

# Development of an eddy-resolving quasi-global ocean reanalysis product -JCOPE-FGO-

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## 1. Background

- **Frontal-scale oceanic variability**, such as meso-scale eddies and associated modulations of currents, **plays an important role in water-mass formation, air-sea interaction, and transports of heat/freshwater/biogeochemical tracers**

(e.g., Ma et al. 2016, Dong et al. 2014).

- An accurate dynamical ocean reanalysis and forecasting system that can smoothly combine information derived from observations into ocean general circulation model (OGCM), is essential for understanding and predicting behavior of these frontal scale oceanic variability.

- To archive this goal, we have developed a **quasi-global eddy resolving ocean reanalysis product, called JCOPE-FGO**, which is a global extension of the regional JCOPE-system

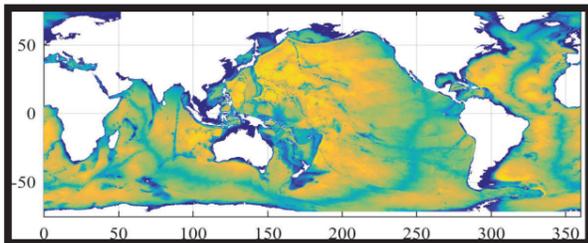
(Miyazawa et al. 2009, 2017)

## 2. A brief overview of the JCOPE-FGO system

### Eddy resolving OGCM (J-POM: 0.1°x0.1° resolution)

Atmospheric forcing: NCEP CFS v1/2

River: JRA55-do



Observation  
MGDSST (Satellite SSTA)

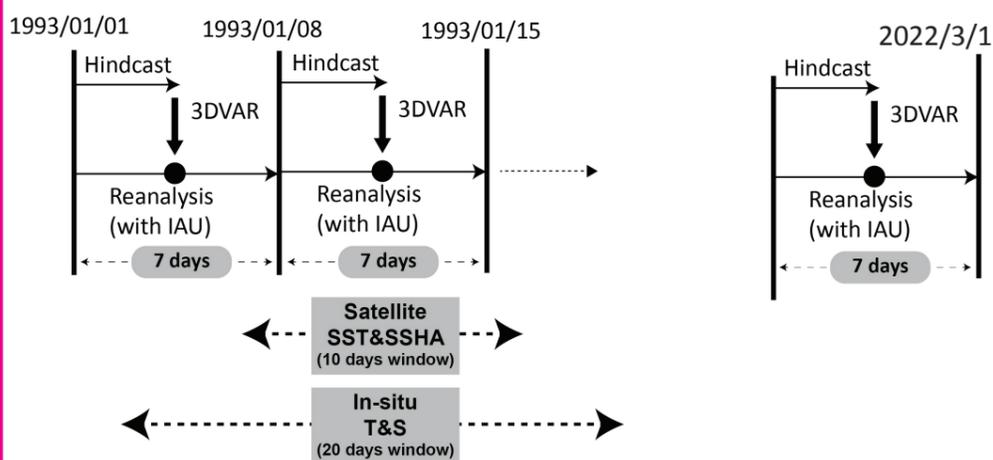
CMEMS (Satellite SLA)

GTSP (In-situ T&S)

• Hindcast  
• 3DVAR  
• Reanalysis

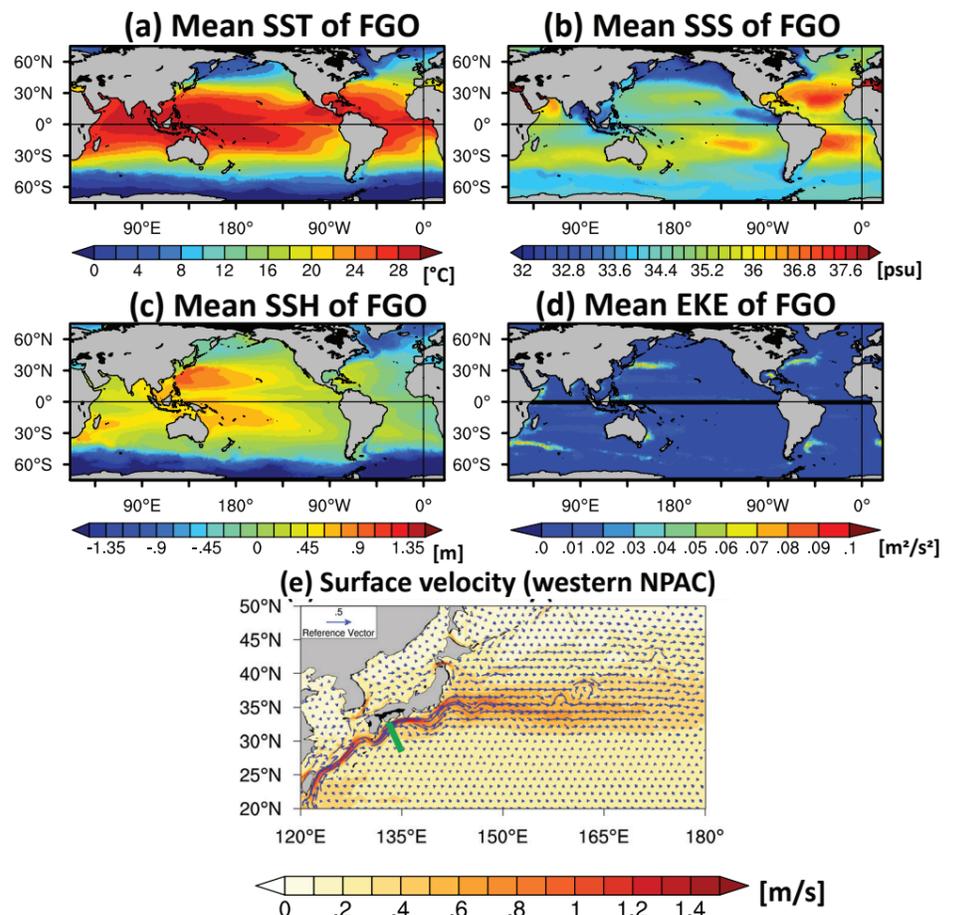
3DVAR code of JCOPE2-M system (Miyazawa et al. 2009)

### Procedure for data assimilation



## 3. Performance of the JCOPE-FGO

### Mean state



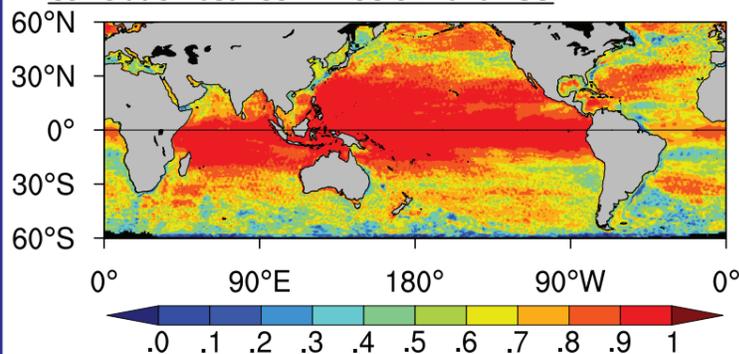
- JCOPE-FGO reasonably capture the mean structure of

- (1) temperature and salinity fields,
- (2) the upper ocean circulation, and
- (3) Eddy kinetic energy (EKE)

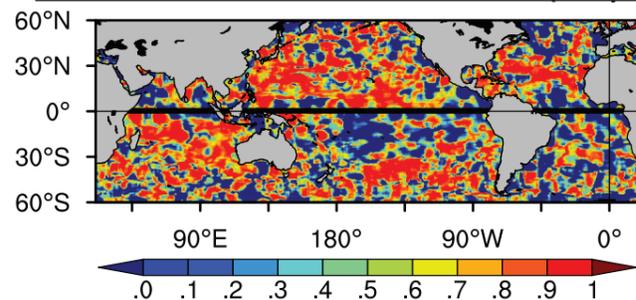
in the global ocean

### Nonseasonal variability

#### Correlation between AVISO SLA and FGO



#### Correlation between AVISO EKE and FGO (comparison is made at 5°x5° grid)



- Nonseasonal variations in SLA are better captured compared to other non-eddy resolving reanalysis products (e.g., SODA3 and ORAS4) especially in extratropical regions

- Observed low-frequency variations in intensity/position of western boundary current jet systems as well as EKE fields, are also reasonably reproduced