



Global coupled ocean-atmosphere reanalysis and forecast with pelagic ecosystem

1. IDENTIFICATION INFORMATION

Name	Global coupled ocean-atmosphere reanalysis and forecast with pelagic ecosystem
Abbreviation	K 7 CDA
Metadata Identifier	RECCA_JAMSTEC_K7_CDA20230727071733-DIAS20221121113753-en

2. CONTACT

2.1 CONTACT on DATASET

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2.2 CONTACT on PROJECT

2.2.1 Data Integration and Analysis System

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4. DATASET CREATOR

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5. DATE OF THIS DOCUMENT

2023-07-27

6. DATE OF DATASET

creation : 2014-08-26

7. DATASET OVERVIEW

7.1 Abstract

The system used to produce the data set is the 4-dimensional variational (4D-VAR) coupled data assimilation system based on a

coupled ocean-atmosphere global model, which was developed by Sugiura et al. (2008) and the JAMSTEC-K7 consortium. It also

incorporates a biogeochemical model (NPZDC model), which is the pelagic ecosystem model based on nitrogen cycle (Masuda et al. 2013). (See the references for details of the system and models.)

In the 4D-VAR approach, optimized 4-dimensional analysis fields are sought by minimizing a cost function on the basis of adjoint method for physical parameters and Green's function approach (Menemenlis et al. 2005) for biogeochemical ones. The assimilated observations for the atmospheric component are the PREPBUFR data set (air temperature, specific humidity, and wind vectors) and 10 m scalar wind stress from SSMIS satellite observations. The assimilated observations for the oceanic physical component are OISST, and temperature and salinity profile data from the Argo and GTSPP. The assimilated data for the biogeochemical

component are climatological mean monthly nitrate from WOA05, chlorophyll-a from SeaWiFS, and chlorophyll-a from WOA98 which is converted to detritus.

The procedure of the production of the data set is as follows: using the assimilation window of 3 months, the assimilation experiment was conducted for every 3-months period from January-March 2010. Using the optimized control variables and parameters within the assimilation windows, the forecast experiments were performed for 3 years from the beginning of the assimilation windows (thus, the first 3 months correspond to the state estimation and the remaining 2 years and 9 months correspond to the pure forecast). In the forecast experiments, 10 ensemble forecast runs were also conducted using the atmospheric initial conditions shifted to 1-5 days before/after.

7.2 Topic Category(ISO19139)

climatologyMeteorologyAtmosphere

oceans

7.3 Temporal Extent

Begin Date	2014-01-01
End Date	Under Continuation
Temporal Characteristics	10day

7.4 Geographic Bounding Box

North latitude	bound	90
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West longitude bound	360
Eastbound longitude	0
South latitude bound	-90

7.5 Grid

Dimension Name	Dimension Size (slice number of the dimension)	Resolution Unit
row	360	1 (deg)
column	180	1 (deg)
vertical	45	(m)

7.6 Geographic Description

7.7 Keywords

7.7.1 Keywords on Dataset

Keyword Type	Keyword	Keyword thesaurus Name
theme	OCEANOGRAPHY GENERAL > Physical and biogeochemical interactions, OCEANOGRAPHY GENERAL > Climate and interannual variability, OCEANOGRAPHY GENERAL > Ocean data assimilation and reanalysis, OCEANOGRAPHY GENERAL > Ocean predictability and prediction, OCEANOGRAPHY BIOLOGICAL AND CHEMICAL > Nutrients and nutrient cycling	AGU
theme	Models >	GCMD_platform
theme	Oceans > Ocean Circulation, Biosphere > Aquatic Ecosystems > Plankton	GCMD_science

7.7.2 Keywords on Project

7.7.2.1 Data Integration and Analysis System

Keyword Type	Keyword	Keyword thesaurus Name
theme	DIAS > Data Integration and Analysis System	No_Dictionary

7.8 Online Resource

DIAS data download site : <https://data.diasjp.net/dl/storages/filelist/dataset:234>

7.9 Data Environmental Information

7.10 Distribution Information

name	version	specification
Raw binary (GrADS形式)	1.0	

8. DATA PROCESSING

9. DATA REMARKS

10. DATA POLICY

10.1 Data Policy by the Data Provider

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10.2.1 Data Integration and Analysis System

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12. DATA SOURCE ACKNOWLEDGEMENT

12.1 Acknowledge the Data Provider

12.2 Acknowledge the Project

12.2.1 Data Integration and Analysis System

If you plan to use this dataset for a conference presentation, paper, journal article, or report etc., please include acknowledgments referred to following examples. If the data provider describes examples of acknowledgments, include them as well.

” In this study, [Name of Dataset] provided by [Name of Data Provider] was utilized. This dataset was also collected and provided under the Data Integration and Analysis System (DIAS), which was developed and operated by a project supported by the Ministry of Education, Culture, Sports, Science and Technology. ”

13. REFERENCES

Sugiura, N., T. Awaji, S. Masuda, T. Mochizuki, T. Toyoda, T. Miyama, H. Igarashi, and Y. Ishikawa (2008), Development of a four-dimensional variational coupled data assimilation system for enhanced analysis and prediction of seasonal to interannual climate variations. *J. Geophys. Res.*, 113, C10017, doi:10.1029/2008JC004741.

Masuda, S., T. Doi, N. Sugiura, S. Osafune, and Y. Ishikawa (2014), Data synthesis for biogeochemical variables by using a 4 dimensional variational approach.

Ann. Rep. ESC., April 2012 – March 2013, 67–70.

Menemenlis, D. I. Fukumori, and T. Lee (2005), Using Green’s functions to calibrate an ocean general circulation model. *Mon. Wes. Rev.*, 133, 1224–1240.