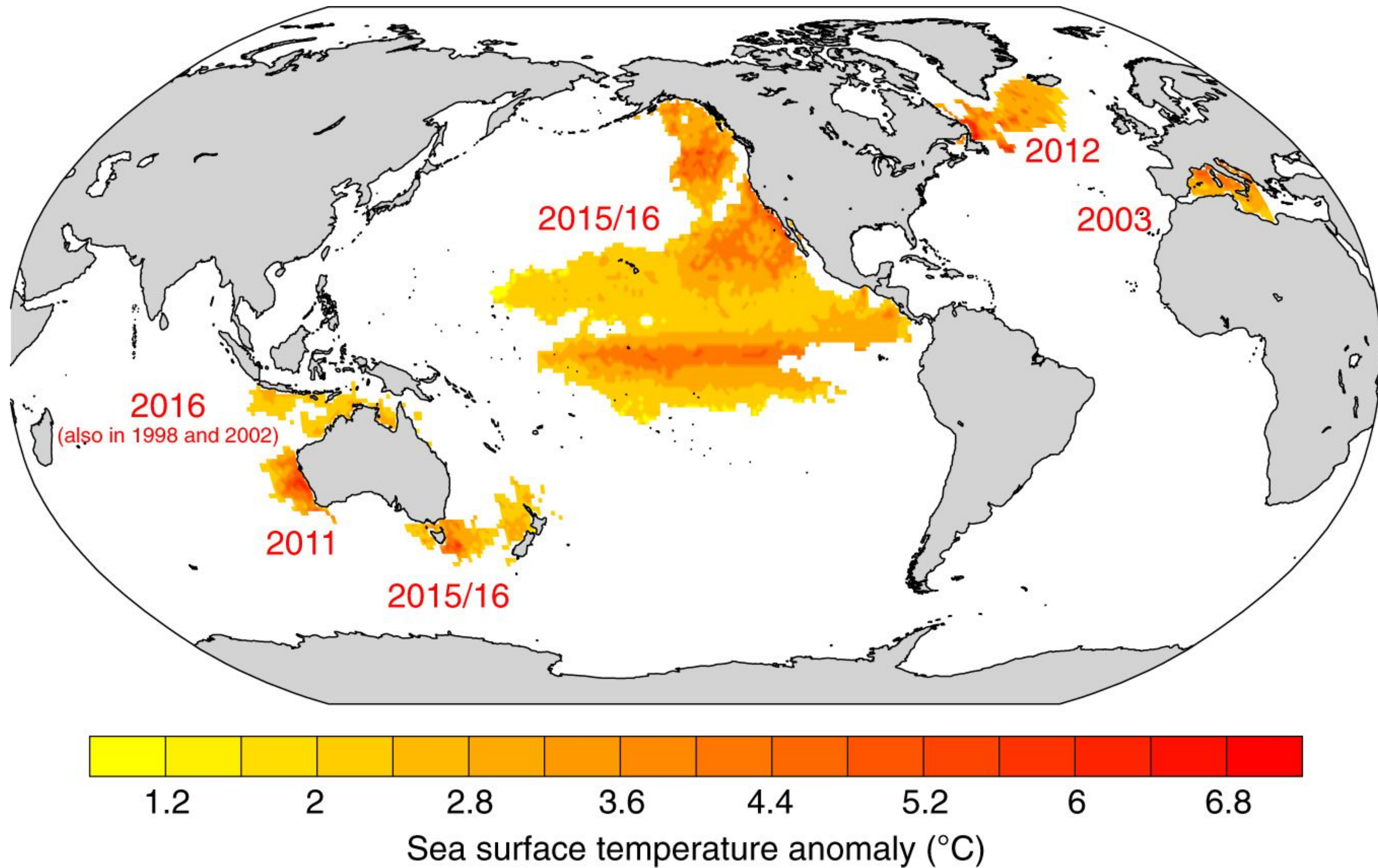


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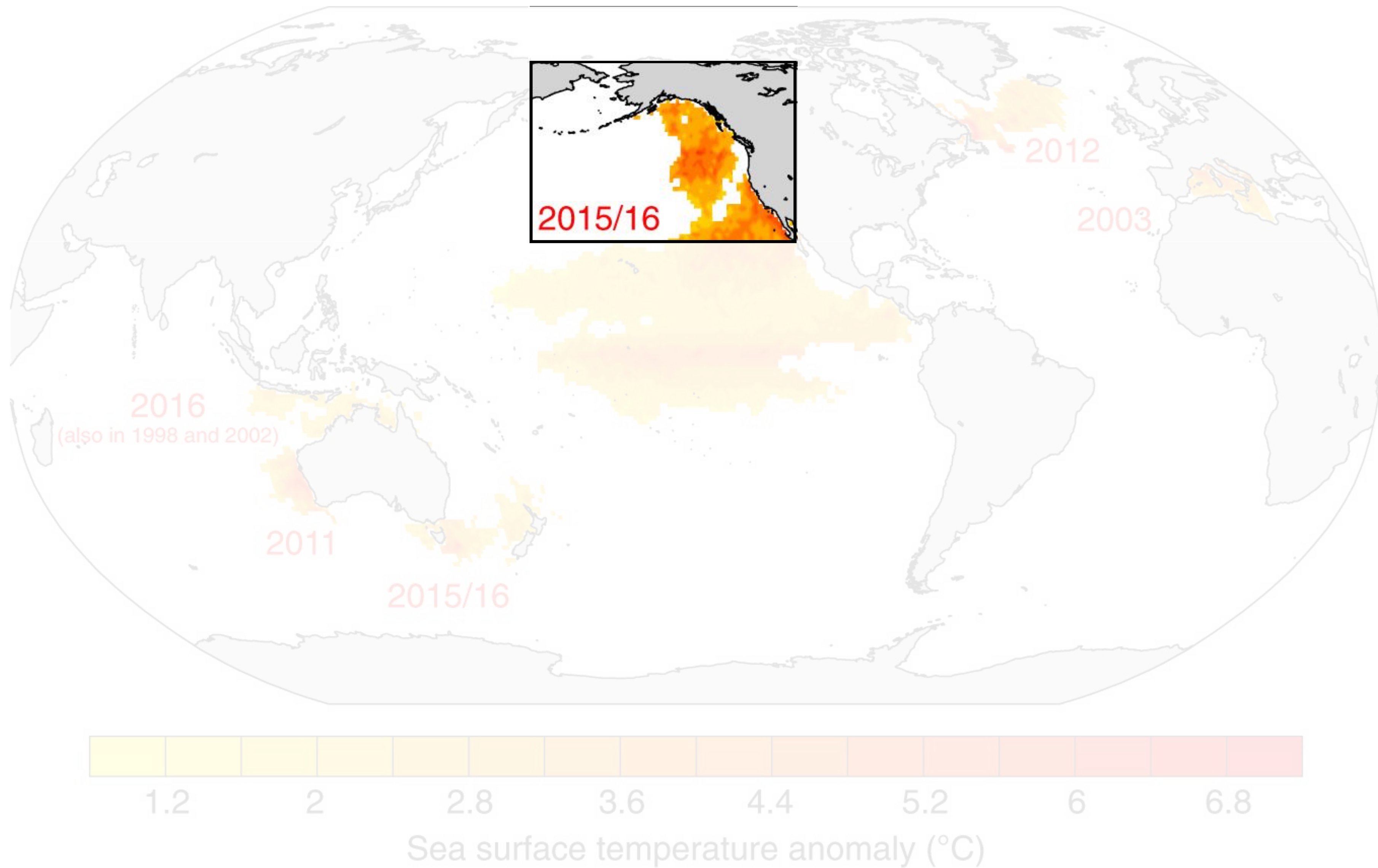
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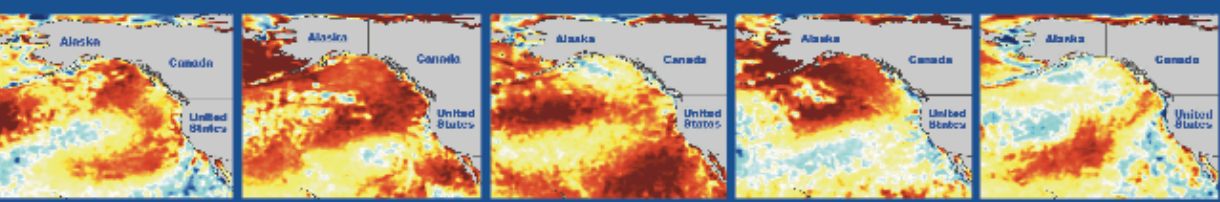




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These sea surface temperature anomaly maps of the northern Pacific Ocean between 2013-2017 show the Blob form and dissipate. The darker the red, the farther temperatures are above average. The darkest reds indicate 3 degrees Celsius above average. Credit: NOAA National Centers for Environmental Information



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Fraser River sockeye.

Fraser River sockeye.

Washington: coho, pink salmon, Dungeness crab.

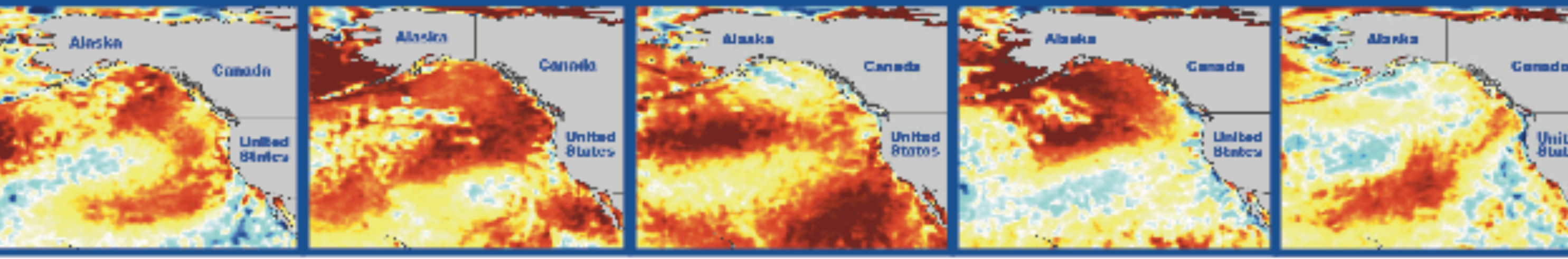
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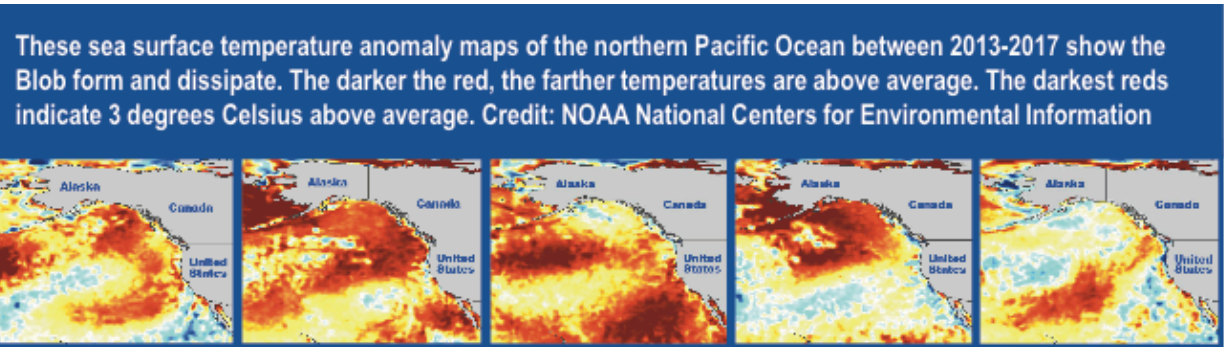
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Infographic by Michael Milstein and others





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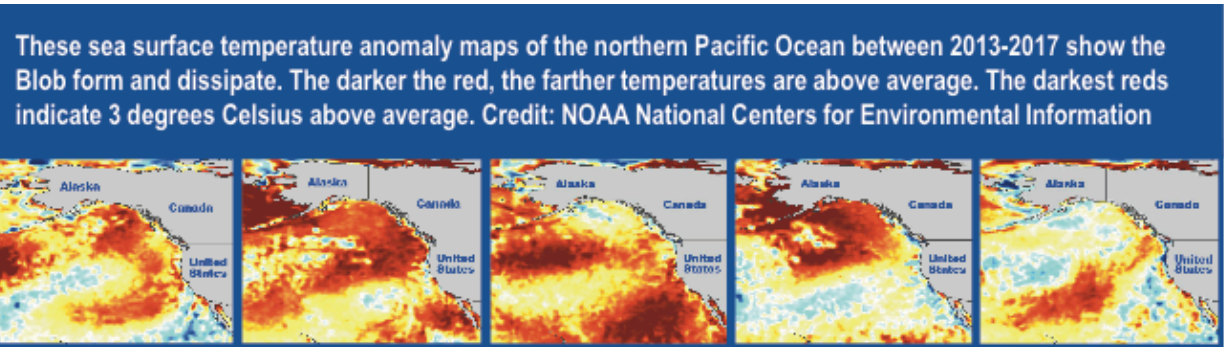
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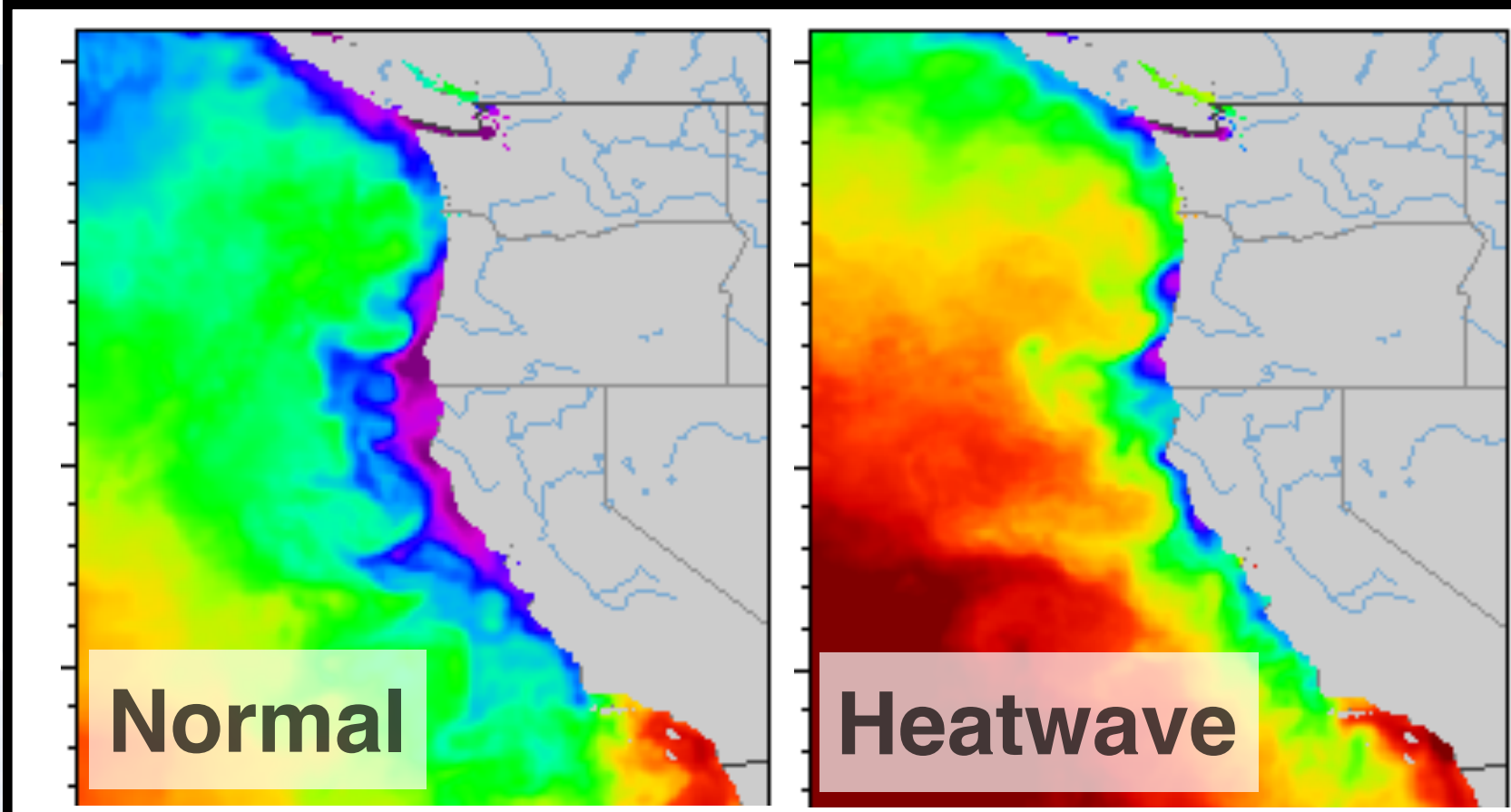
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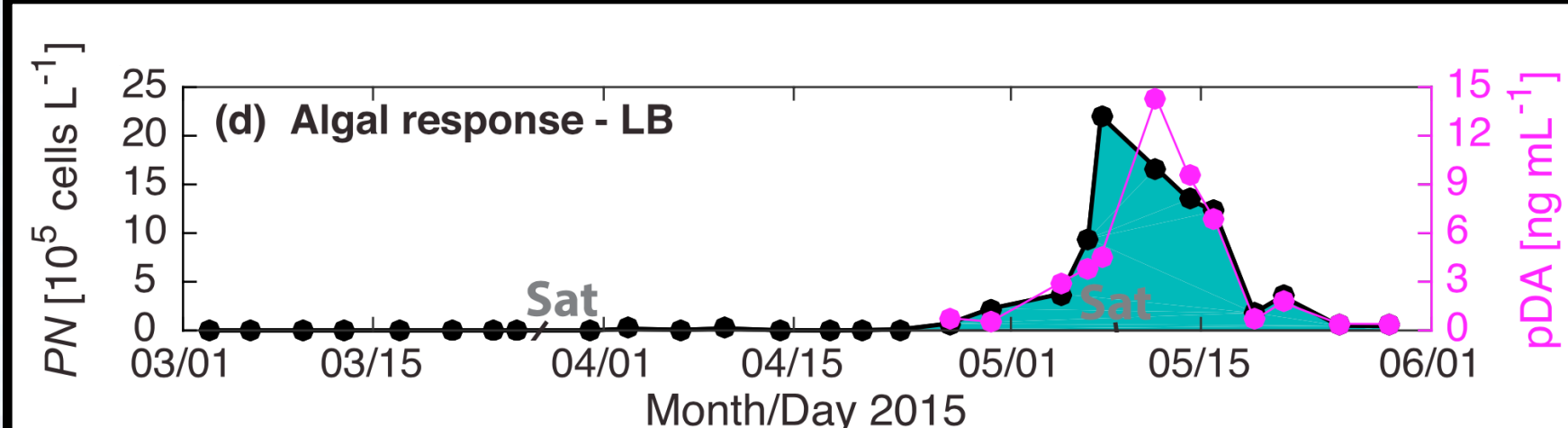
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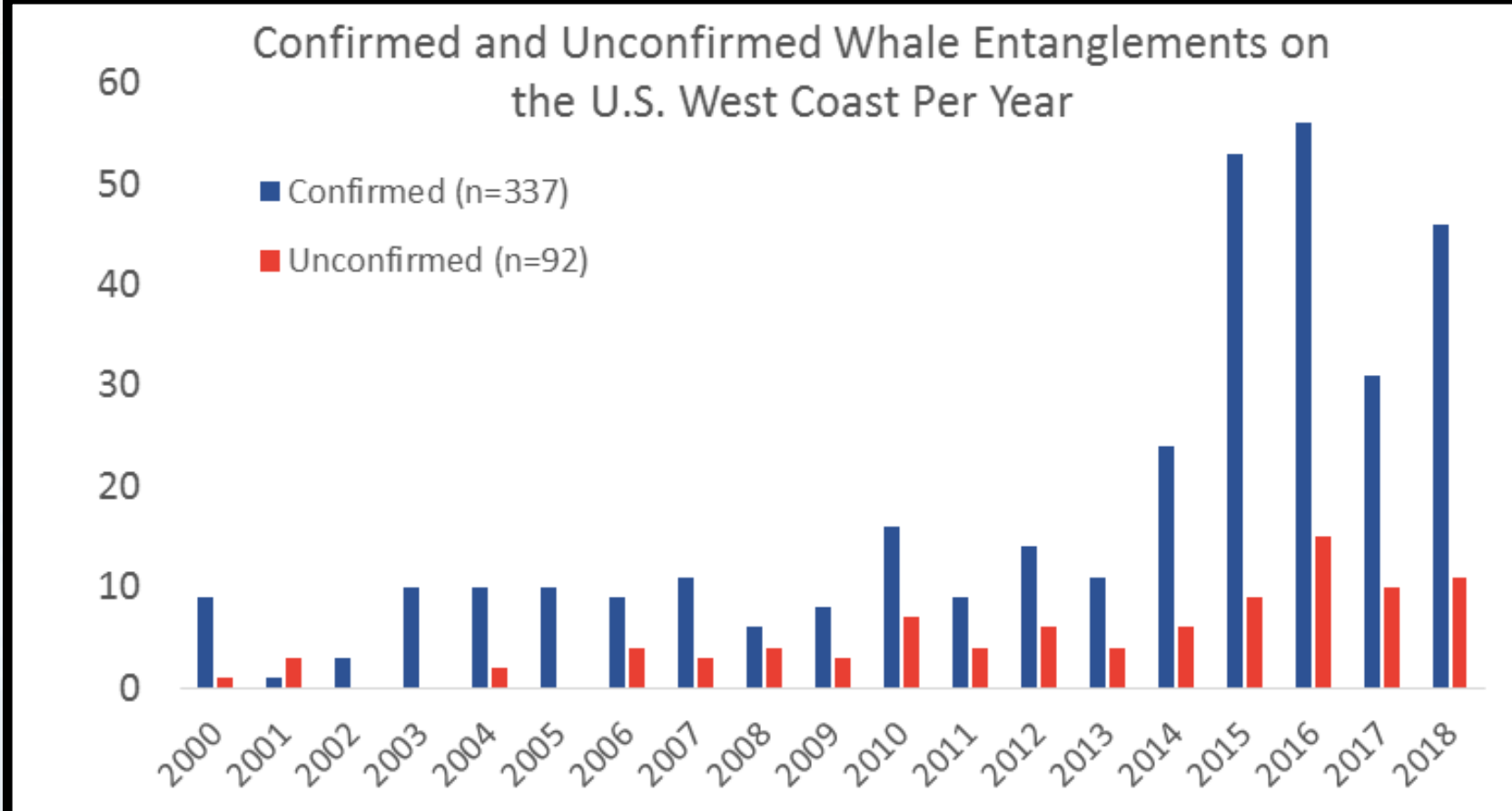


Low Productivity  
Habitat Compression



Harmful Algal Bloom  
Fishery Closures /  
Delayed Opening

McCabe et al. (2016)



Increased Fishery /  
Whale Overlap  
Record Whale  
Entanglements

2014

2015

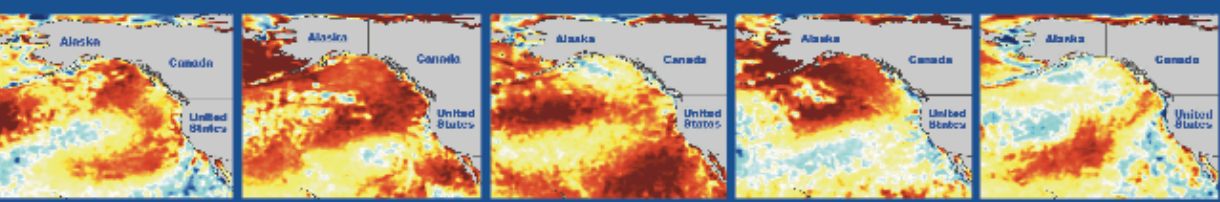
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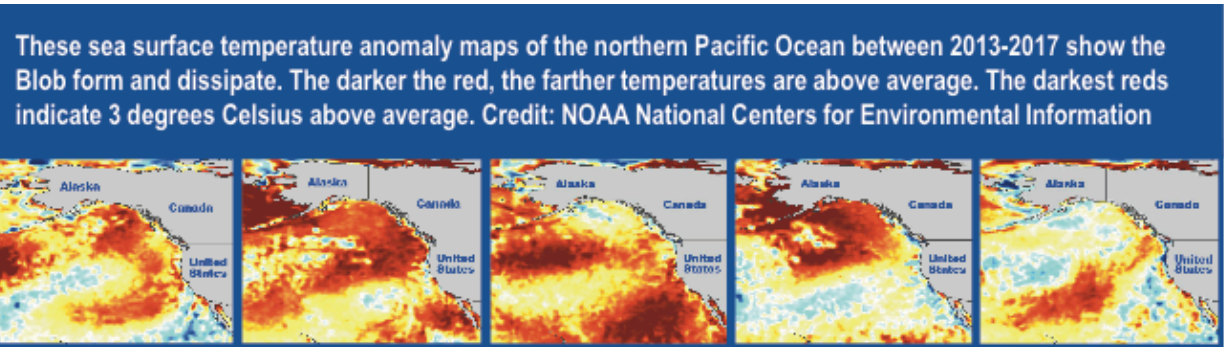
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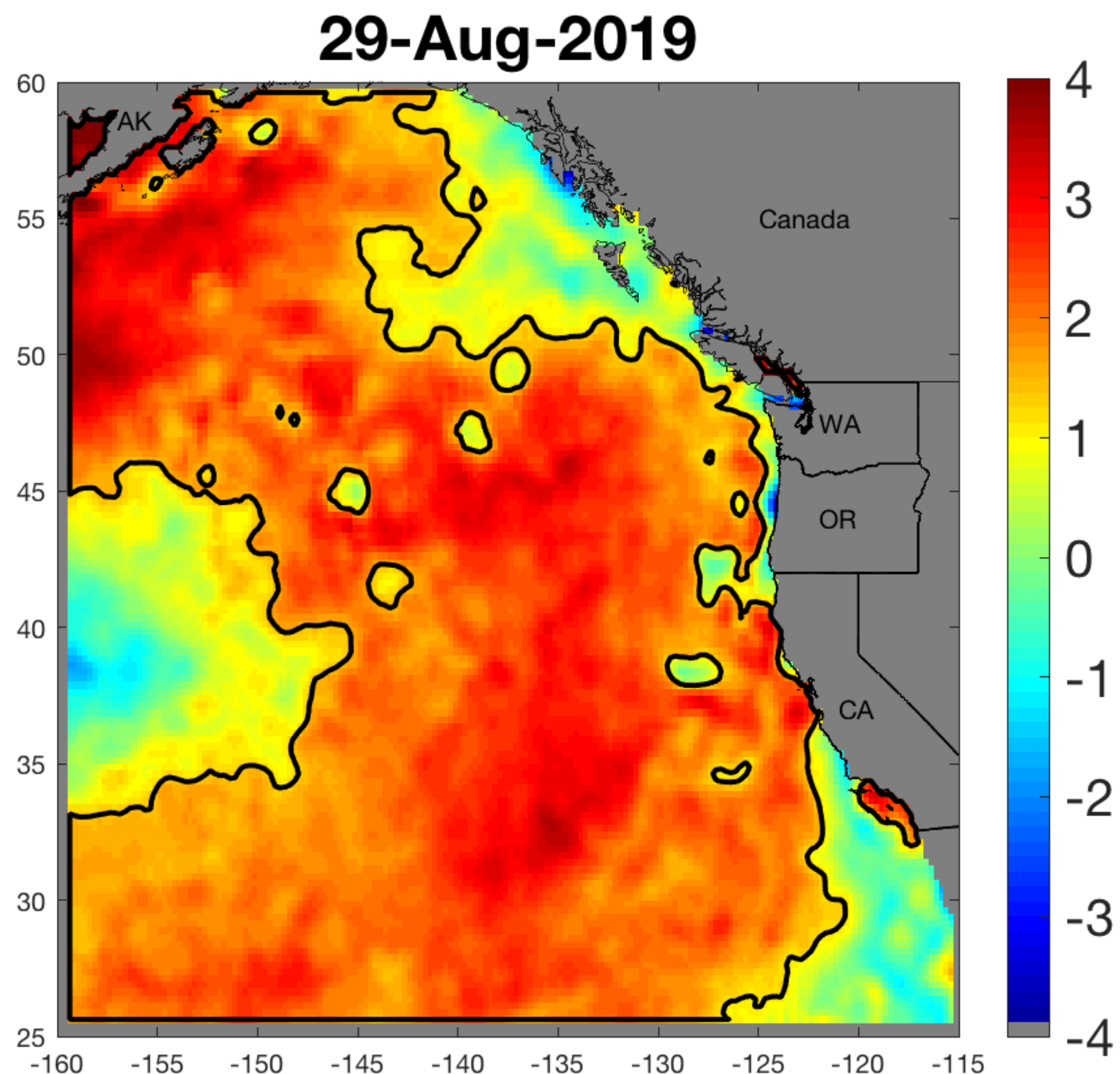
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## Is 'The Blob' back? New marine heat wave threatens Pacific

By [Warren Cornwall](#) | Sep. 17, 2019 , 4:15 PM

### Marine Heat Wave Reminiscent of 'the Blob' Lingers off U.S. West Coast

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Tuesday, October 8, 2019

### Return of warm water 'blob' in the Pacific threatens marine life



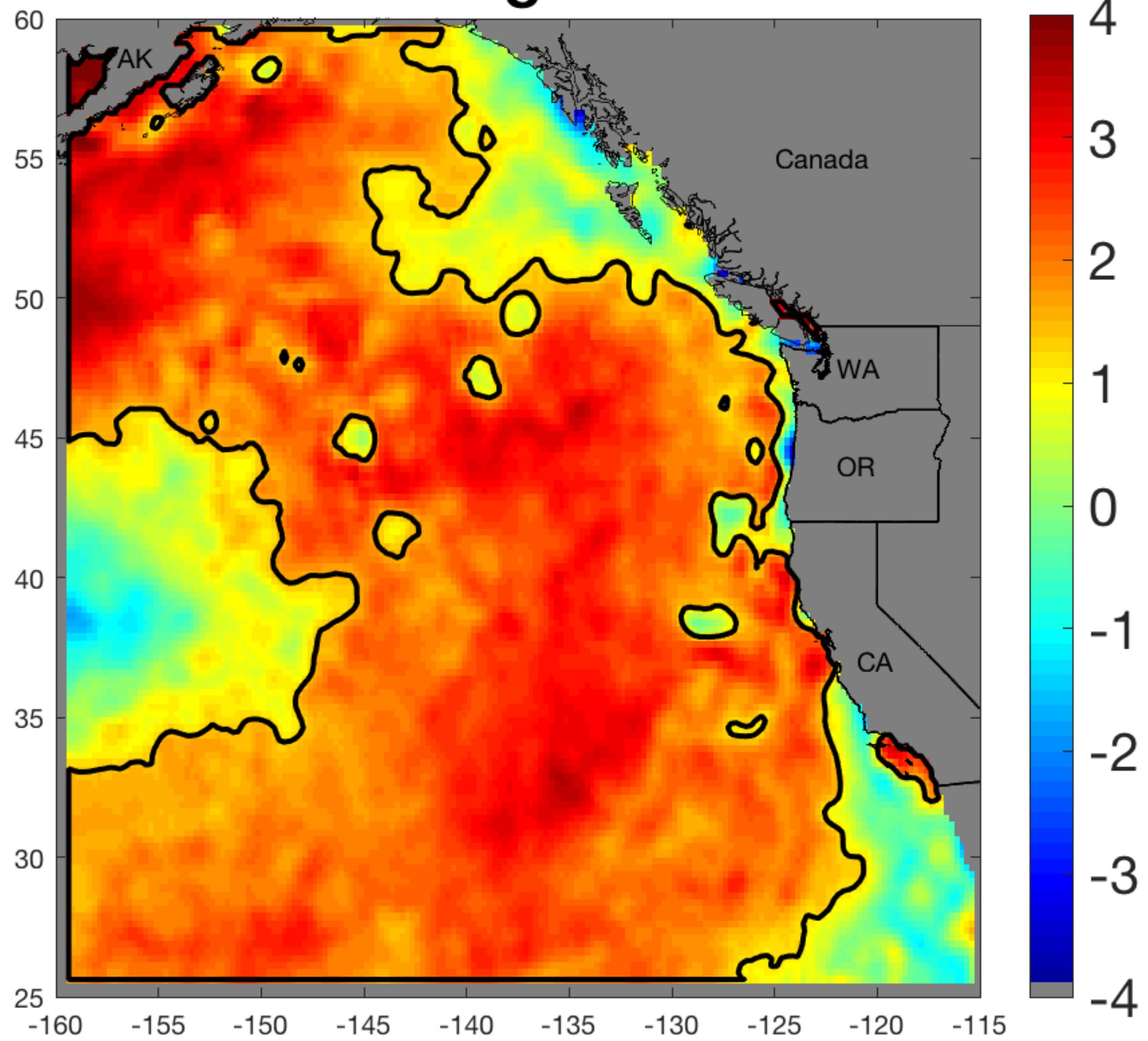
**ENVIRONMENT** 9 October 2019

By [Adam Vaughan](#)

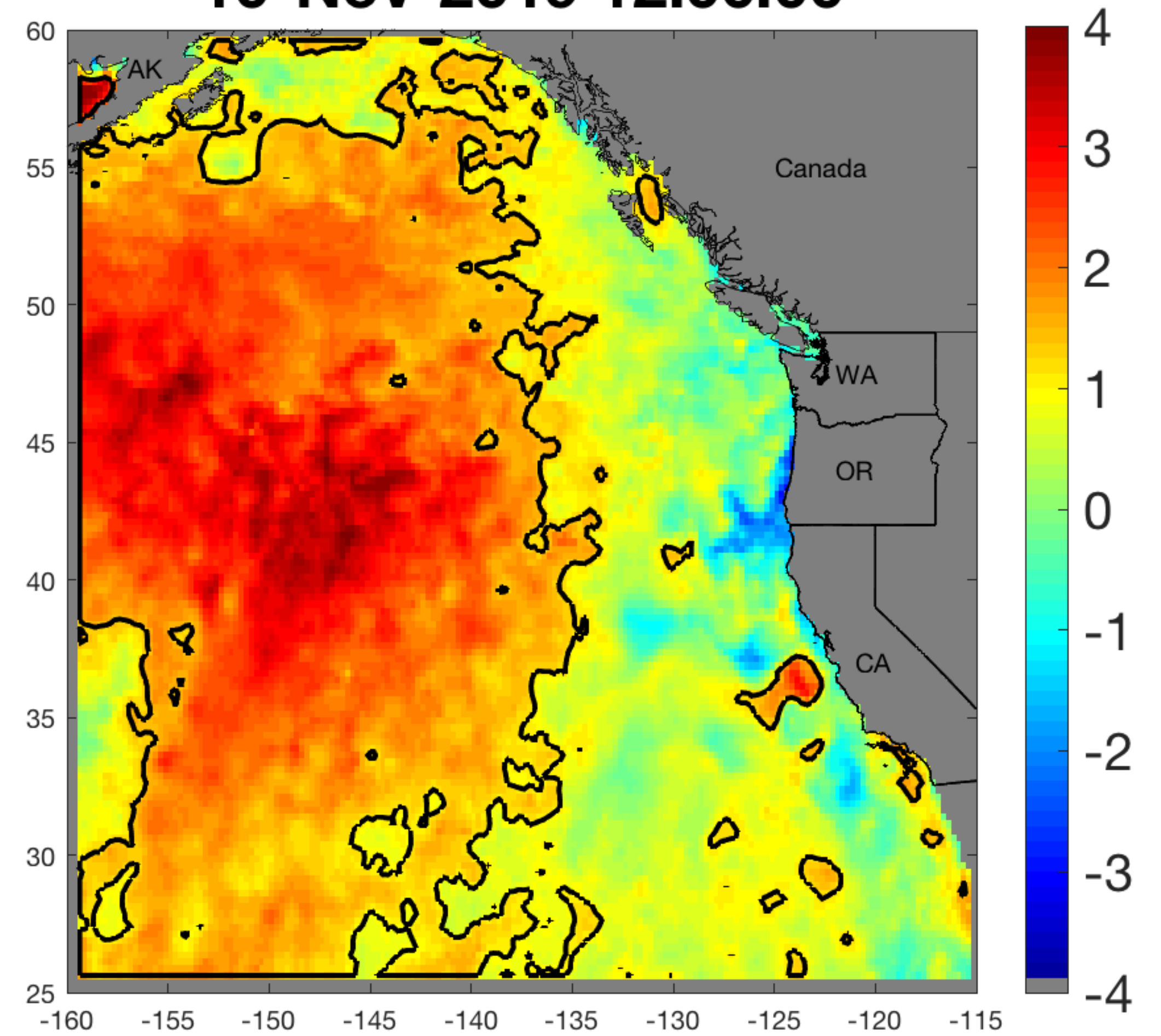
<https://www.integratedecosystemassessment.noaa.gov/regions/california-current/cc-projects-blobtracker>



**29-Aug-2019**

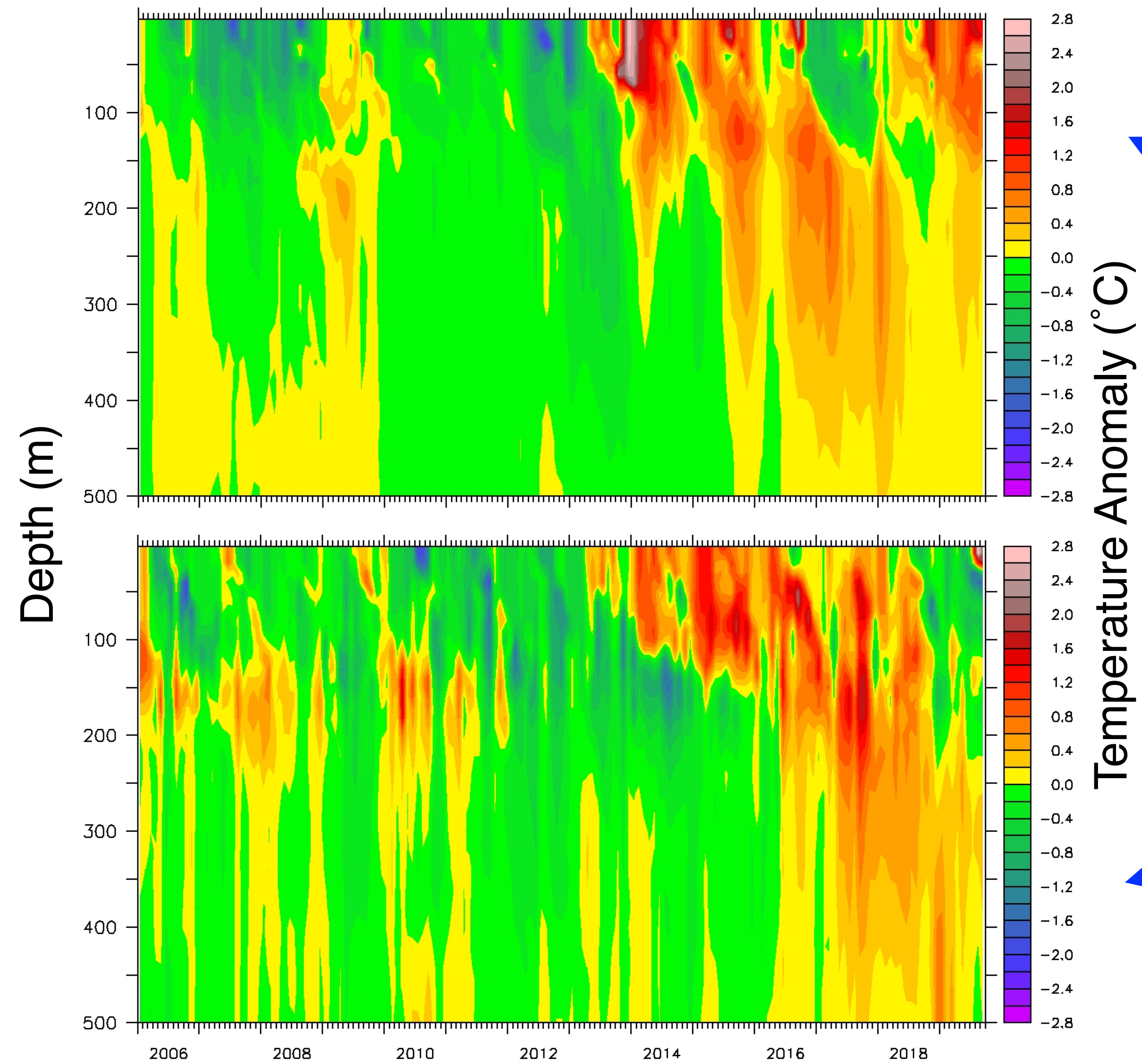


**10-Nov-2019 12:00:00**

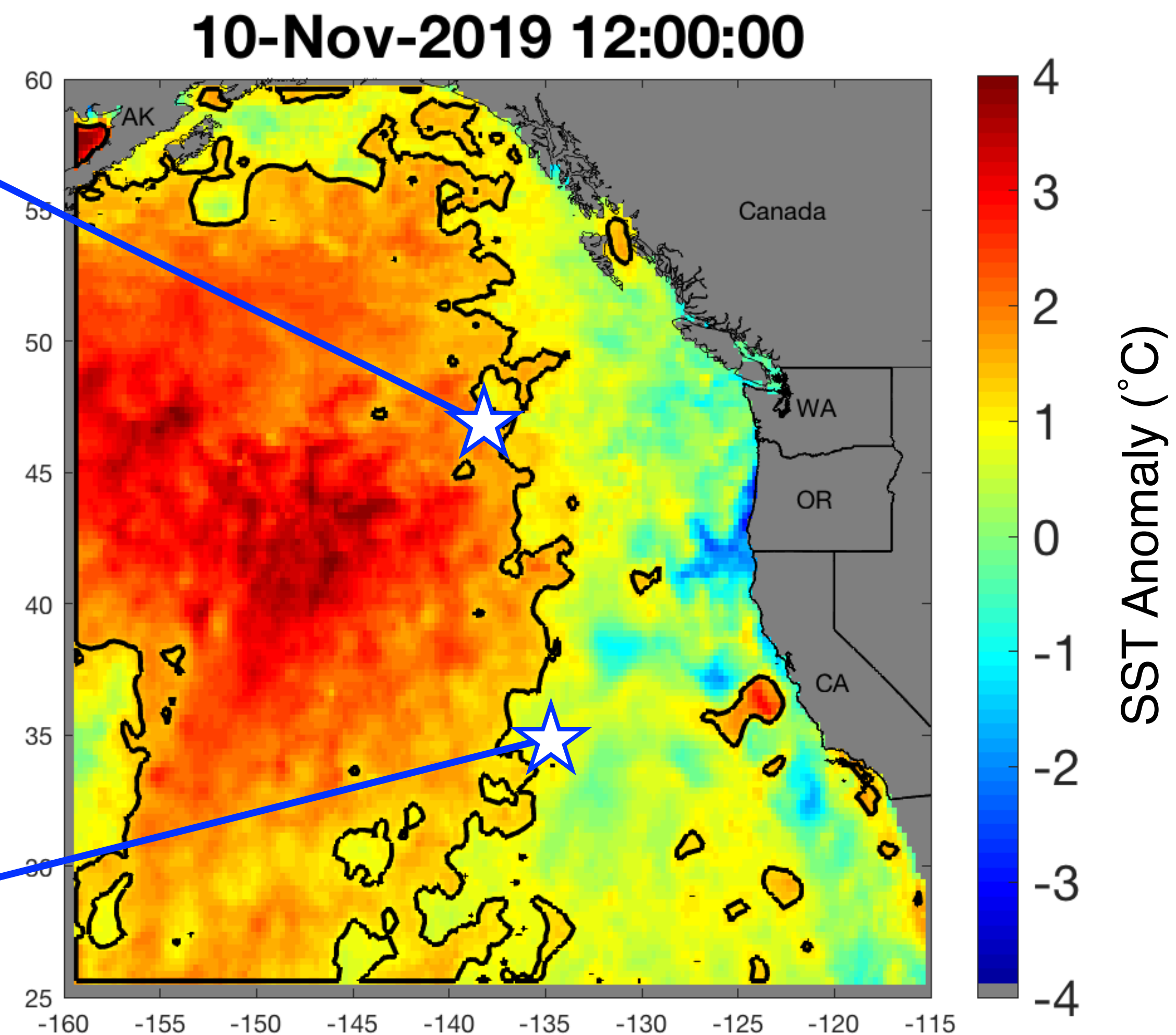


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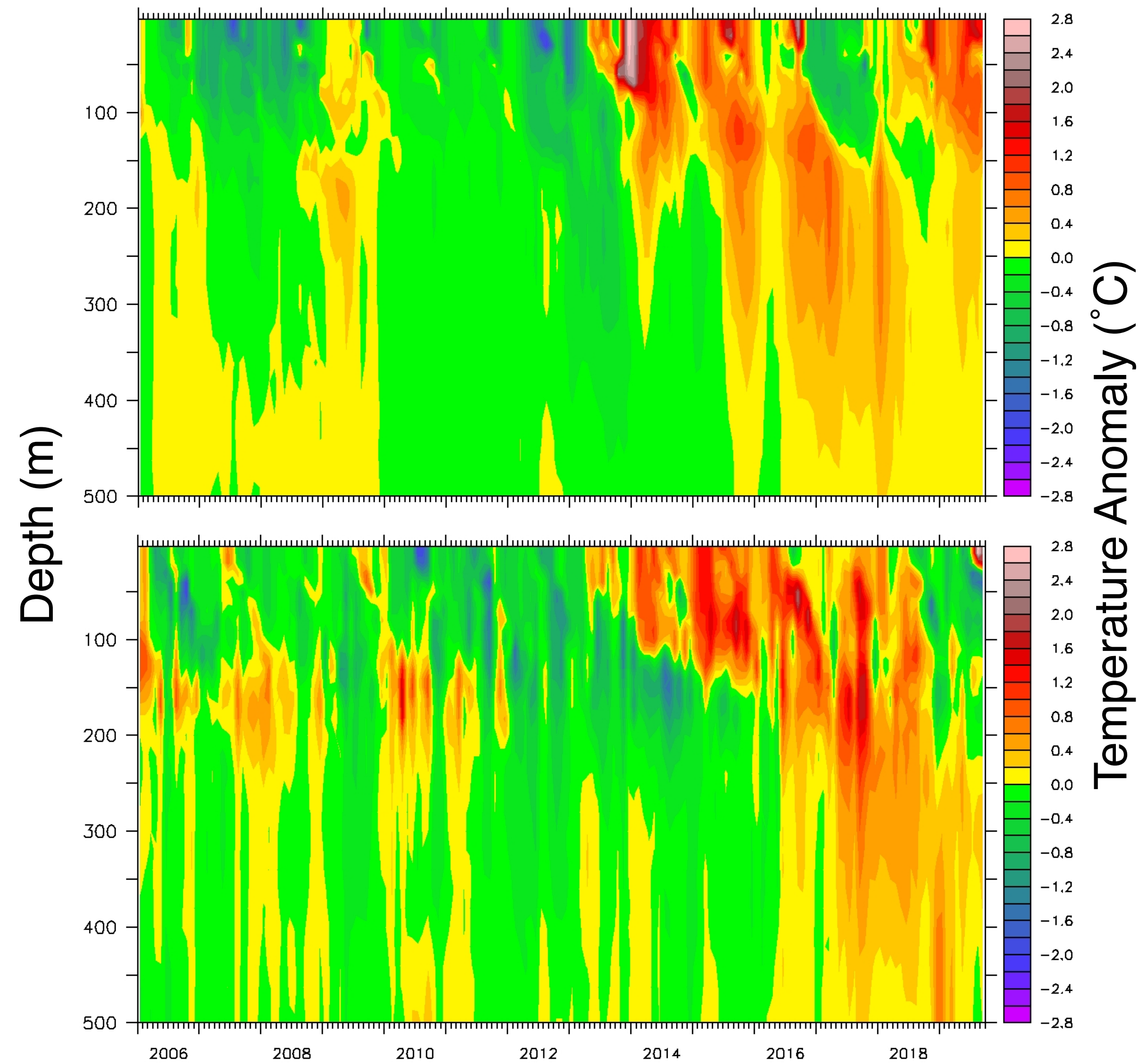


[http://sio-argo.ucsd.edu/RG\\_Climatology.html](http://sio-argo.ucsd.edu/RG_Climatology.html)



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## NOAA and partners are closely monitoring conditions

Physical conditions and characteristics of MHW

Physics, chemistry and plankton off Newport, OR every 2 weeks

Physics, chemistry and plankton off Trinidad Head, CA every 4 weeks

Physics, chemistry and plankton from regional cruises (e.g. CalCOFI, CPS, etc)

Overwinter growth and survival of CA sea lion pups at San Miguel Island

Partners in states will monitor domoic acid and other HAB-related indicators

Coastwide network of partners will monitor bird strandings on beaches

Impact on fisheries along the west coast

