

Marine Heatwave of Sea Surface Temperature of the Oyashio Region in Summer since 2010

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Hanako Goto²

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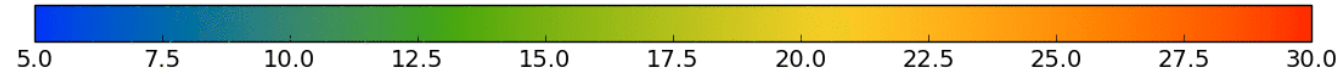
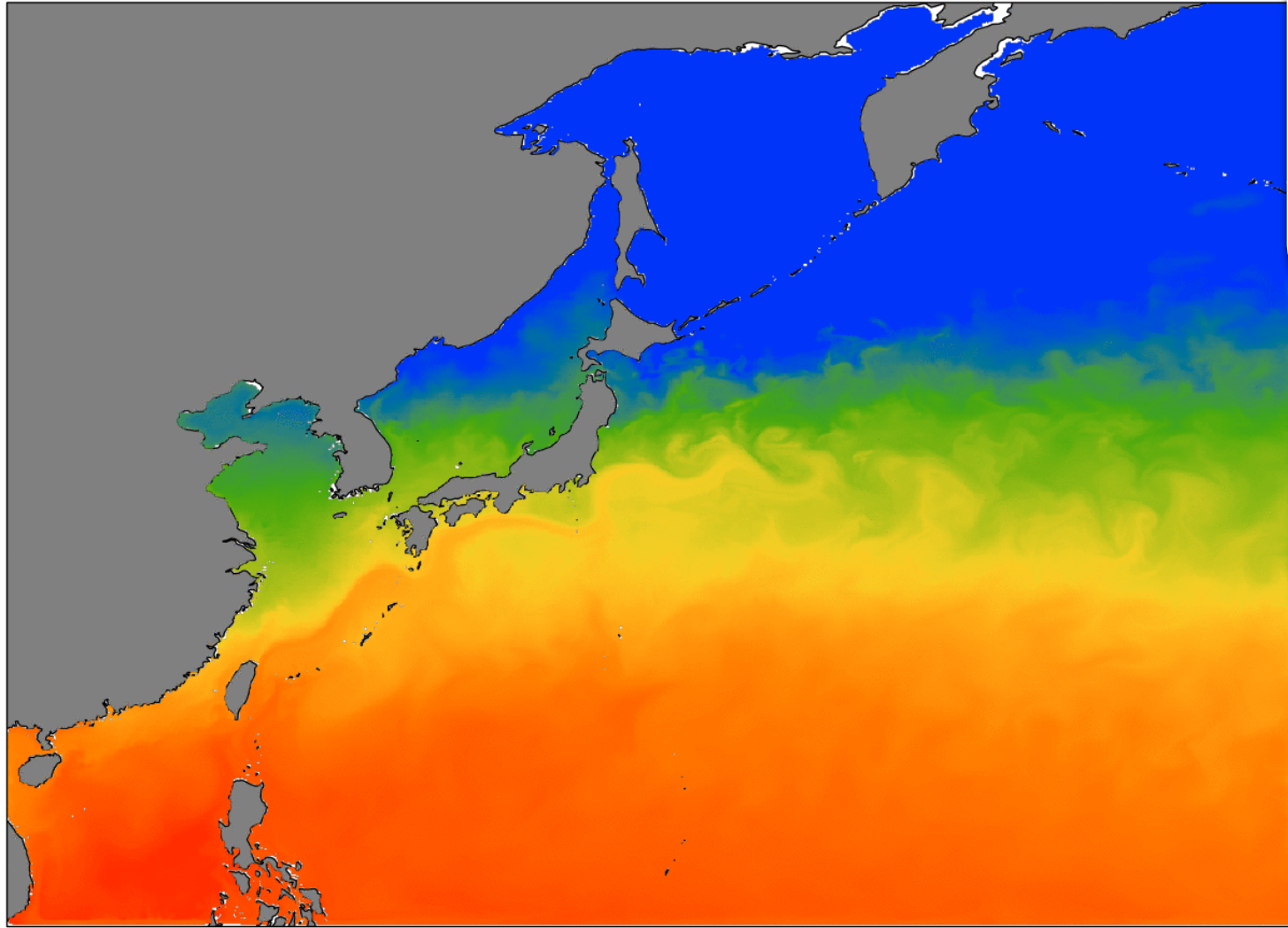
²Hokkaido University, Sapporo, Japan

2019/10/22 PICES 2019

Contents

1. **Ocean forecasts** around Japan by Application Laboratory (APL) of Japan Agency for Marine-Earth Science and Technology (JAMSTEC)
2. **Warming** (marine heatwave) of the Oyashio Region in summer since 2010
→ impact on fisheries

Multi-scale prediction (1)



1. JCOPE2M
Resolution **1/12°** (~ 9km)
2-month forecast,
twice a week

Experimental prediction of PH



Marine Crisis Watch prototype

SPF THE SASAKAWA PEACE FOUNDATION
OPRI THE OCEAN POLICY RESEARCH INSTITUTE

Home Prediction Site Policy

Data

- Temperature (°C)
- Salinity
- pH

Cross-sectional Contour Plots

- Horizontal distribution
- Depth
- Vertical distribution

Data Range

- daily average
- monthly average

Select Date

2019/10/22

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Motion Images

The variation of the ocean can be checked from the animation.

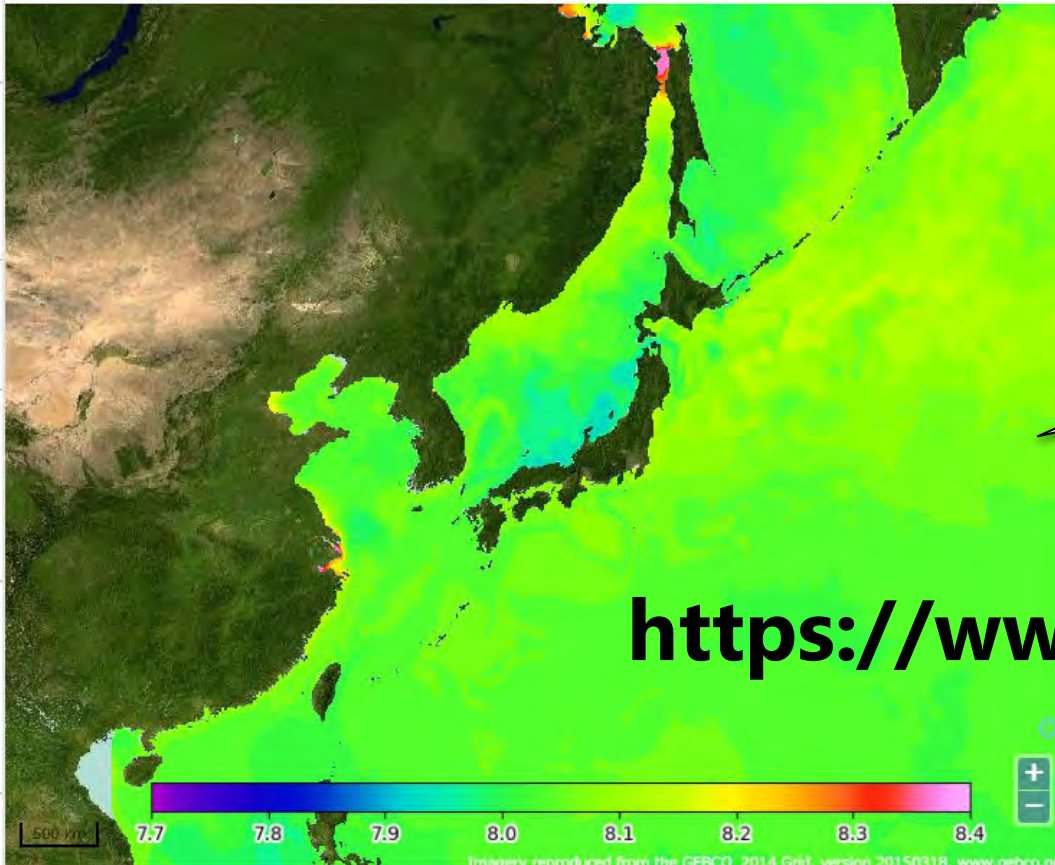
Play

Data Source

JCOPE_EC

HOME » Prediction » JCOPE

日本語

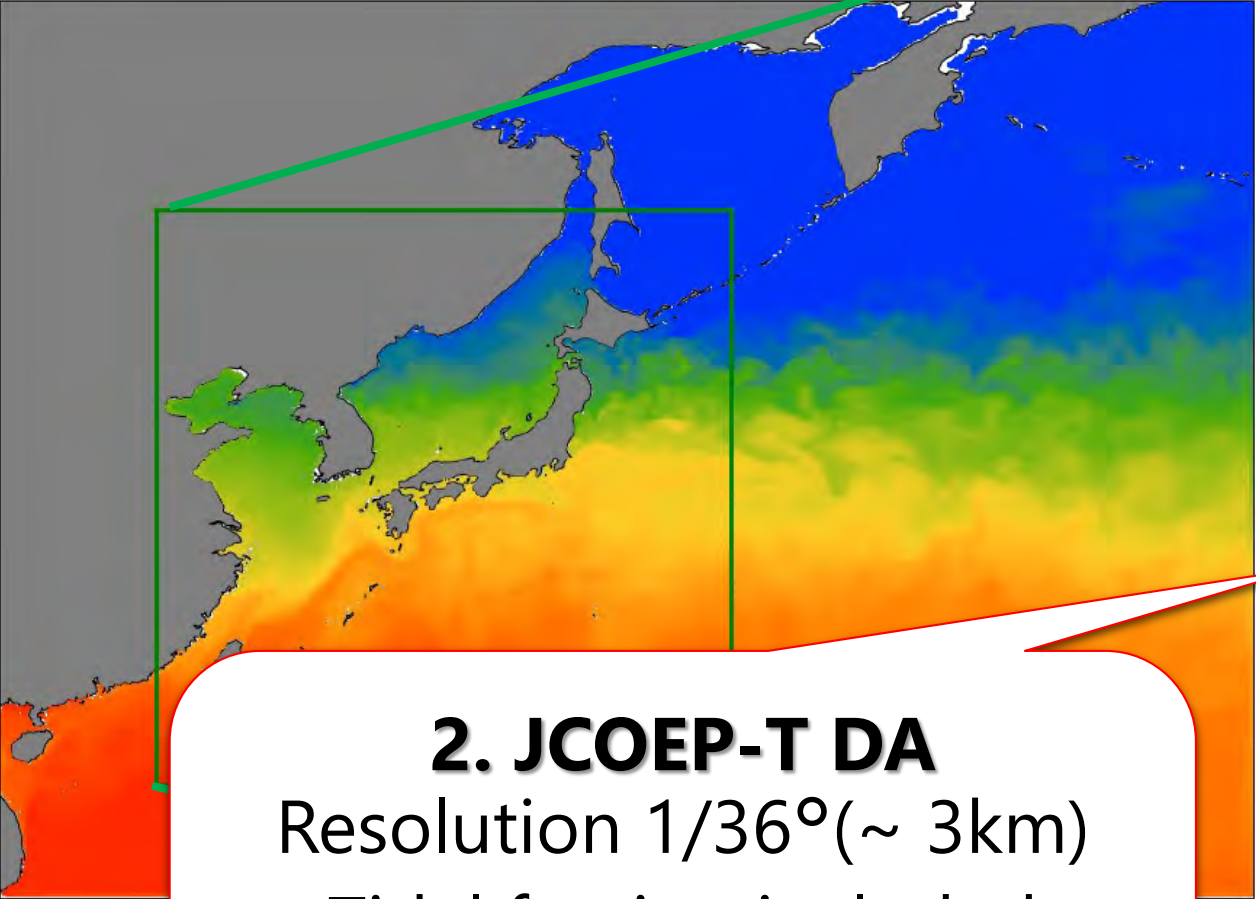


<https://www.marinecrisiswatch.jp/>

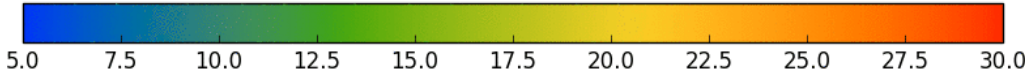
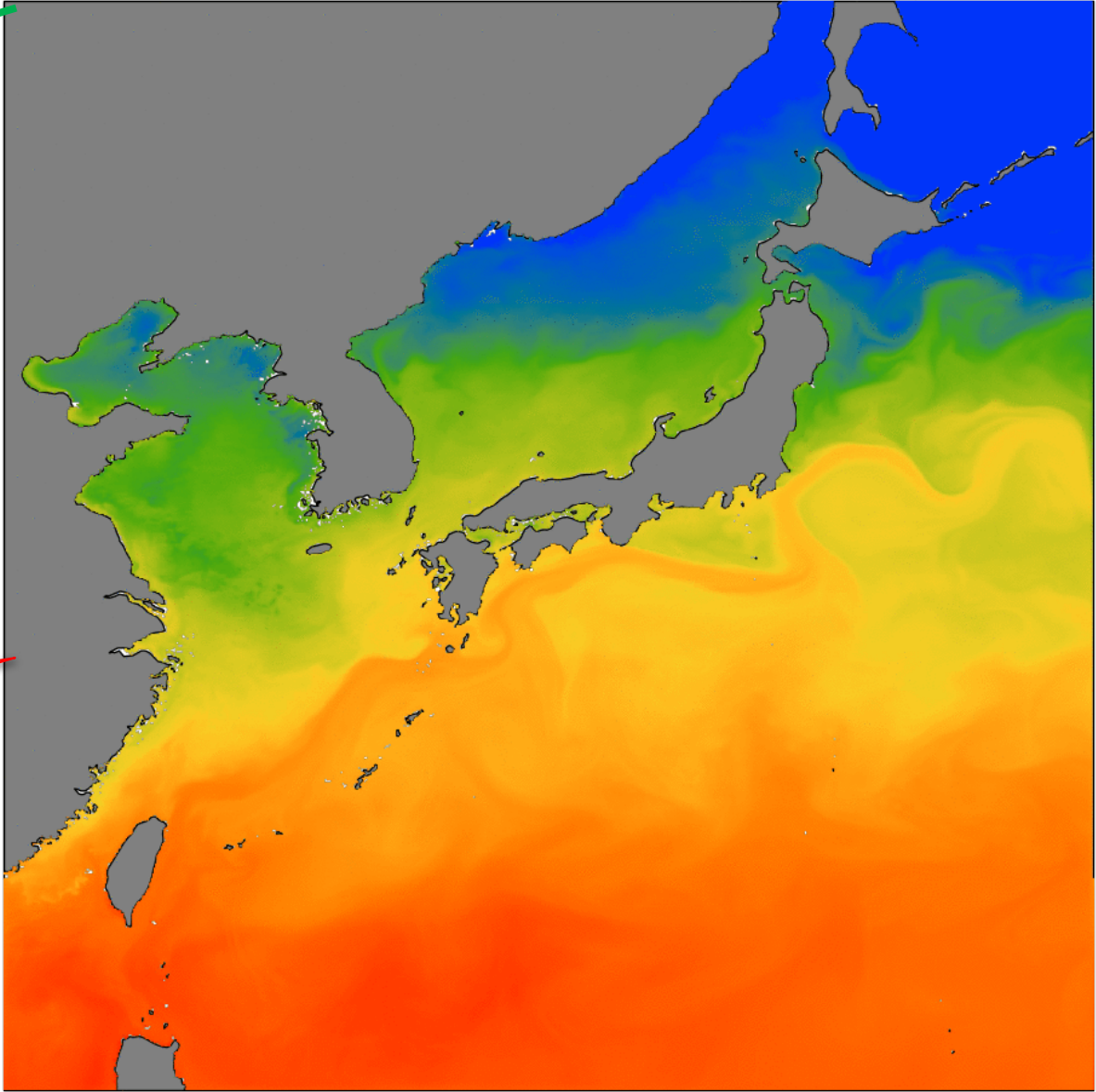
Marine Crisis Watch prototype
By Sasagawa Peace Foundation

JCOPE_EC
Resolution $1/12^\circ$ (~ 9km)
Offline tracer model driven
by JCOPE2M
(Ishizu, et al, 2019
in *Sustainability*)

Multi-scale prediction (2)

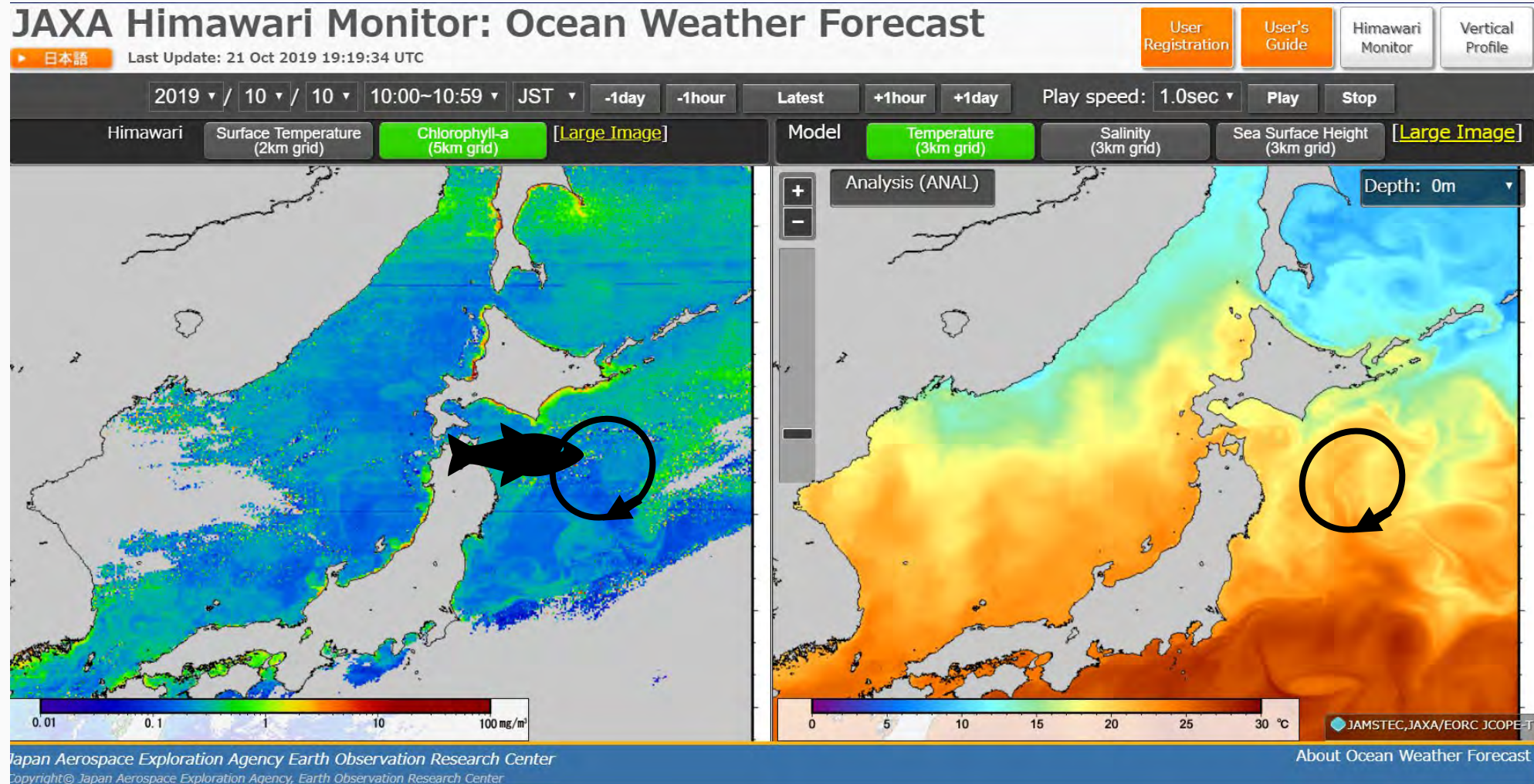


2. JCOEP-T DA
Resolution $1/36^\circ$ (~ 3km)
Tidal forcing included
10-day forecast,
every day



JAXA Himawari Monitor

https://www.eorc.jaxa.jp/ptree/ocean_model/index.html



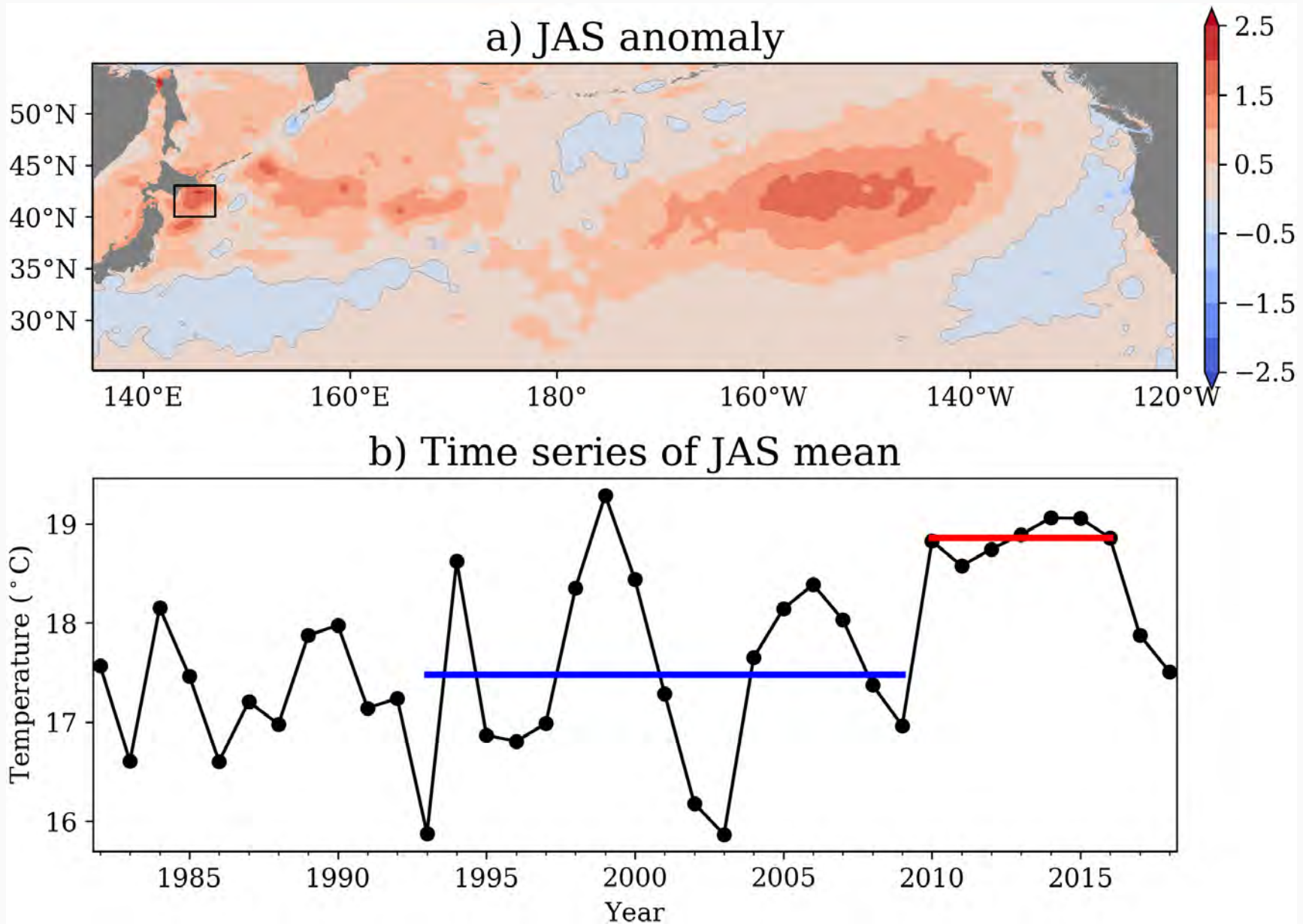
Chlorophyll-a by Himawari-8 satellite

SST by JCOPE-T DA

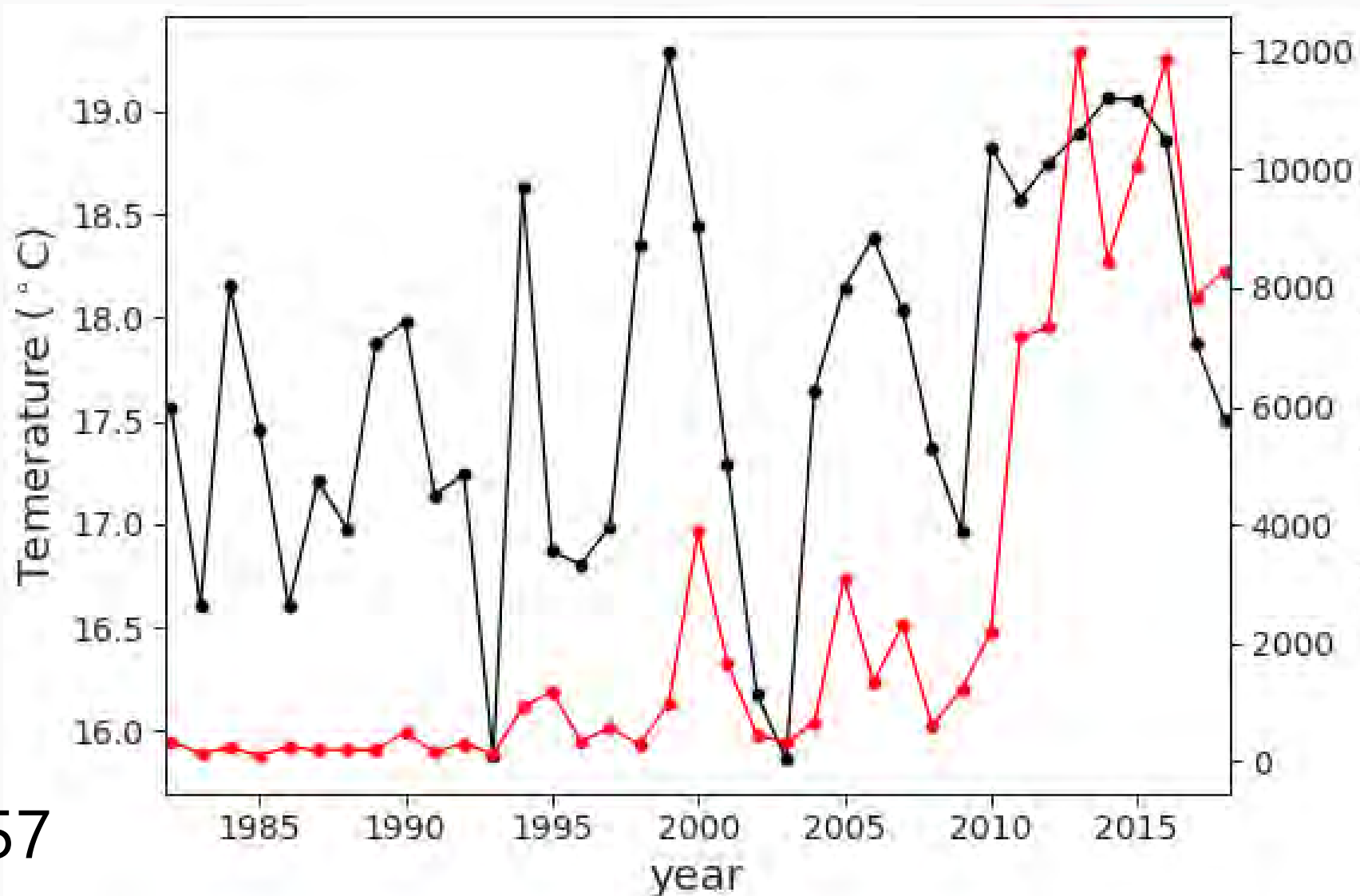
July-August-September mean SST

**2010-2016
minus
1993-2009
average**

Data source:
NOAA OISST



Catch of yellowtail and SST

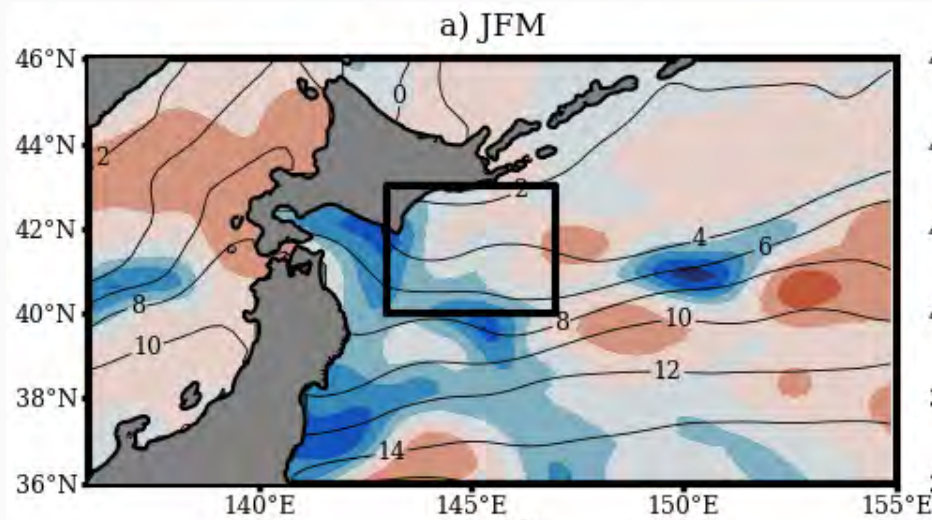


Catch of yellowtail in Hokkaido

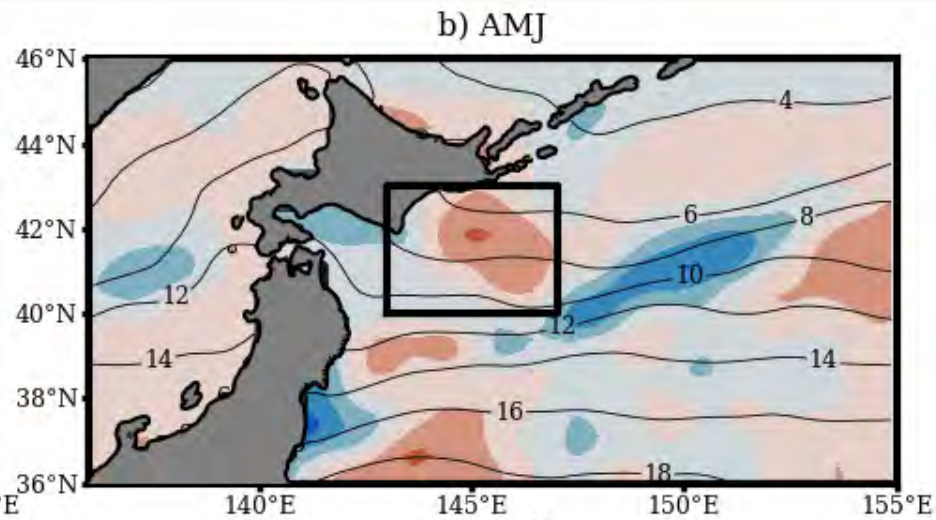
Corr. 0.57

SST change in each season

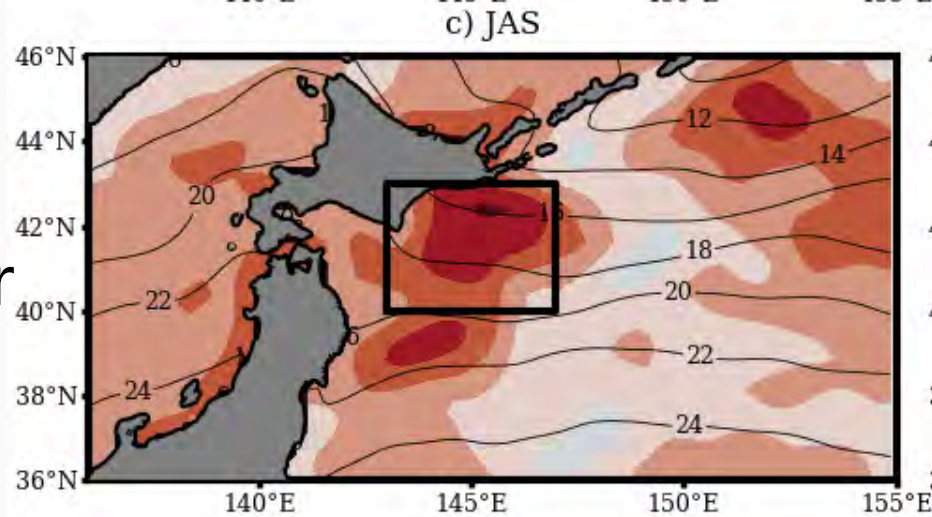
Winter



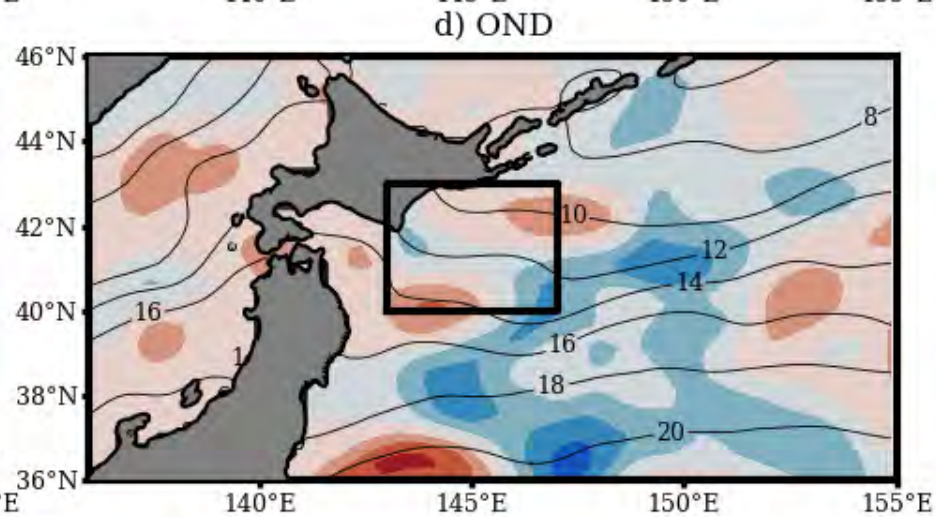
Spring



Summer

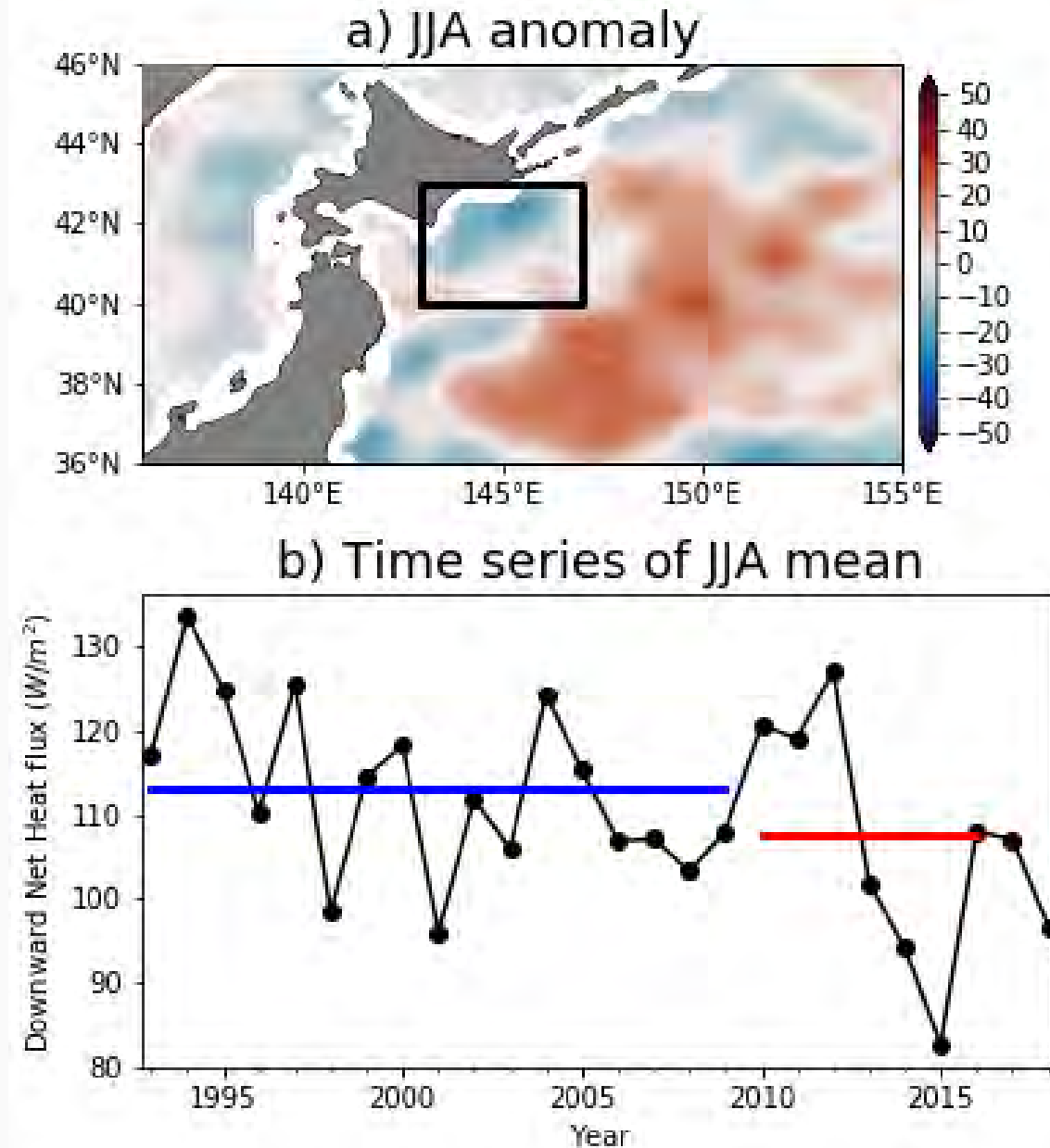


Fall



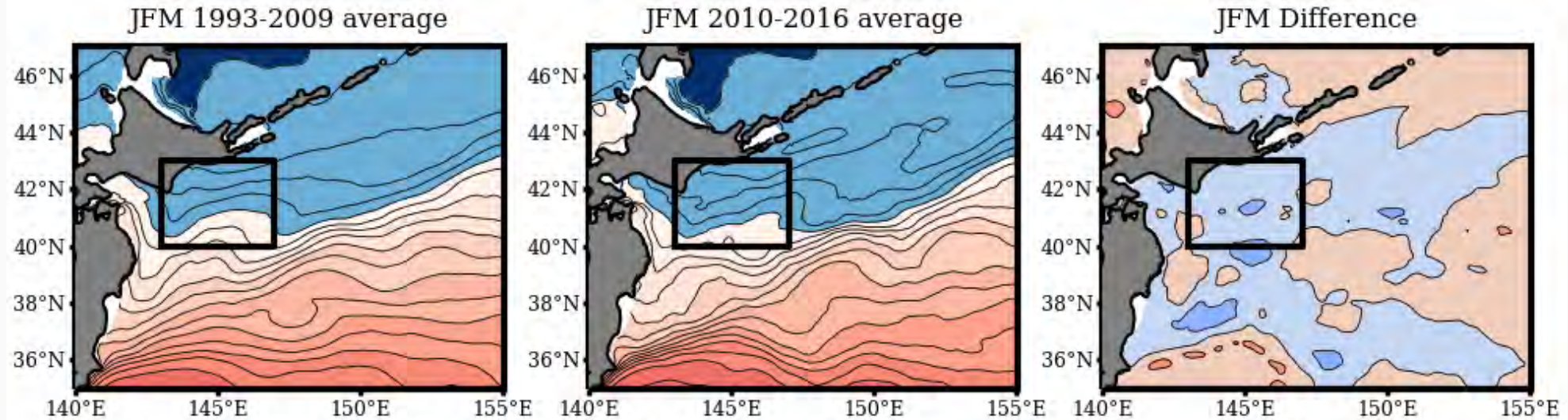
2010-2016 minus 1993-2009 average

Downward Air-Sea Heat flux

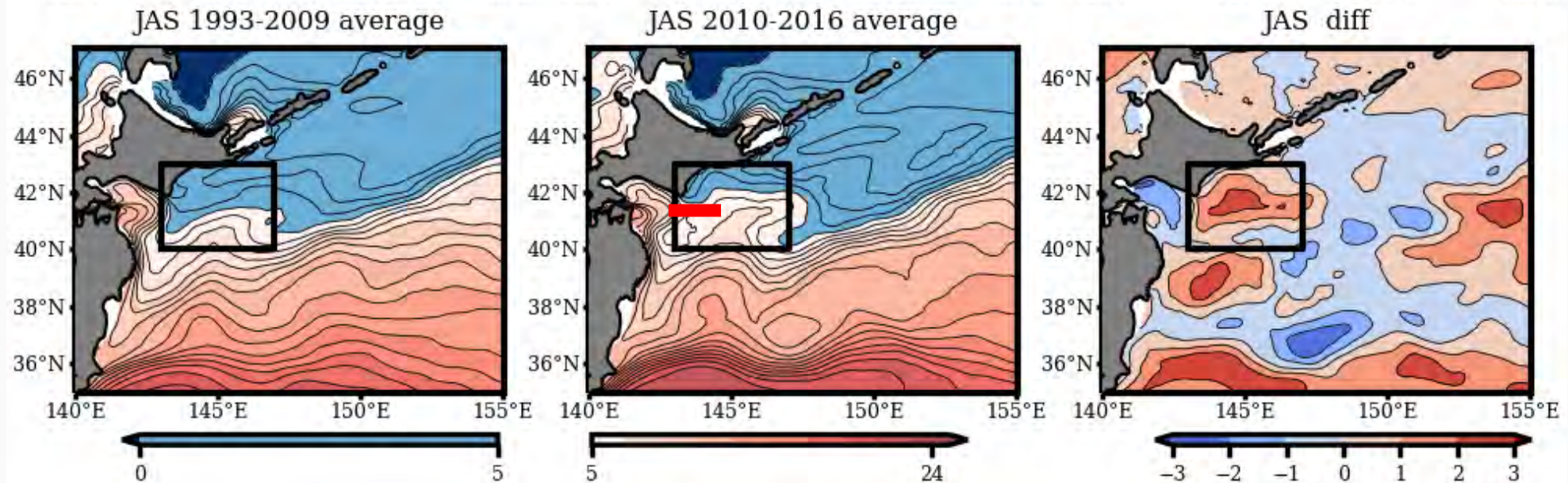


Subsurface temperature (100m)

Winter

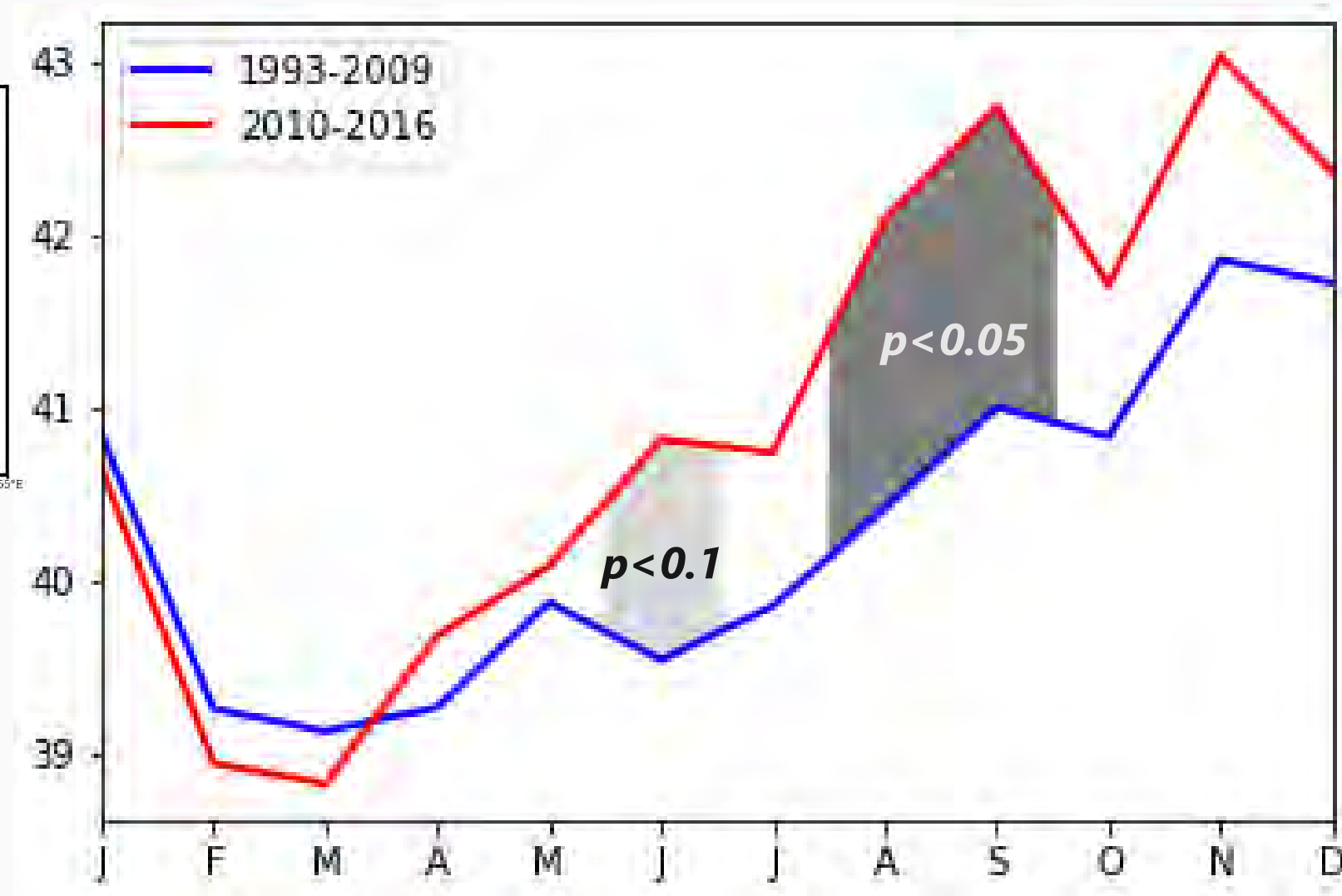
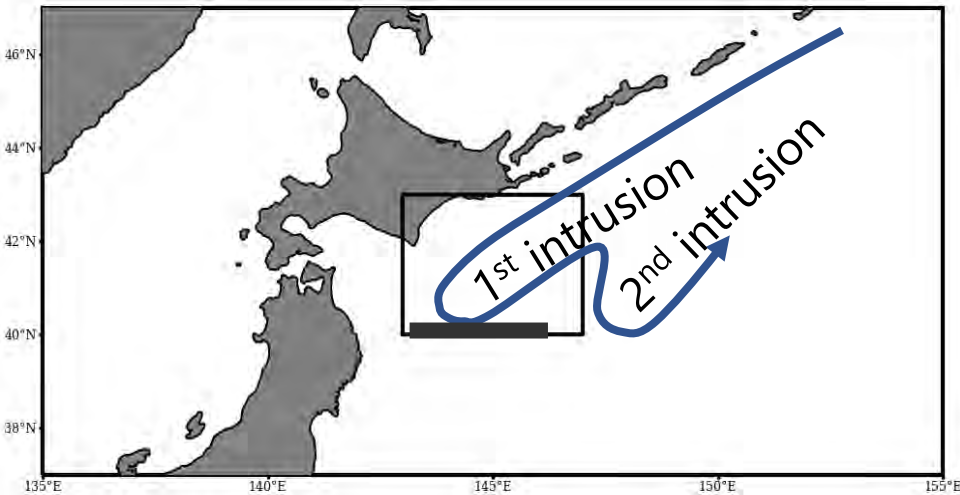


Summer



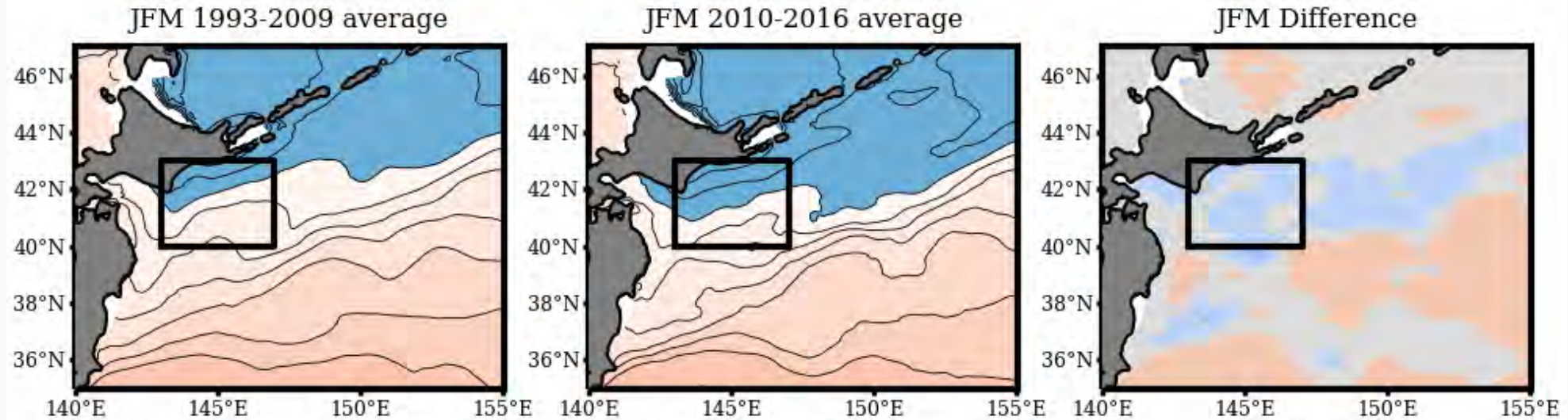
Data source: Reanalysis of JCOPE2M prediction system ($1/12^\circ$ horizontal resolution)

Seasonal variation of the southernmost latitude of the Oyashio 1st intrusion

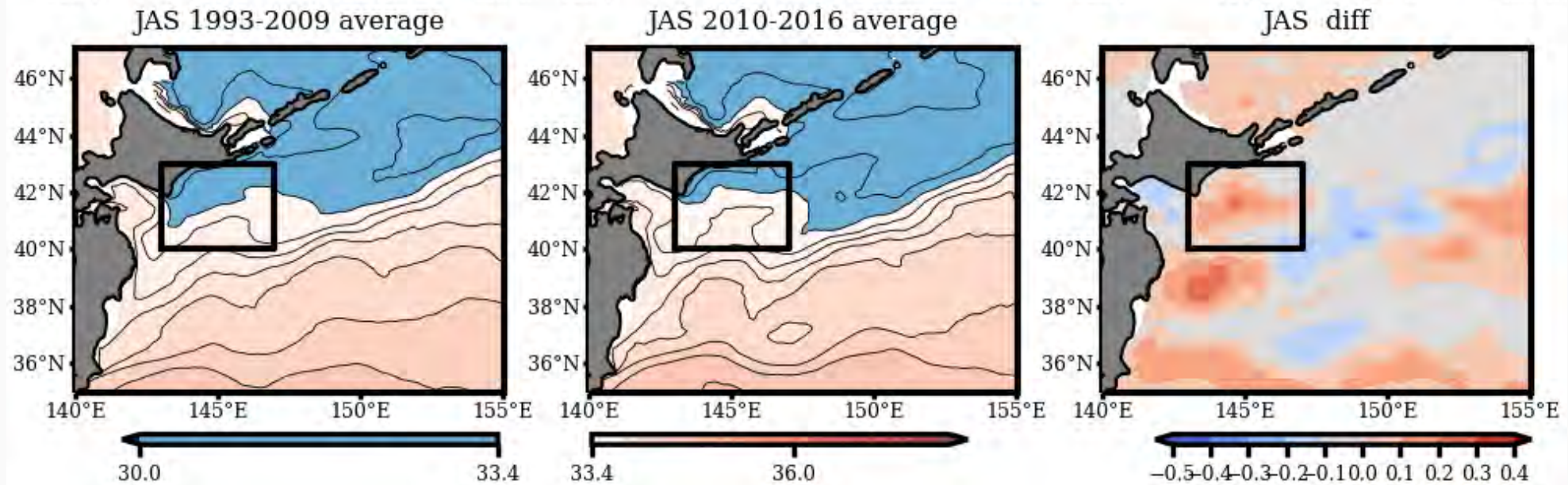


Subsurface salinity (100m)

Winter



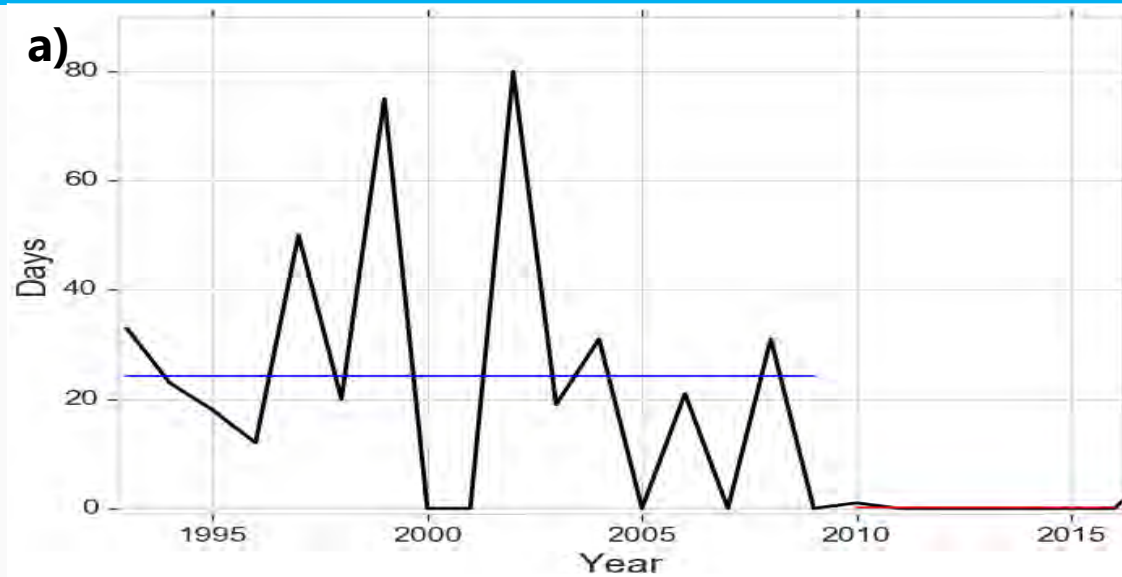
Summer



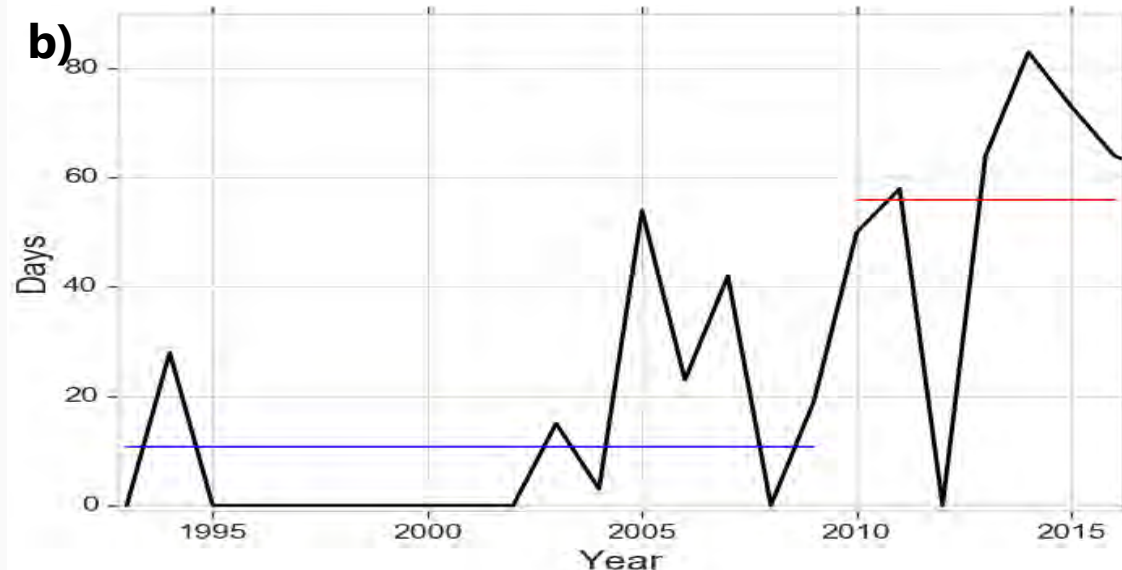
Data source: Reanalysis of JCOPE2M prediction system ($1/12^\circ$ horizontal resolution)

Accumulative arrival days of eddies in summer season (JAS)

**Cyclonic
(cold)
eddies**



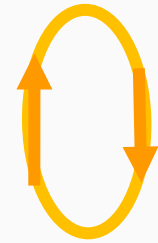
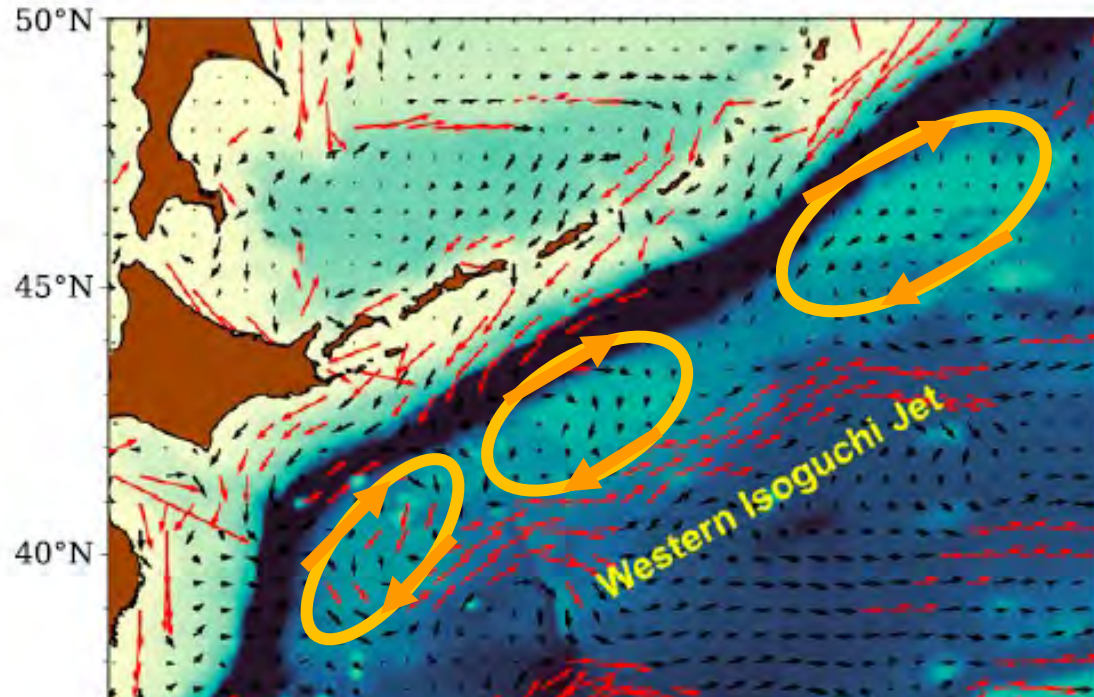
**Anticyclonic
(warm)
eddies**



Calculated from
eddy tracking
product from
altimeter data by
AVISO

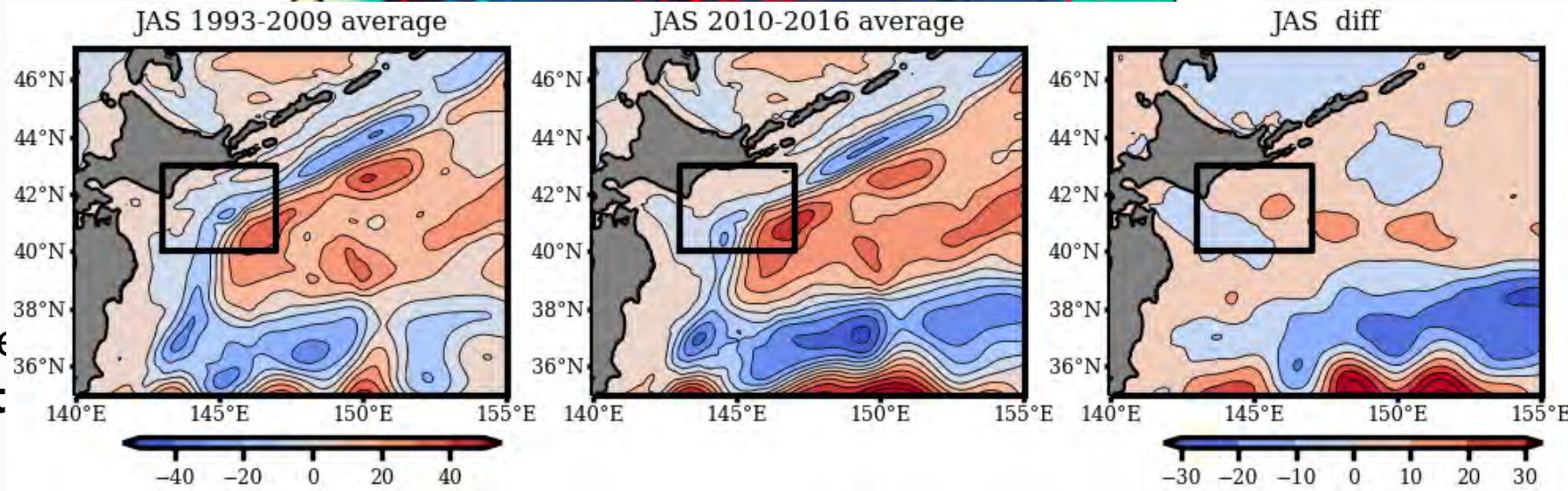
Role of eddies in the Oyashio current system

Shade:
topography



Eddy-Topography induced
Anticyclonic circulation

Mitsudera
baroclinic jet
Miyama et al.
Ocean (the



re by forming
the North Pacific

Oyashio forecast

Application Laboratory JAMSTEC

黒潮親潮ウォッチ Kurashio-Oyashio Watch

黒潮 大蛇行中

Home 黒潮予測 黒潮予測検証 解説 親潮 活動日誌 English

親潮の水は沖合で断続的に (親潮ウォッチ2019/10)

Author: 美山 透 | 2019-10-02

親潮

まとめ

- 図1①: 沿岸寄りの親潮の南下は(親潮第一分枝^①)は平年並みか、暖水渦Aの影響でやや弱めになりそうです。
- 図1②: 暖水渦の影響で沖側の親潮の南下(親潮第二分枝^②)は暖水渦A,Bの影響を併せて、断続的に冷水渦の形で入りそうです。

図1: 親潮状態の説明図。

黒潮親潮ウォッチとは？

海洋研究開発機構(JAMSTEC)アプリケーションラボ(APL)が実施している日本沿岸予測可能性実験(JCOPE)による予測実験と、関係する様々な問題について、お知らせします。黒潮流路の変化とその予測については、毎週水曜日に更新予定です。

お問い合わせ

RSSフィード

当サイトを購読

最近の投稿

- トークショー「海流とこみの本音の語」のアフタートーク
- 2019年10月24日までの黒潮「短期」予測(10月16日発表)
- 2019年12月18日までの黒潮「長期」予測(10月16日発表)
- 最近の水温と海面高度の状況(2019/10)台風19号が近づく



Summary

- Application Laboratory (APL) of JAMSTEC provides multiple **ocean forecasts around Japan**.
- The **recent warming in the Oyashio** region affected fisheries.
- The warming in 2010-2016 occurred in the **first Oyashio intrusion** of the **summer season** accompanied by the enhanced **anticyclonic eddies** between the first and second intrusion of the Oyashio. The reason remains to be identified.