

Next Generation Global Ocean Data Assimilation System (NG-GODAS): a new 40-year reanalysis and OSSE applications

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- **Motivation for NG-GODAS**

- No major upgrade of the GODAS operational ocean monitoring system since 2003
- GODAS/CFSR: MOM3/4, no sea-ice, low resolution, univariate 3DVar, limited observation types

- **Contents**

- Completion of a new 40-year reanalysis with NG-GODAS and its validations
- Its OSSE applications for TPOS

Support from CVP/CPO and GOMO is acknowledged

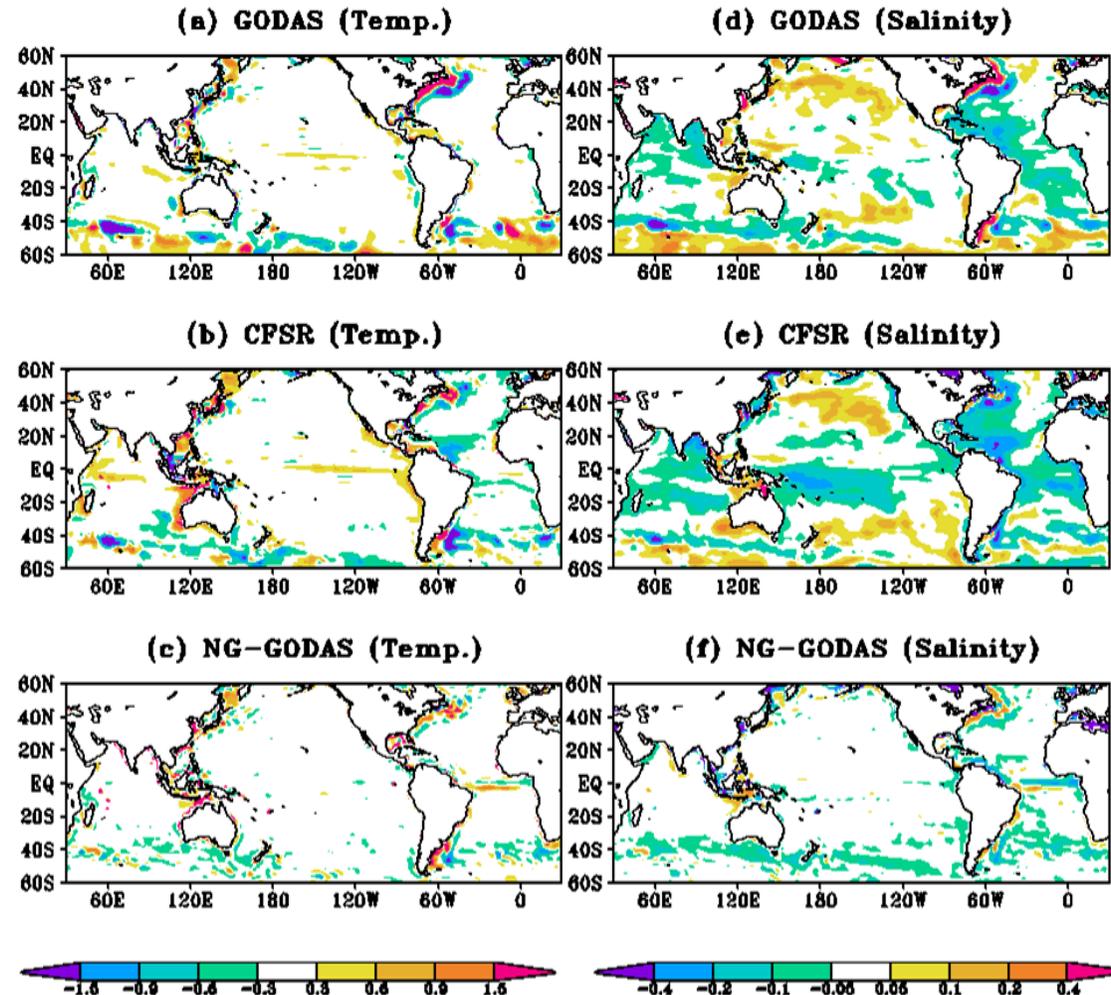
NG-GODAS and a 40-year Reanalysis (1979-2019)

- DA algorithm: JEDI-SOCA 3DVar
- Model: DATM-MOM6-CICE6 (1-degree)
- Atmospheric forcing: CFSR (1979/01-2000/12)+GEFS (2001/01-2019/08)
- Ocean/sea ice obs.:

Obs type	Date
ADT	1993-2020 (NESDIS)
Satellite SST (AVHRR)	1981-200208 (ESACCI L3U), 200208-201811 (NESDIS L3U)
Insitu (T&S)	1979-2020 (WOD)
SSS	SMOS ESA L2 (2010-2020), SMAP RSS/JPL L2 (2015-2020)
Sea ice Conc	NSIDC L3 SSMR, SSMI (1979-200305), EMC L2 (200306-2020 SSMI, SSMIS)

NG-GODAS/NOAA-ODAs: compared with UK-MET EN4

Mean Diff. w.r.t EN4 during 2001–2019: 0–300m

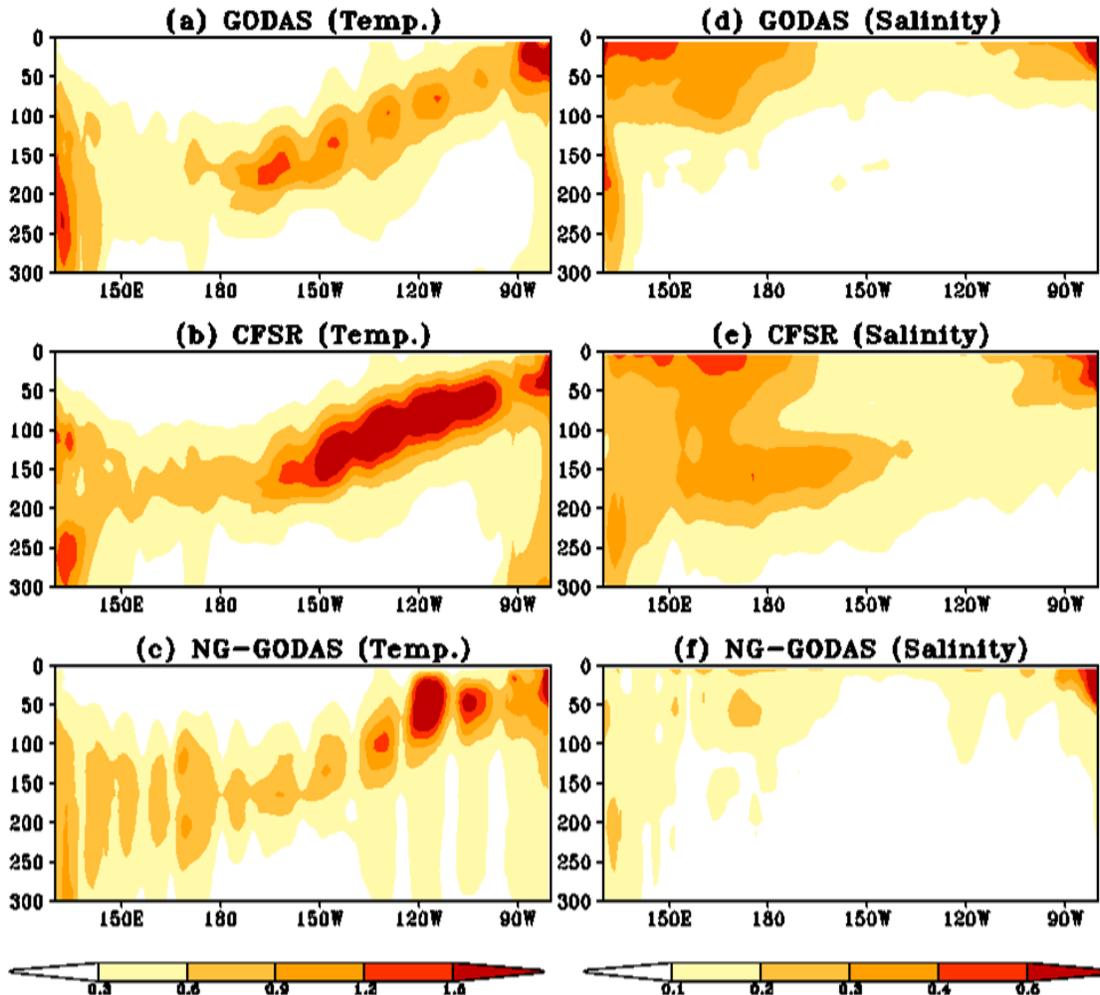


- Mean biases at upper ocean (particularly in salinity):

CFSR > GODAS > NG-GODAS

NG-GODAS/NOAA-ODAs: compared with UK-MET EN4

RMSE w.r.t EN4 during 2001–2019: Eq

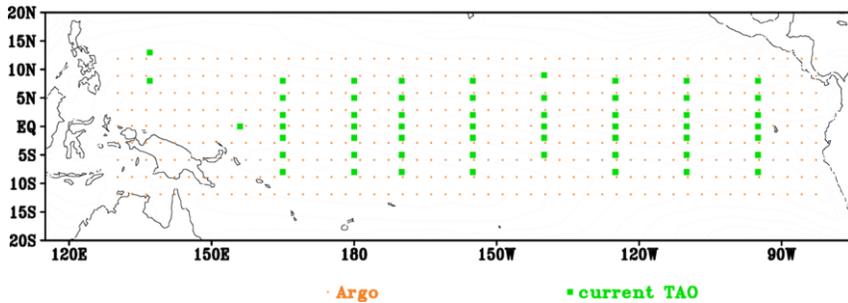


- RMSE along the equatorial Pacific (particularly in salinity):

CFSR > GODAS > NG-GODAS

OSSE studies for the Tropical Pacific Observing System

Current TPOS configuration for OSSE

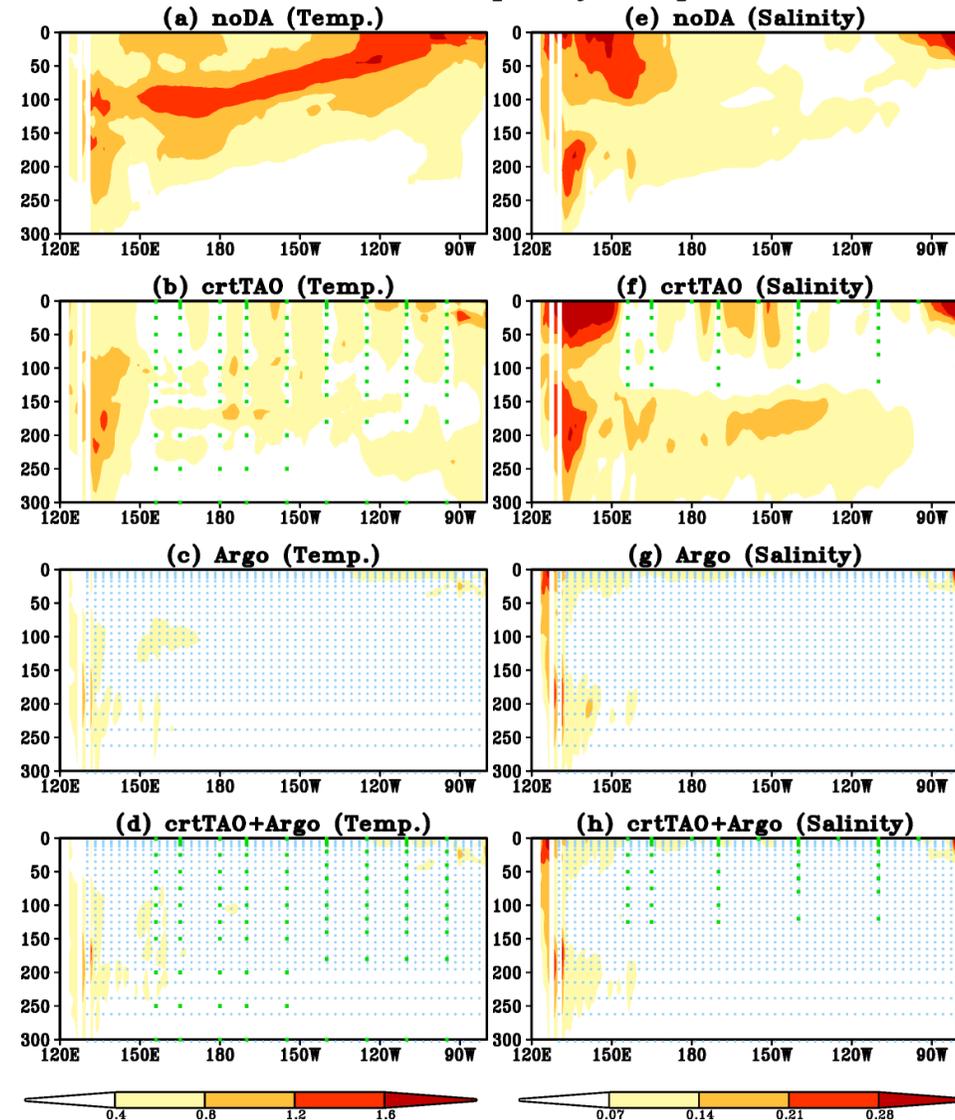


Experiments	Assimilated data
noDA	none
crtTAO	T profiles (a few S) every day with current TAO configurations
Argo	T/S profiles every 3x3 box and every 10 days
crtTAO+Argo	Both TAO and Argo profiles

- **Temp.:** Both TAO and Argo improve the estimate of its LF component (Argo is better)
- **Salinity:** Argo presents the same improvement as in Temp., but TAO presents some improvement only over the upper ocean

(Zhu et al. 2021)

RMSD of Low-frequency component



Summary

- A 40-year (1979-2019) new ocean reanalysis was completed with NG-GODAS, as a joint effort of EMC-CPC-JCSDA;
- NG-GODAS provides improved analysis results (especially in salinity field), in comparison with the current NOAA operational GODAS/CFSR systems;
- An OSSE capability with NG-GODAS was set up for the tropical Pacific observing system.