Guidelines for NICAM AMIP-like simulation data users 5 Aug 2014

1. The uses are requested to send us the information when you consider publications or presentations using the NICAM simulation data.
2. The users are requested to include the following information in their publications or presentations.

   Acknowledgement:

   "All the runs were performed on the K computer at the RIKEN Advanced Institute for Computational Science (Proposal number hp120279, hp130010 and hp140219). This study is supported by Strategic Programs for Innovative Research (SPIRE) Field 3 (Projection of Planet Earth Variations for Mitigating Natural Disasters), which is promoted by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan."

   Reference:

   Kodama et al. (2014), "Mean State and Variability of the NICAM AMIP-like Climate Simulation", Journal of the Meteorological Society of Japan, to be submitted.

   Reference information is given on NICAM web (http://nicam.jp/hiki/?NICAM+Papers)
3. Any feedbacks to the NICAM team members regarding the dataset, science discussion, and suggestions are greatly appreciated.
4. Please consider adding following persons to co-authors: Chihiro Kodama, Yohei Yamada, Akira T. Noda (JAMSTEC)
5. Please check http://nicam.jp/hiki/?Research+Collaborations for TERMS and CONDITIONS and Guideline for data users.
6. Please contact following persons if you want to use the following dataset.

   Contact persons:

   Masaki Satoh satoh@aori.u-tokyo.ac.jp (Project leader)

   Chihiro Kodama kodama@jamstec.go.jp (Experiment leader)

Information of data set

1. General information

1.1 NICAM

- NICAM.12 (2012's version)
- Tomita and Satoh [2004]; Satoh et al. [2008,2014]

Table: model description

Cloud microphysics	NICAM Single-moment Water 6 (NSW6) with TOA radiation tuning	Tomita (2008)
Cumulus convection	Not used	
Radiation	mstrnX	Sekiguchi and Nakajima (2008)
Turbulence	Mellor-Yamada Nakanishi-Niino (MYNN2)	Nakanishi and Niino (2006); Noda et al. (2010)
Gravity wave	Not used	
Land surface	Minimal Advanced Treatments of Surface Interaction and RunOff (MATSIRO)	Takata et al. (2003)
Surface flux (ocean)	Bulk surface flux	Louis (1979); surface roughness following Moon et al. (2007) and Fairall et al. (2003)
Ocean model	Single layer slab ocean with SST nudging (τ=7 days and D=15m) and fixed sea ice fraction	τ and D suggested by Grabowski [2006]

1.2 Experimental design

- Kodama et al., in prep.
- runs

    - CNTL run: 1978.06-2009.12 (spin-up: 1978.06-12)
    - FUTURE run: 2074.06-2105.12 (A1B scenario) (spin-up: 2074.06-12)
- resolutions
    - 14km horizontal mesh
    - 38 vertical levels up to 40km
    - sponge layer above 20km
- SST/ICE (including interannual variability)
    - CNTL: monthly mean AMIP2 SST including interannual variability (1°×1°)
    - FUTURE: CMIP3 model ensemble dSST = SST(2075-2099) – SST(1979-2003) including trend is added to AMIP2 SST. For sea ice, areal change is considered following Mizuta et al. [2008].
- minor constituents (including interannual variability)
    - CO2, N2O, CH4, CFC11, CFC12: globally uniform
    - O3: output from MRI-CTM AMIP run (with 5-year smoothing)
- no aerosol, no solar cycle

2. Datasets

- All the data files except for monthly means are compiled with NetCDF format. Monthly-mean data are compiled with 4-byte big-endian flat binary.
- For use in GrADS, control files are prepared. You can open them by “xdfopen” (NetCDF) or “open” (flat binary).
- Convention of the directory name: {h-info}.{v-info}.{t-info}
    - {h-info}
        - 02560x01280: 0.14°-mesh (semi-native grid)
        - 00360x00181: 1°-mesh
        - 00288x00145: 1.25°-mesh
        - 00144x00072: 2.5°-mesh
    - {v-info}
        - zorg: semi-native grid (38 layers in z, 1 layer at the surface etc)
        - p37: pressure coordinate in hPa (1000, 975, 950, 925, 900, 875, 850, 825, 800, 775, 750, 700, 650, 600, 550, 500, 450, 400, 350, 300, 250, 225, 200, 175, 150, 125, 100, 70, 50, 30, 20, 10, 7, 5, 3, 2, 1)

        - p26: pressure coordinate in hPa (1000, 975, 950, 925, 900, 850, 800, 750, 700, 650, 600, 550, 500, 450, 400, 350, 300, 250, 200, 150, 100, 70, 50, 30, 20, 10)
    - {t-info}
        - torg: native output
        - mm: monthly-mean
    - Currently the following directories are available (bracket: approx. data size per a run per 30 years for all the available variables):
        - 02560x01280.zorg.torg (192 TB)
        - 00360x00181.zorg.torg (4.7 TB)
        - 00360x00181.p26.torg (1.9 TB)
        - 00288x00145.zorg.torg (3.1 TB)
        - 00288x00145.p37.torg (1.6 TB)
        - 00144x00072.zorg.torg (0.84 TB)
        - 00144x00072.p37.torg (0.44 TB)
        - 02560x01280.zorg.mm (2.8 TB)
        - 00360x00181.zorg.mm (58 GB)
        - 00360x00181.p26.mm (33 GB)
        - 00288x00145.zorg.mm (37 GB)
        - 00288x00145.p37.mm (31 GB)
        - 00144x00072.zorg.mm (9.2 GB)
        - 00144x00072.p37.mm (7.4 GB)
        - (Total: 208 TB per a run per 30 years)
        - See datasize.xlsx for detailed information on data size.
- Convention of the variable name: {layer-type}{time-type}_{var-name}
    - {layer-type}
        - m: 3-D atmosphere
        - s: 2-D atmosphere
        - o: ocean
        - l: land
    - {time-type}
        - s: snapshot
        - a: time-mean
- Availability of the data depends on the variables, as shown in the following tables as:
    - A: 1978.06.01- or 2074.06.01-.

- B: 1986.07.27- or 2082.04.18-.
- C: 1989.07.19- or 2084.12.19-.
- D: 1991.03.27- or 2087.02.07-.

Table: List of variables for 3-D atmosphere with 6-hourly interval

var. name	description	unit	term
ms_dh	diabatic heating rate (cloud microphysics)	[K/s]	A
ms_lwhr	long wave heating rate	[K/s]	C
ms_pres	pressure	[Pa]	A
ms_qc	cloud water mixing ratio (microphysics)	[kg/kg]	A
ms_qg	graupel mixing ratio	[kg/kg]	A
ms_qi	cloud ice mixing ratio	[kg/kg]	A
ms_qr	rain mixing ratio	[kg/kg]	A
ms_qs	snow mixing ratio	[kg/kg]	A
ms_qv	water vapor mixing ratio	[kg/kg]	A
ms_rh	relative humidity	[]	A
ms_swhr	short wave heating rate	[K/s]	C
ms_tem	temperature	[K]	A
ms_u	zonal velocity	[m/s]	A
ms_v	meridional velocity	[m/s]	A
ms_w	vertical velocity	[m/s]	A

Table: List of variables for 2-D atmosphere with 6-hourly/1-hourly interval

var. name	description	unit	int.	term
sa_albedo	albedo	[0-1]	6	C
sa_cld_frac	cloud fraction	[0-1]	6	A
sa_cld_frac_1h			1	D
sa_cldi	column integrated solid water (ice water path)	[kg/m^2]	6	A
ss_cldi			6	A
sa_cldw	column integrated liquid water (liquid water path)	[kg/m^2]	6	A
ss_cldw			6	A
sa_evap	evaporation rate	[kg/m^2/s]	6	A
sa_evap_1h			1	D
ss_evap			6	A
sa_evap_energy	N/A	N/A	6	A

sa_lh_sfc sa_lh_sfc_1h ss_lh_sfc	surface latent heat flux	[W/m^2]	6 1 6	A D A
sa_lwd_sfc sa_lwd_sfc_1h ss_lwd_sfc	surface downward long-wave radiation	[W/m^2]	6 1 6	A D A
sa_lwd_sfc_c sa_lwd_sfc_c_1h ss_lwd_sfc_c	surface downward long-wave radiation (clear sky)	[W/m^2]	6 1 6	B D B
sa_lwu_sfc sa_lwu_sfc_1h ss_lwu_sfc	surface upward long-wave radiation	[W/m^2]	6 1 6	A D A
sa_lwu_sfc_c sa_lwu_sfc_c_1h ss_lwu_sfc_c	surface upward long-wave radiation (clear sky)	[W/m^2]	6 1 6	B D B
sa_lwu_toa sa_lwu_toa_1h ss_lwu_toa	TOA upward long-wave radiation (OLR)	[W/m^2]	6 1 6	A D A
sa_lwu_toa_c sa_lwu_toa_c_1h ss_lwu_toa_c	TOA upward long-wave radiation (clear-sky)	[W/m^2]	6 1 6	A D A
sa_q2m sa_q2m_1h ss_q2m ss_q2m_1h	2 m water vapor mixing ratio	[kg/kg]	6 1 6 1	A D A D
sa_sh_sfc sa_sh_sfc_1h ss_sh_sfc	surface sensible heat flux	[W/m^2]	6 1 6	A D A
sa_slp sa_slp_1h ss_slp	sea level pressure	[Pa]	6 1 6	A D A
sa_swd_sfc sa_swd_sfc_1h ss_swd_sfc	surface downward short-wave radiation	[W/m^2]	6 1 6	A D A
sa_swd_sfc_c sa_swd_sfc_c_1h	surface downward short-wave radiation (clear-sky)	[W/m^2]	6 1	B D

ss_swd_sfc_c			6	B
sa_swd_toa sa_swd_toa_1h ss_swd_toa	TOA downward short-wave radiation (insolation)	[W/m^2]	6 1 6	A D A
sa_swu_sfc sa_swu_sfc_1h ss_swu_sfc	surface upward short-wave radiation	[W/m^2]	6 1 6	A D A
sa_swu_sfc_c sa_swu_sfc_c_1h ss_swu_sfc_c	surface upward short-wave radiation (clear-sky)	[W/m^2]	6 1 6	B D B
sa_swu_toa sa_swu_toa_1h ss_swu_toa	TOA upward short-wave radiation (OSR)	[W/m^2]	6 1 6	A D A
sa_swu_toa_c sa_swu_toa_c_1h ss_swu_toa_c	TOA upward short-wave radiation (clear-sky)	[W/m^2]	6 1 6	A D A
sa_t2m sa_t2m_1h ss_t2m.ctl ss_t2m_1h	2 m temperature	[K]	6 1 6 1	A D A D
sa_tauu	surface stress by zonal velocity	[N/m^2]	6	C
sa_tauv	surface stress by meridional velocity	[N/m^2]	6	C
sa_tem_atm	mass weighted column averaged temperature	[K]	6	A
sa_tem_p80	Temperature at 80hPa	[K]	1	D
sa_tem_sfc sa_tem_sfc_1h ss_tem_sfc ss_tem_sfc_1h	surface skin temperature	[K]	6 1 6 1	A D A D
sa_tppn ss_tppn	surface precipitation rate	[kg/m^2/s]	1 6	A A
sa_tppn_energy	N/A	N/A	6	A
sa_u10m sa_u10m_1h ss_u10m ss_u10m_1h	10 m zonal velocity	[m/s]	6 1 6 1	A D A D

sa_u_p80	zonal wind at 80hPa	[m/s]	1	D
sa_v10m	10 m meridional velocity	[m/s]	6	A
sa_v10m_1h			1	D
ss_v10m			6	A
ss_v10m_1h			1	D
sa_v_p80	meridional wind at 80hPa	[m/s]	1	D
sa_vap_atm	precipitable water	[kg/m^2]	6	A
sa_vap_atm_1h			1	D
ss_vap_atm			6	A
ss_vap_atm_1h			1	D
sa_w_p80.ctl	vertical velocity at 80 hPa	[m/s]	1	D

Table: List of variables for 2-D ocean with daily interval

var. name	description	unit	term
oa_aflx	heating by nudging process	[W/m^2]	A
oa_ice	sea ice mass	[kg/m^2]	A
oa_icr	sea ice fraction	[0-1]	A
oa_ist	ice skin temperature	[K]	A
oa_snw	snow over ice	[kg/m^2]	A
oa_sst	sea surface temperature	[K]	A

Table: List of variables for land with daily interval

var. name	description	unit	term
la_lai	leaf area index	[]	A
la_rof	N/A	N/A	A
la_rofl	N/A	N/A	A
la_snw	N/A	N/A	A
la_tg	soil temperature (5 layers)	[K]	A
la_wg	soil water (5 layers)	[0-1]	A

Table: List of variables for ISCCP simulator with 6-hourly interval

var. name	description	unit	term
dfq_isccp2	cloud amount by the ISCCP simulator	[0-1]	A
ds_isccp2			B