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# Typhoon DDS dataset for changing climate

## 1. IDENTIFICATION INFORMATION

Name	Typhoon DDS dataset for changing climate
DOI	doi:10.20783/DIAS.644 [ <a href="https://doi.org/10.20783/DIAS.644">https://doi.org/10.20783/DIAS.644</a> ]
Metadata Identifier	CRess_TY_DDS20221122154809-DIAS20221121113753-en

## 2. CONTACT

### 2.1 CONTACT on DATASET

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#### 2.2.1 Data Integration and Analysis System

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## 5. DATE OF THIS DOCUMENT

2022-11-22

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## 6. DATE OF DATASET

creation : 2022-03-31

## 7. DATASET OVERVIEW

### 7.1 Abstract

CReSS02 and CReSS04 data are high-resolution datasets focusing on typhoons that can affect Japan. The dynamical downscaling (DDS) experiments were performed by the Earth Simulator using a high-resolution non-hydrostatic regional model (Cloud Resolving Storm Simulator, CReSS; Tsuboki and Sakakibara 2002) developed at Nagoya University, with horizontal resolutions of approximately 4 km (CReSS04) and 2 km (CReSS02).

#### (a) CReSS02

The initial and boundary conditions were provided from the output calculated by the Meteorological Research Institute using an atmospheric general circulation model with a horizontal resolution of 20km (MRI-AGCM3.2S, Mizuta et al., 2012). The results of climate runs for the present-day climate (1979-2003), the near-future climate (2015-2039), and the future climate (2075-2099) were used. The targets of the DDS experiment were those in which the minimum central pressure not greater than 970 hPa, which was located in the region between 120° E 150° E 15° N 45° N. The CReSS02 uses latitude and longitude coordinates, with 2403 grids in the longitude direction and 2051 in the latitude direction. The horizontal resolution is 0.0186 and 0.0181 degrees in the longitude and latitude directions, respectively.

#### (b) CReSS04

Dynamical downscaling experiments of TCs traveling over the sea east of Japan were performed by using the Policy Decision-Making for Future Climate Change (d4PDF) database (Mizuta et al. 2017, Sasaki et al. 2011). All TCs that made landfall in eastern Hokkaido in northern Japan from the western North Pacific Ocean with no previous landfalls were selected from the 3,000 years of current-climate (1950-2011, 50 members) and 5,400 years of 4-K warming-climate (2051-2111, 90 members) runs, respectively (MRI-AGCM3.2H). The DDS experiments for all targeted storms were conducted with CReSS with a horizontal resolution of 0.04° (approximately 4 km). The computational domain of CReSS04 spans 128° E 152° E and 24° N 48° N. The CReSS04 uses latitude and longitude coordinates, with 603 grids in the longitude direction and 603 in the latitude direction.

### 7.2 Topic Category(ISO19139)

climatologyMeteorologyAtmosphere

### 7.3 Temporal Extent

Begin Date	1950-09-01
End Date	2111-08-31

### 7.4 Geographic Bounding Box

North latitude bound	47.0507
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West longitude bound	113.8
Eastbound longitude	158.421
South latitude bound	10.0

## 7.5 Grid

Dimension Name	Dimension Size (slice number of the dimension)	Resolution Unit
column		0.0186/0.04 (deg)
column		0.0181/0.04 (deg)

## 7.6 Geographic Description

## 7.7 Keywords

### 7.7.1 Keywords on Dataset

Keyword Type	Keyword	Keyword thesaurus Name
theme	GLOBAL CHANGE > Impacts of global change	AGU

### 7.7.2 Keywords on Project

#### 7.7.2.1 Data Integration and Analysis System

Keyword Type	Keyword	Keyword thesaurus Name
theme	DIAS &gt; Data Integration and Analysis System	No_Dictionary

## 7.8 Online Resource

file download : <https://data.diasjp.net/dl/storages/filelist/dataset:644>

## 7.9 Data Environmental Information

The CReSS02 and CReSS04 datasets contain the following files and variables. 1) Two dimensional surface data 2) Geographical data ( "\_geography") 3) User namelist (".user.conf") 1) and 2) are 4byte binary (big endian) data files with corresponding Grads ctl files. The extension ".bin" is for the data file and ".ctl" is for the Grads ctl file. 1) Two dimensional surface data Time intervals: 1 hour (CReSS04) and 15 minutes (CReSS02) Variables: slp sea level pressure Pa us velocity in lon direction at 10m m/s vs velocity in lat direction at 10m m/s tgs soil and sea surface temperature K prr rain fall rate m/s pra accumulated rain fall m File names: (CReSS02) Present-day climate: sfc.spaXXX\_TID\_YYYYv343f.mon\_YYYY\_MO\_DD\_HHMMUTC.united.bin Near-future climate: sfc.snaXXX\_TID\_YYYYv343f.mon\_YYYY\_MO\_DD\_HHMMUTC.united.bin Future:

sfc.sfaXXX\_TID\_YYYYv343f.mon\_YYYY\_MO\_DD\_HHMMUTC.united.bin XXX: Experiment ID TID: Typhoon ID in MRI-AGCM3.2S YYYY: Year MO: Month DD\_HHMM: Day, hour, and minutes (CRSS04) Current-climate: sfc.HPB\_EM\_TID.mon\_YYYY\_MO\_DD\_HHMMUTC.united.bin 4-K warming-climate: sfc.XX\_EM\_TID.mon\_YYYY\_MO\_DD\_HHMMUTC.united.bin TID: Typhoon ID in MRI-AGCM3.2H EM: Ensemble number in MRI-AGCM3.2H YYYY: Year MO: Month DD\_HHMM: Day, hour, and minutes XX: SST patterns (CC: CCSM4, GF=GFDL-CM3, HA=HadGEM2-AO, MI=MIROC5, MP=MPI-ESM-MR, MR=MRI-CGCM3) 2) Geographical data ht terrain height alat latitude alon longitude map map scale factor fs Coriolis parameter land real land use categories (sea: -1, land: 10)

## 7.10 Distribution Information

name	version	specification
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## 8. DATA PROCESSING

## 9. DATA REMARKS

## 10. DATA POLICY

### 10.1 Data Policy by the Data Provider

Data Polilcy:

1. Individual users should not redistribute the data to any third party.
2. The source of the database should be acknowledged in scientific and technical papers, publications, press releases and other communications in case of using the data.

Disclaimer:

The intellectual property rights of the dataset belong exclusively to Nagoya university. Nagoya university and anyone, including the creator (and all individuals and organizations involved in the creation of this dataset), are not responsible for any damage that may result from the use of this dataset.

### 10.2 Data Policy by the Project

#### 10.2.1 Data Integration and Analysis System

If data provider does not have data policy, DIAS Terms of Service (<https://diasjp.net/en/terms/>) and DIAS Privacy Policy (<https://diasjp.net/en/privacy/>) apply.

If there is a conflict between DIAS Terms of Service and data provider's policy, the data provider's policy shall prevail.

## 11. LICENSE

## 12. DATA SOURCE ACKNOWLEDGEMENT

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## 12.1 Acknowledge the Data Provider

CRess02:

This study used data produced with the 2017 Earth Simulator Strategic Project with Special Support and the Program for Risk Information on Climate Change (SOUSEI) from the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan.

CRess04:

This work was supported by the Integrated Research Program for Advancing Climate Models (TOUGOU) Grant Number JPMXD0717935561 from the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan. Numerical simulations were performed using the Earth Simulator at Japan Agency for Marine–Earth Science and Technology (JAMSTEC).

## 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

CRess02:

Tsuboki, K., 2017: Cloud-resolving Downscaling Simulations of Northward-moving Typhoons in Warming Climates of the Near Future and Late Twenty-first Century. Annual Report of the Earth Simulator, April 2016–March 2017, 339–344.

CRess04:

Kanada, S., K. Tsuboki, and I. Takayabu, 2020: Future changes of tropical cyclones in the midlatitudes in 4-km-mesh downscaling experiments from large-ensemble simulations, SOLA. 16, 57–63, doi:10.2151/sola.2020-010.

Cloud Resolving Storm Simulator, CRess:

Tsuboki, K., and A. Sakakibara, 2002: Large-scale parallel computing of Cloud Resolving Storm Simulator, in High Performance Computing, edited by H. P. Zima, K. Joe, M. Sato, Y. Seo, and M. Shimasaki, pp. 243–259, Springer, New York.

MRI-AGCM3.2:

Mizuta, R., H. Yoshimura, H. Murakami, M. Matsueda, H. Endo, T. Ose, K. Kamiguchi, M. Hosaka, M. Sugi, S. Yukimoto, S. Kusunoki, and A. Kitoh, 2012: Climate simulations using MRI-AGCM3.2 with 20-km grid. J. Meteor. Soc. Japan, 90A, 233–258, doi:10.2151/jmsj.2012-A12.

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Mizuta, R., and co-authors, 2017: Over 5000 Years of Ensemble Future Climate Simulations by 60 km Global and 20 km Regional Atmospheric Models. Bull. Amer. Meteor. Soc., 1383–1398, doi:10.1175/BAMS-D-16-0099.1.

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