

The climate impact on Pacific saury (*Cololabis saira*) stock dynamics

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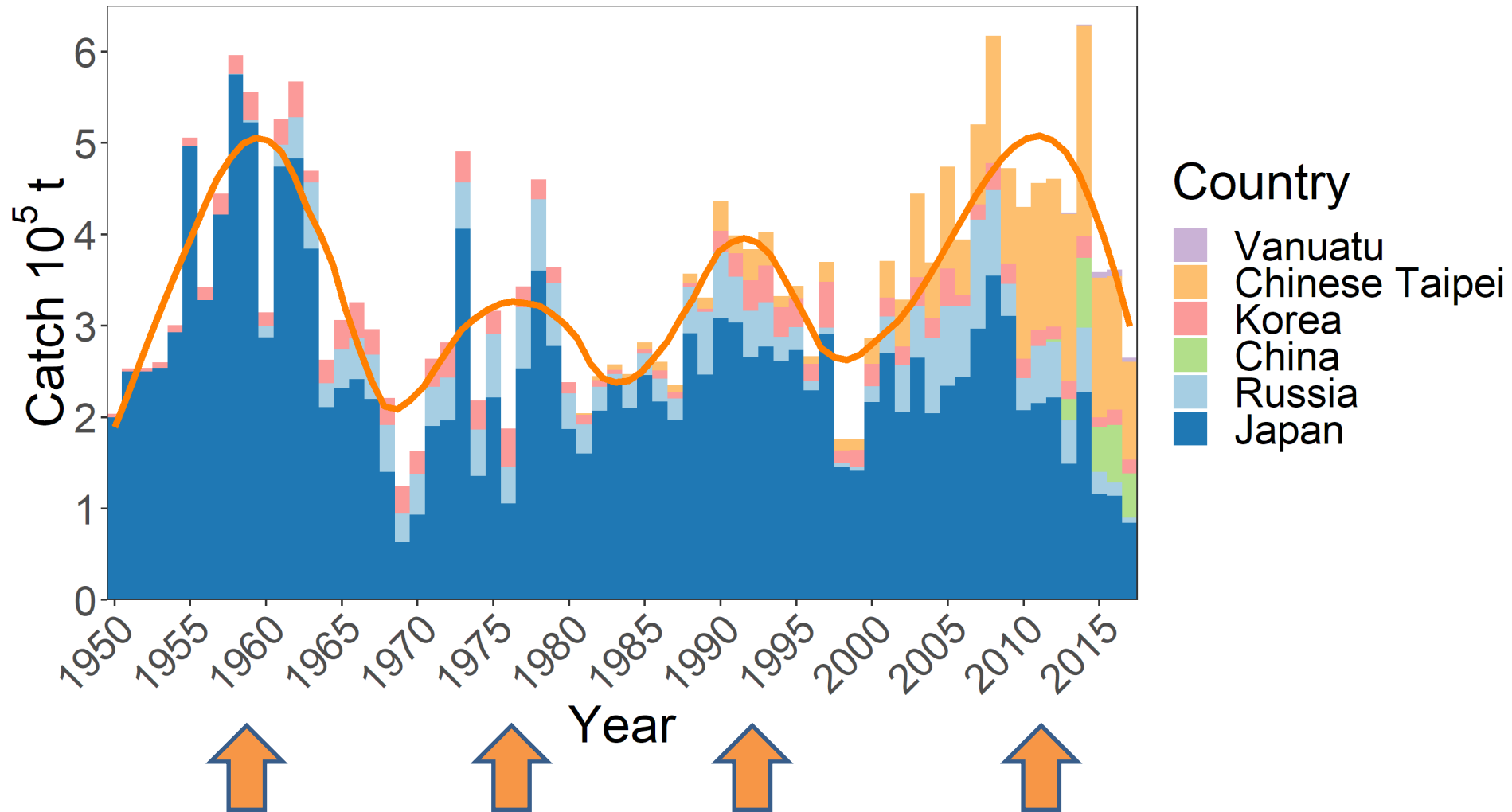
Outline

- Materials and methods
- Is there any periodicity in saury stock condition?
- If yes, is saury stock related to any NP climate modes?
- If yes, what could be the mechanisms?
- What about higher-frequency dynamics?
- Take-home message

Materials and methods

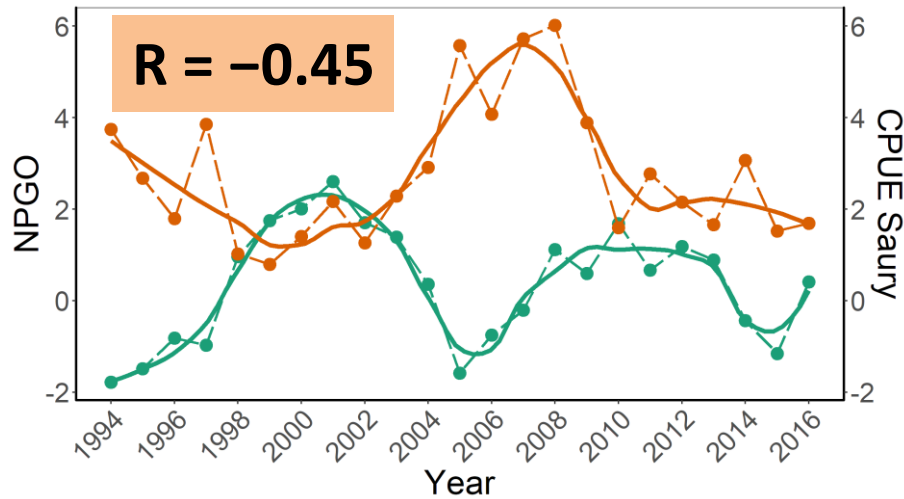
- Mean monthly SST data for (1950)-2017 from NOAA ERSST v3b dataset [www.esrl.noaa.gov/psd/]
- Mean monthly H_{500} data for (1950)-2017 from NCEP/NCAR Reanalysis [www.esrl.noaa.gov/psd/]
- Mean monthly values of the NPGO index for (1950)-2017 [www.o3d.org/npgo/data/NPGO.txt]
- Catch and CPUE data of Pacific saury [Reports of 1st Meeting of the Technical Working Group on Pacific Saury Stock Assessment, 20-22 February 2017]
- Russian daily catch data 1995-2018

Periodicity in stock condition

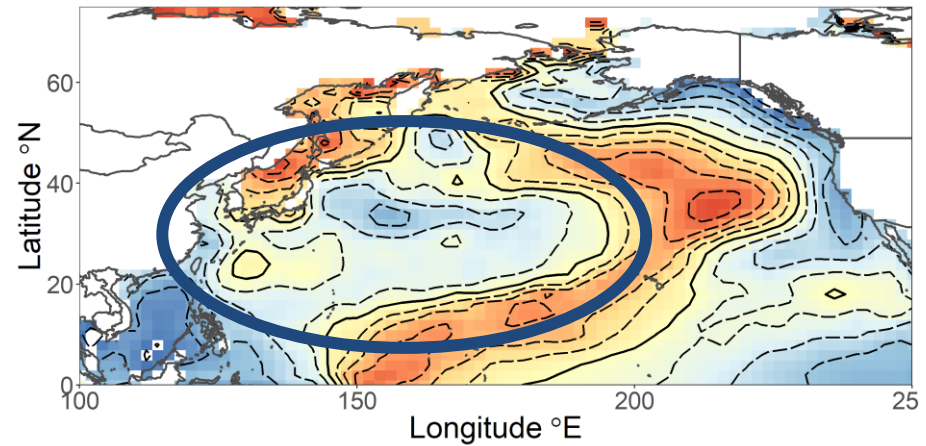


Relation to NPGO at lag 0 yr

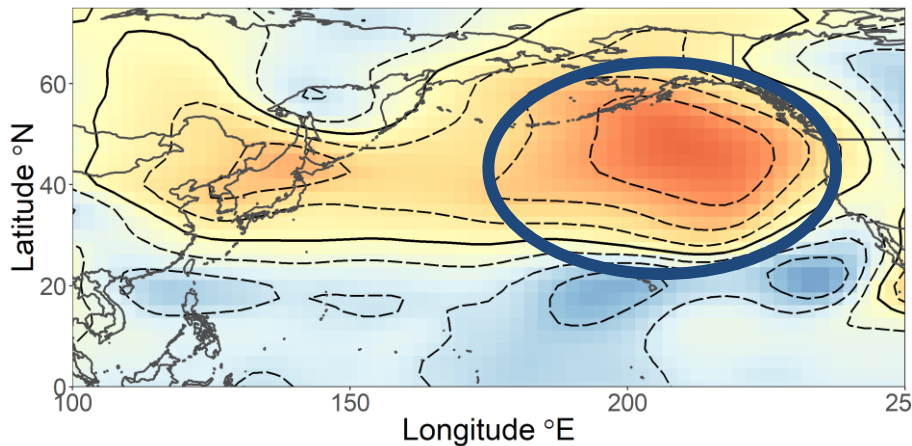
Saury CPUE and NPGO time-series



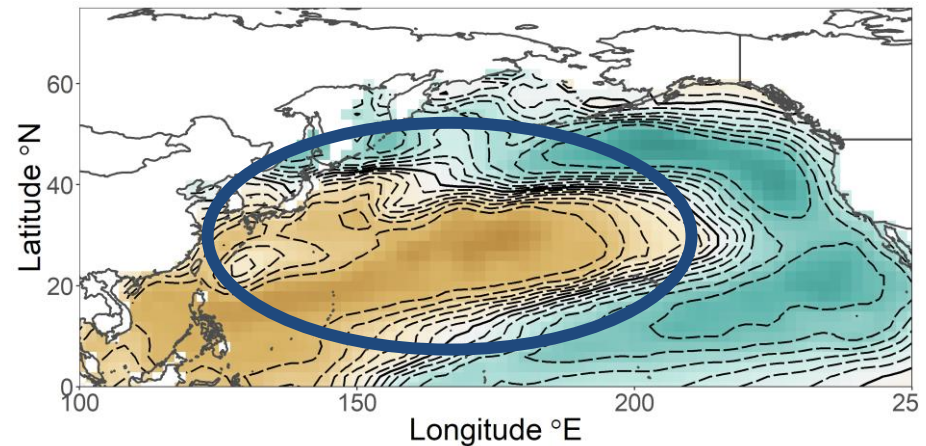
Corr.: saury CPUE to SSTA, lag 0 yr



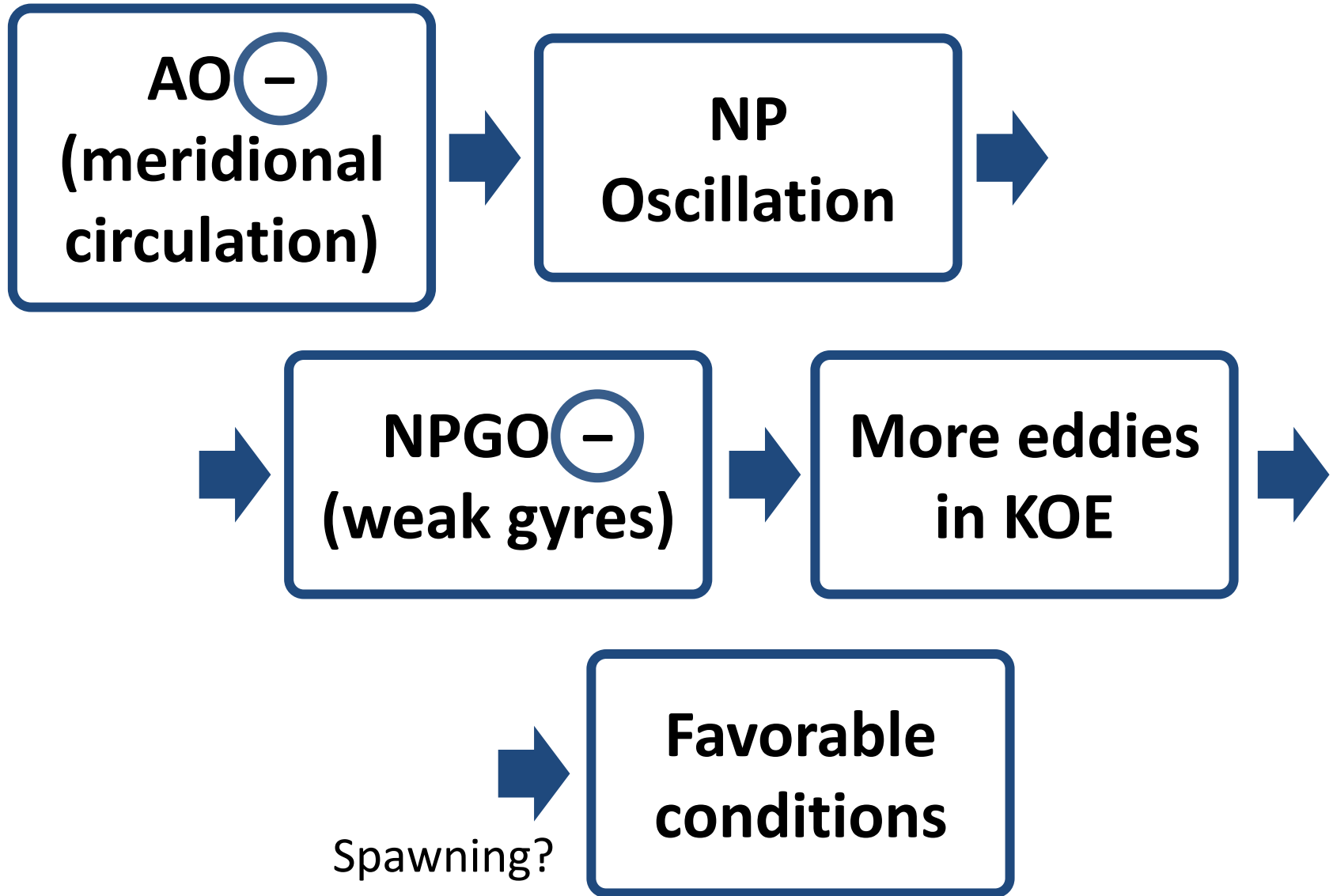
Corr.: saury CPUE to H_{500} , lag 0 yr



NPGO to SSTA, lag 0 yr

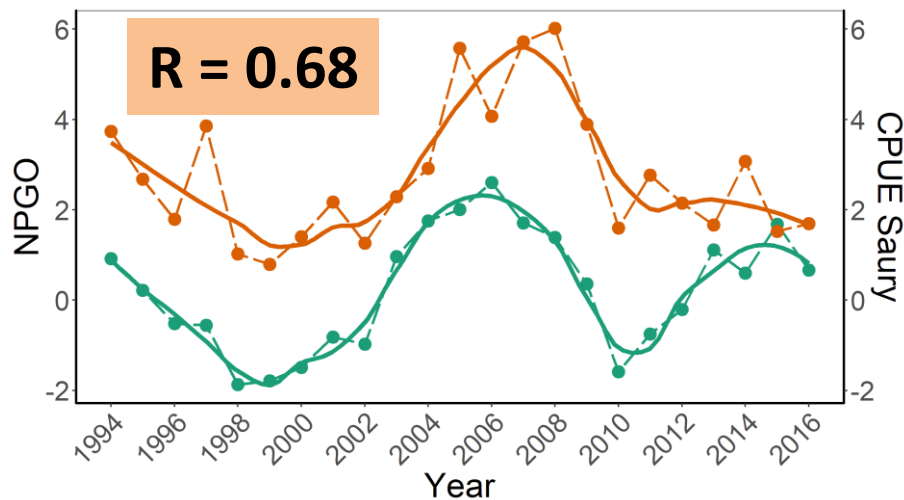


Relation to NPGO at lag 0 yr

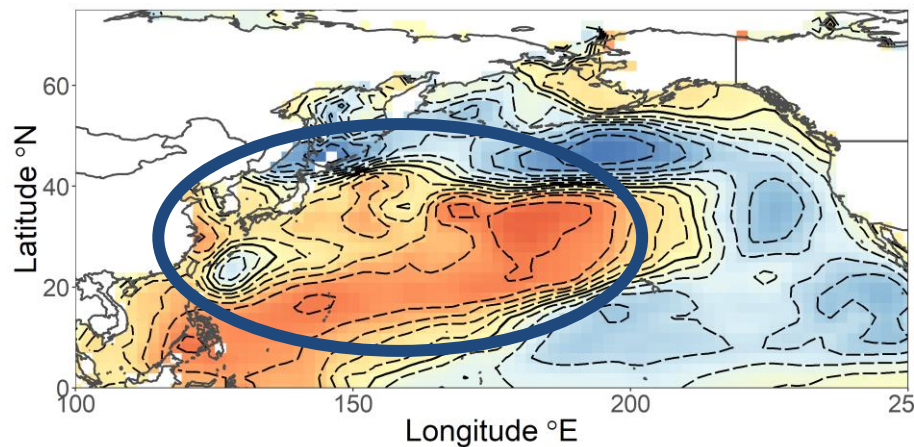


Relation to NPGO at lag -5 yr

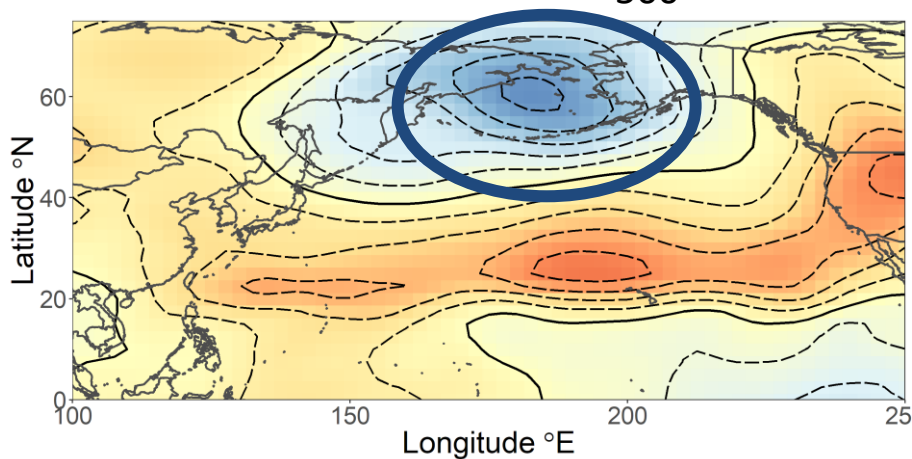
Saury CPUE and NPGO time-series



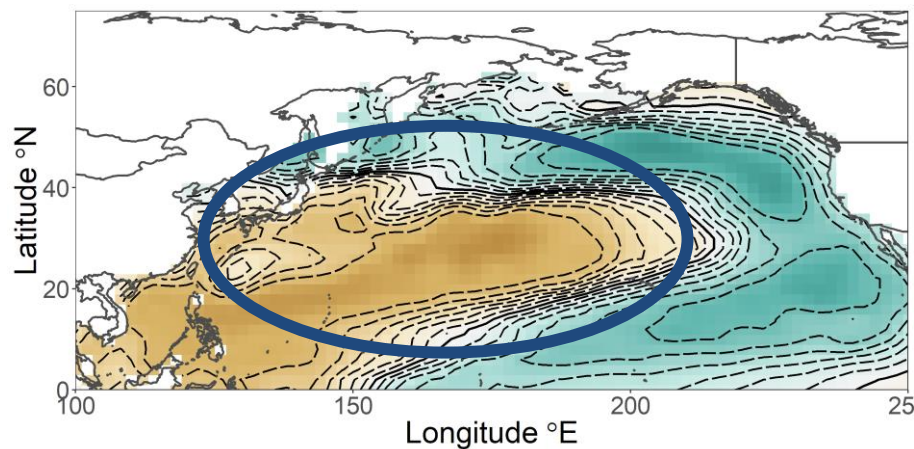
Corr.: saury CPUE to SSTA, lag -5 yr



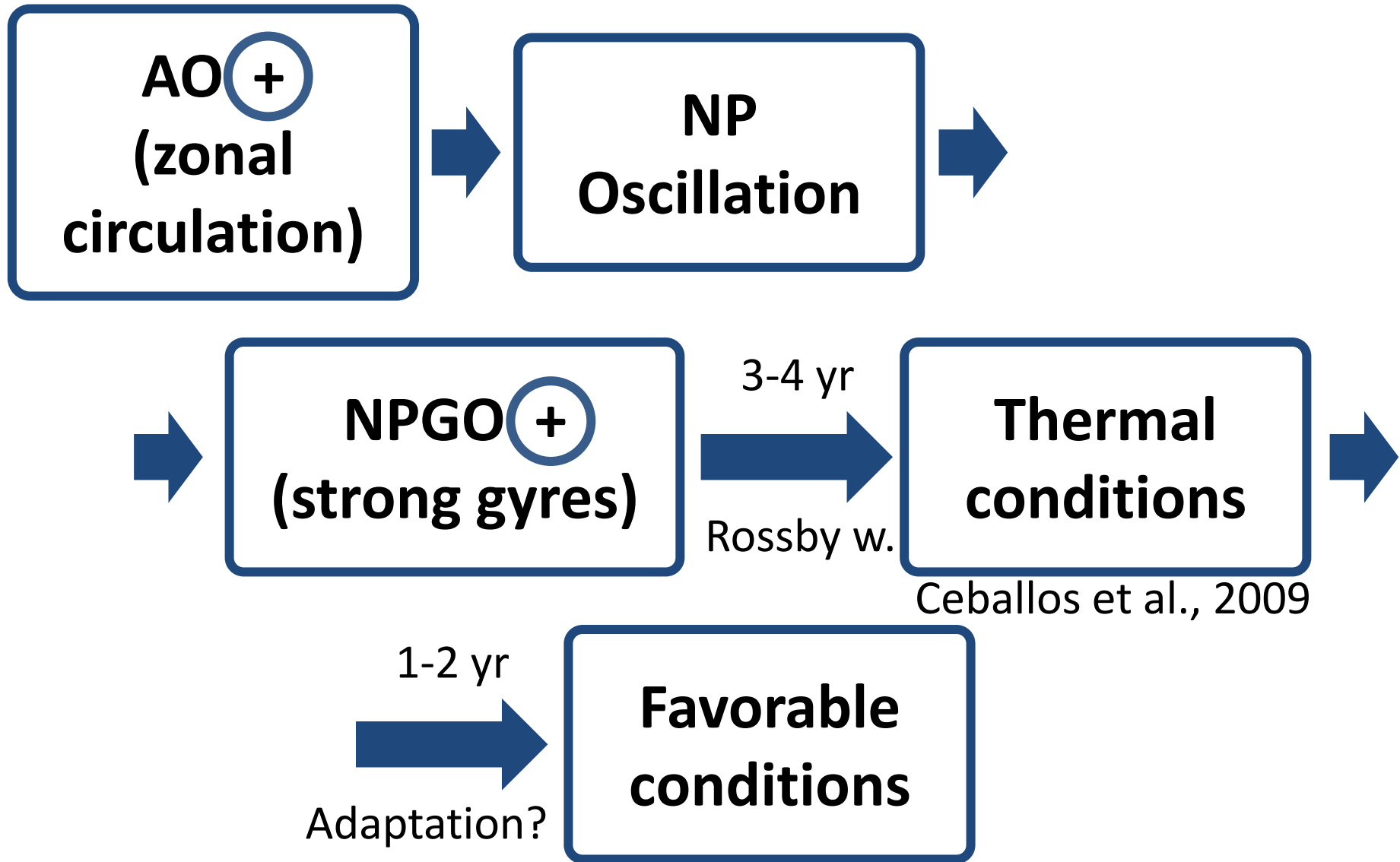
Corr.: saury CPUE to H_{500} , lag -5 yr



NPGO to SSTA, lag 0 yr

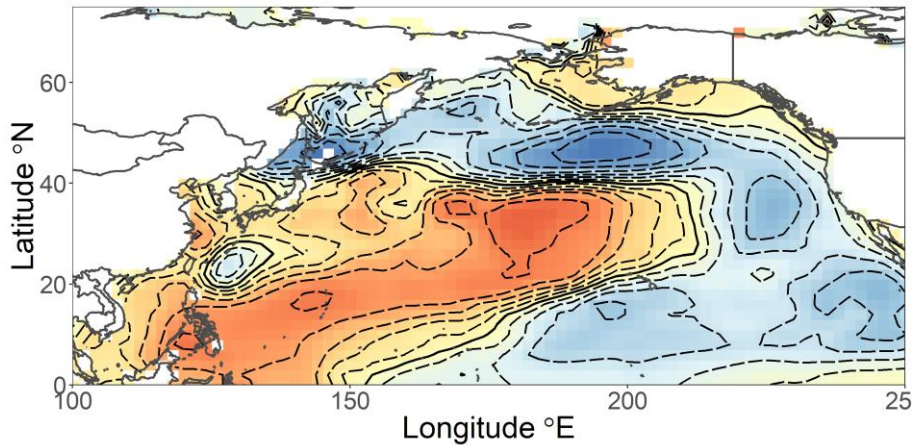


Relation to NPGO at lag -5 yr

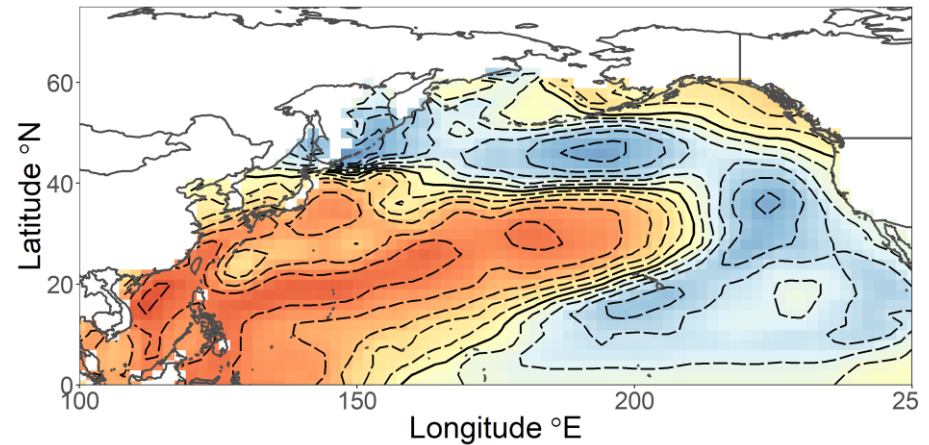


Similarity to other stocks

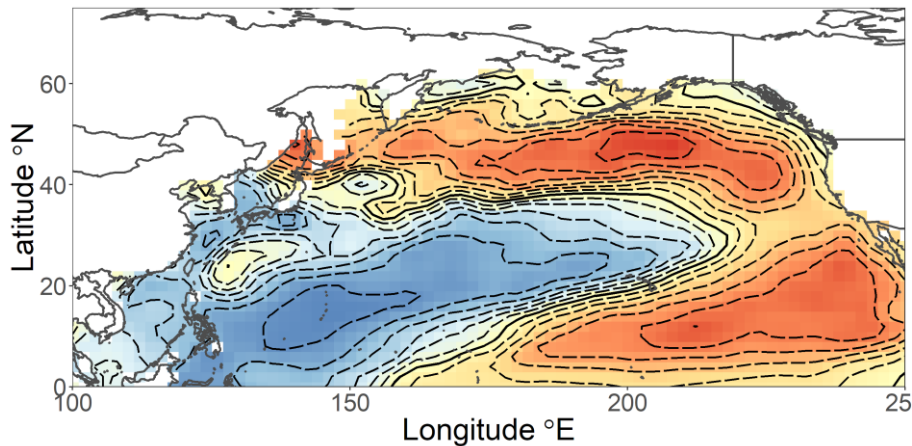
Saury CPUE to SSTA, lag -5 yr



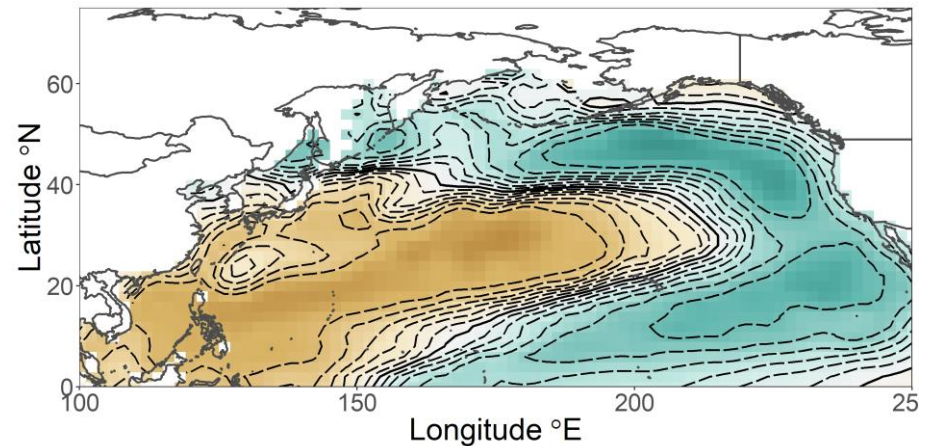
Okh. Pollock R3/SSB to SSTA, lag 0 yr



NWBS Cod R1 to SSTA, lag 0 yr

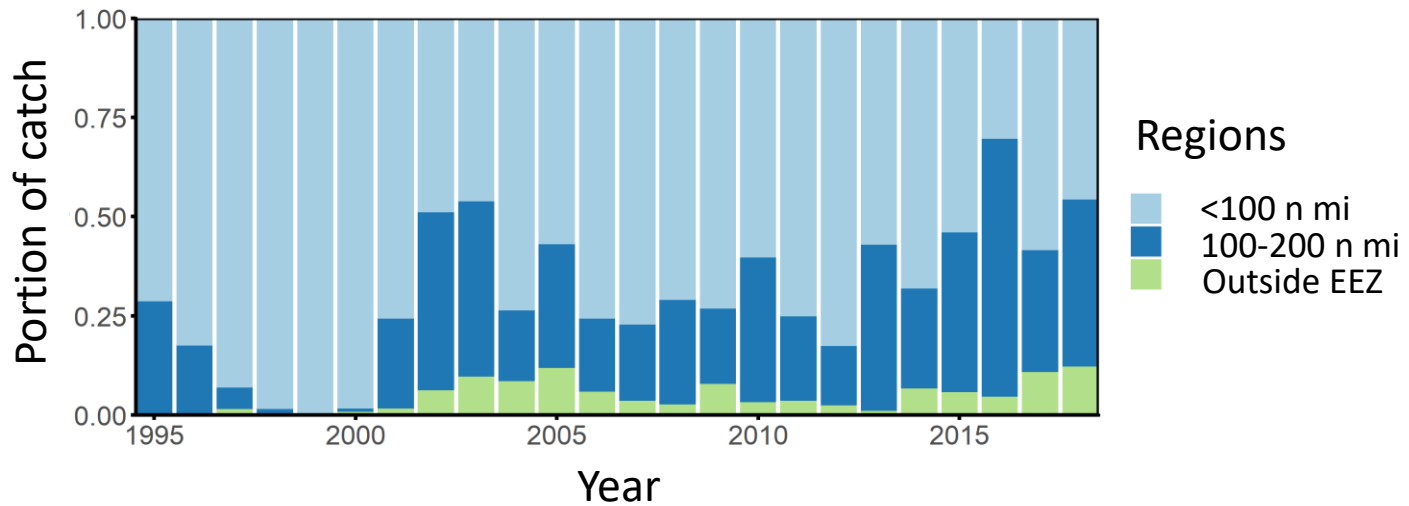
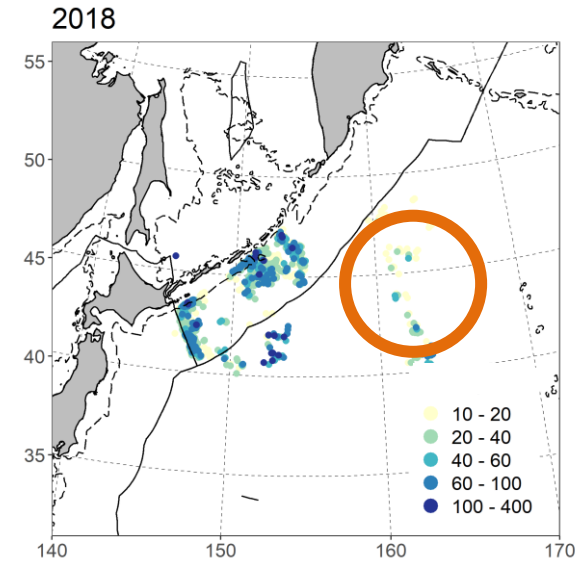
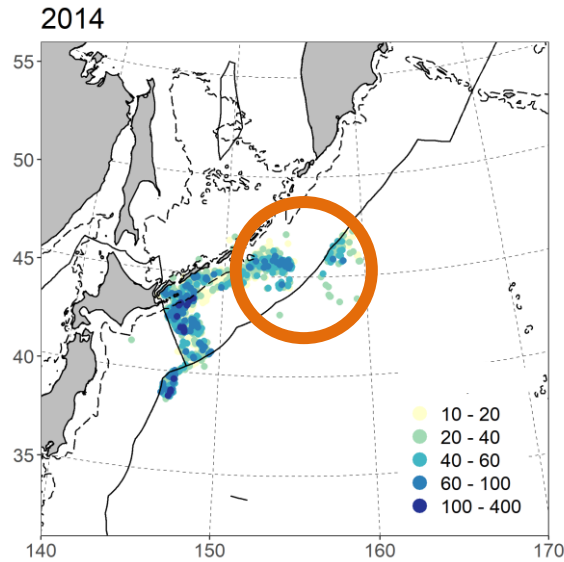
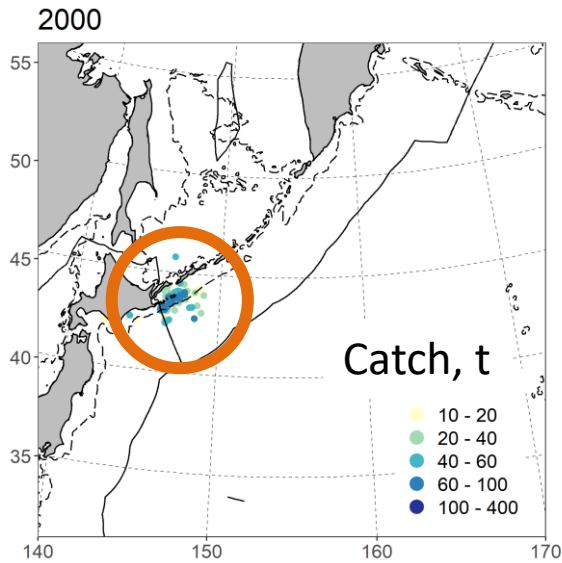


NPGO to SSTA, lag 0 yr



Correlation of three different fish stocks to SSTA, as well as NPGO to SSTA field

Short-term influence



Take-home message

- ≈ 15 - 20 -yr periodicity in saury stock condition
- Relation of CPUE to NPGO at lag 0 yr ($R = -0.45$) – weaker SA and ST gyres promote favorable conditions
- Relation of CPUE to NPGO at lag +5 yr ($R = 0.68$) – possible role of Rossby waves
- Similarity of saury stock dynamics to other NP fishes
- Recent heat waves disturb the long-term mean picture, the species area extends northwards