How do marine ecosystem respond to climate forcing ?

by Emanuele Di Lorenzo







Pacific Decadal Oscillation (PDO)





-0.6

-0.8







GOAL: Develop a conceptual and quantitative model of how marine ecosystems respond to climate forcing



Pacific Decadal Oscillation (PDO)

long-term ecological observations

GOAL: Develop a conceptual and quantitative model of how marine ecosystems respond to climate forcing



California Current Nyctiphanes simplex



courtesy of Mark Ohman

GOAL: Develop a conceptual and quantitative model of how marine ecosystems respond to climate forcing









QUESTION:

how does a system respond to a perturbation?



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Dissipation or Memory timescale































Ocean Transport Pacific Decadal Oscillation

Atmospheric

Forcing Aleutian Low

1 X

INTEGRATION

Ecosystem Timeseries Zooplankton Nyctiphanes simplex

Sea Surface Temperature Anomalies 1998



Sea Surface Temperature Anomalies 1998



120

-100

0.4

-80

0.6

-60

8.0



2008 - 2011 An international collaboration between interdisciplinary scientists from the Pacific rim







Zooplankton Observations





ADVANCES FROM POBEX



Di Lorenzo, E., Combes, V., Keister, J.E., Strub, T.P., Thomas, A.C., Franks, P.J.S., Ohman, M.D., Furtado, J., Bracco, A., Bograd, S.J., Peterson, W.T., Schwing, F.B., Chiba, S., Taguchi, B., Hormazabal, S., Parada, C., 2013.

Synthesis of Pacific Ocean climate and ecosystem dynamics Oceanography, Vol. 26 (4).

-40



Synthesis of Pacific Ocean **Climate & Ecosystem Variability**



BY EMANUELE DI LORENZO, VINCENT COMBES, JULIE KEISTER, TED STRUB, ANDREW THOMAS, PETER LS, FRANKS, ANNALISA BRACCO

STEVEN BOGRAD, WILLIAM PETERSON, FRANK SCHWING, SANAE CHIBA, BUNMEI TAGUCHI, SAMUEL HORMAZABAL AND CAROLINA PARADA



MODEL FOR EXPLAINING PACIFIC DECADAL DYNAMICS AND MARINE ECOSYSTEMS





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