



Introduction of the JMA's models and their Products available via the DIAS

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Office of International Affairs

Japan Meteorological Agency (JMA)



Source: <http://www.diasjp.net/en/about/>

Introduction: JMA's Goals

JMA implements its services with the following ultimate goals

Prevention and mitigation of natural disasters

Provide daily/monthly forecasts and warnings/Advisories for

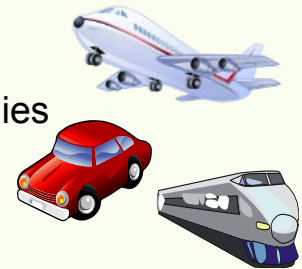
- Preparation for disasters
- Evacuation
- Risk management



Safety of transportation

Provide meteorological information to

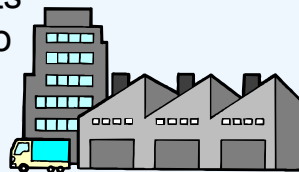
- Pilot and airline companies
- Road administrators
- Train companies



Development and prosperity of industry

Provide weather forecasts and climatological data to

- Energy companies
- Agriculture
- Other industries

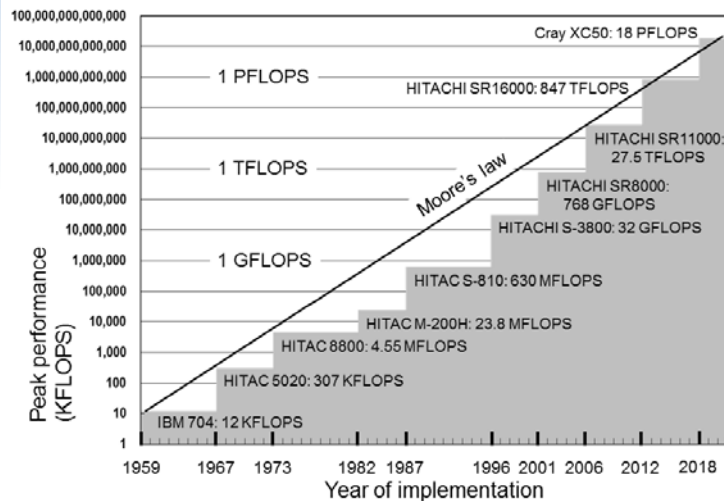


International cooperation

- International data exchange
- Technical support
- Sharing disaster information
- Collaboration to develop techniques



JMA operational NWP history for 60 years

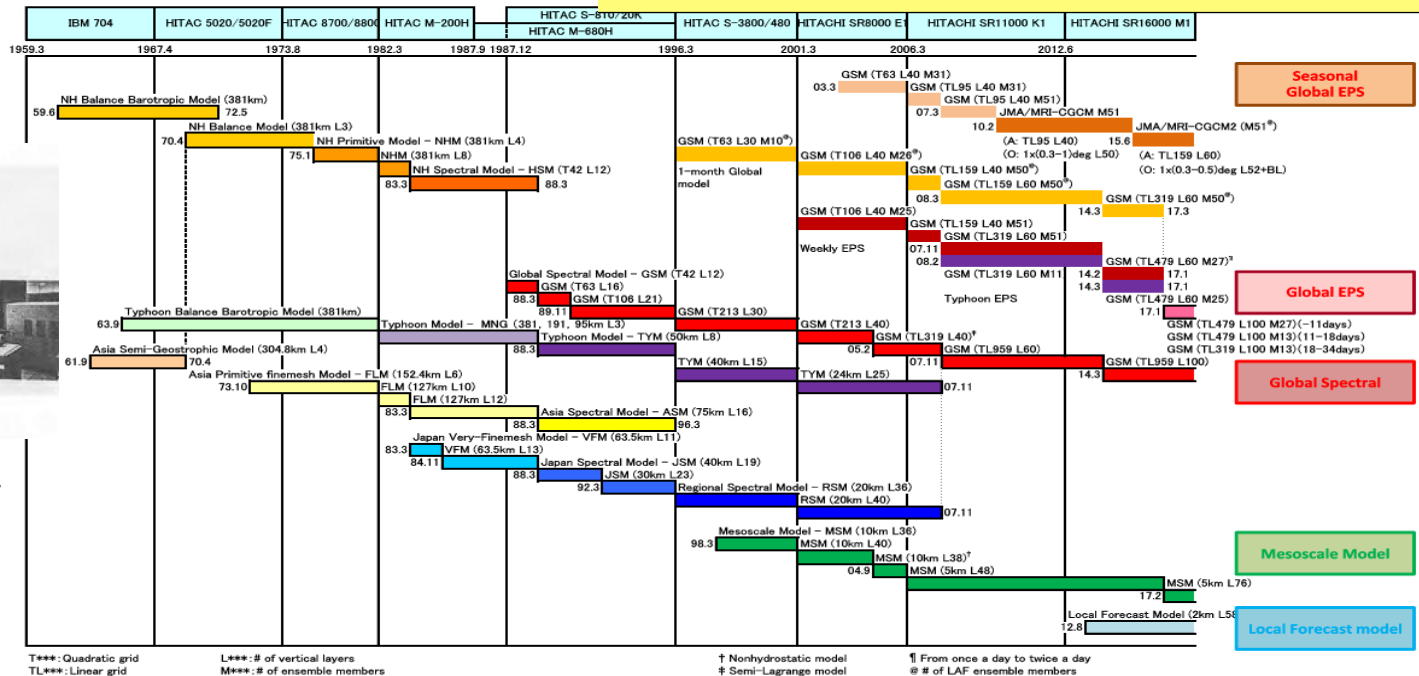


generation	Operation start	Main computer	Speed	Storage
I	1959/3	IBM-704	84 μ sec	8 KW (36bit)
II	1967/4	HITAC-5020F	3.25 μ sec	131 KW (32bit)
III	1973/8	HITAC-8700/8800	0.22 μ sec	2 MB
IV	1982/3	HITAC-M200H x2	0.084 μ sec	16 MB
V	1987/9	HITAC-M680	30 MIPS	32 MB
	1987/12	HITAC-S810	630 MFlops	64 MB + 512 MB(ES)
VI	1996/3	HITAC-S3800_480	32 GFlops	2 GB + 12 GB(ES)
VII	2001/3	HITACHI-SR8000E1	768 GFlops	640 GB
VIII	2006/3	HITACHI-SR11000K1 x 2	21.5 TFlops	10 TB
IX	2012/6	HITACHI-SR16000M1 x 2	847 TFlops	108 TB
X	2018/6	CRAY XC50	19.1PFlops	264TB

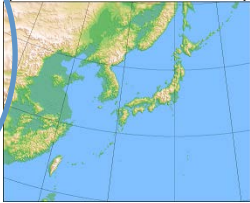
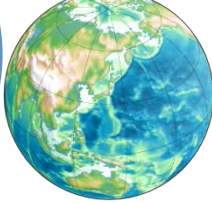


図 7.16 IBM704 の全体機器 (気象庁提供)

The First Super Computer System at JMA (1959)
IBM-704



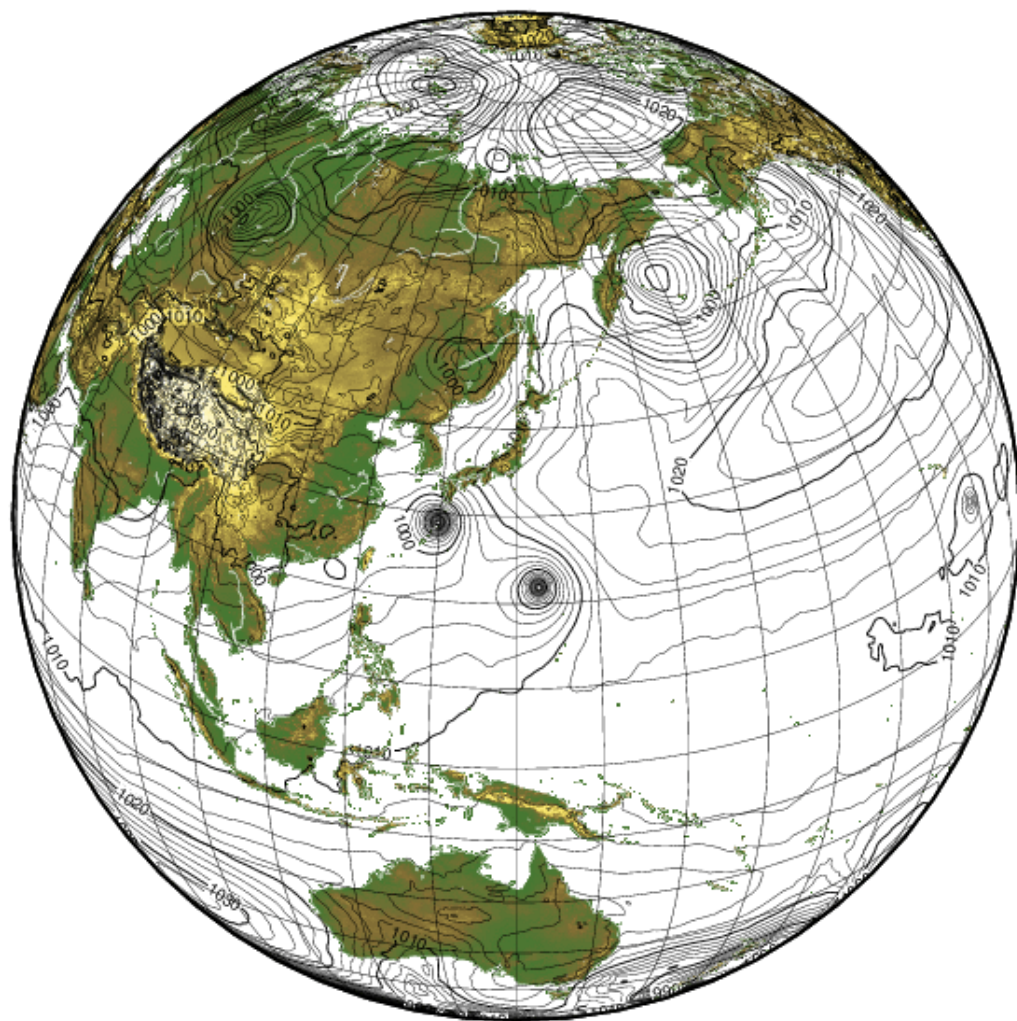
Current NWP models in JMA

	In Operation					On trial
	Global Spectral Model GSM	Meso-Scale Model MSM	Local Forecast Model LFM	Global Ensemble GEPS	Seasonal Ensemble CPS2	Meso-scale Ensemble MEPS
objectives	Short- and Medium-range forecast	Disaster reduction Aviation forecast	Aviation forecast Disaster reduction	One-week forecast Typhoon forecast Early warning on extreme weather One-month forecast	Seasonal forecast (three month forecast, cold/warm season outlook) El Nino outlook	
Forecast domain		Japan and its surroundings (4080km x 3300km) 	Japan and its surroundings (3160km x 2600km) 		Coupled Global Atmosphere and Ocean 	Japan and its surroundings (4080km x 3300km) 
Horizontal resolution	TL959 (0.1875 deg)	5km	2km	TL479 / TL319 (0.375 / 0.5625 deg)	Atmos.: 1.125 deg Ocean: 0.3-0.5x1 deg	5km
Vertical levels / Top	100 0.01 hPa	76 21.8km	58 20.2km	100 0.01 hPa	Atmos.: 60 (~0.1 hPa) Ocean: 52 with BBL* *Bottom Boundary Layer	76 21.8km
Forecast Hours (Initial time)	132 hours (00, 06, 18 UTC) 264 hours (12 UTC)	39 hours (00, 03, 06, 09, 12, 15, 18, 21 UTC)	9 hours (00-23 UTC hourly)	264 h (00, 12 UTC) 132 h (06, 18 UTC)* 27 members Extend to 432 h (4times/week) 816 h (4times/week) 13 members	210 days (00UTC) 51 members / month	39hours (00,06,12,18 UTC) 21 members
Initial Condition	Global Analysis (4D-Var)	Meso-scale Analysis (4D-Var)	Local Analysis (3D-Var)	Global Analysis with ensemble perturbations (SV, LETKF)	JRA-55 with ensemble perturbations (BGM)	Meso-scale Analysis with ensemble perturbations (SV)

* when a TC of TS intensity or higher is present or expected in the RSMC Tokyo - Typhoon Center's area of responsibility (0°–60°N, 100°E–180°).

GSM(Global Spectrum Model) on DIAS

GSM-TL959L100 2018.08.21.12UTC FT=000
(Valid Time: 08.21.12UTC)



Domain : Global
Resolution : 0.5 deg.
Vertical Levels: 18

Initial	Forecast range	Time step	files
00,06, 18 UTC	0-132 hours	6 hours	23
12UTC	0-264 hours	6 hours	45

> Changed in June 2018

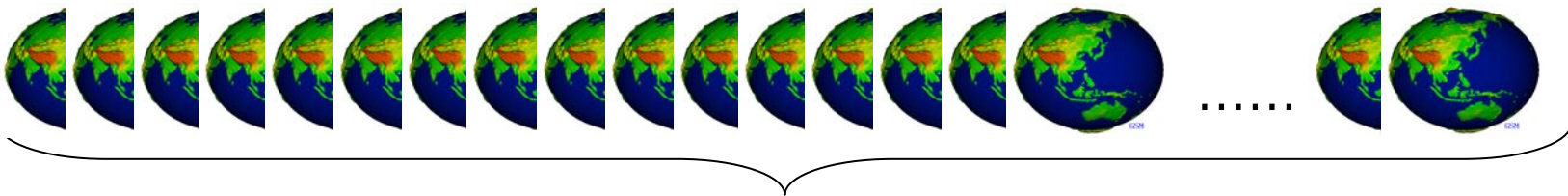
File name (for example)
Z_C_RJTD_yyyymmddhh0000_GSM
_GPV_Rgl_FD0112_grib2.bin

Global Ensemble Prediction System (GEPS) for one-week forecasts on DIAS

Domain : Global
Resolution : 1.25 deg.
Vertical Levels: 5
Ensemble : 27 members

Initial	Forecast range	Time step	files
00,12 UTC	0-264 hours	6 hours	2 (0-192,198-264)

> Changed in June 2018



27 initial conditions are integrated by using a low-resolution version of the JMA GSM.

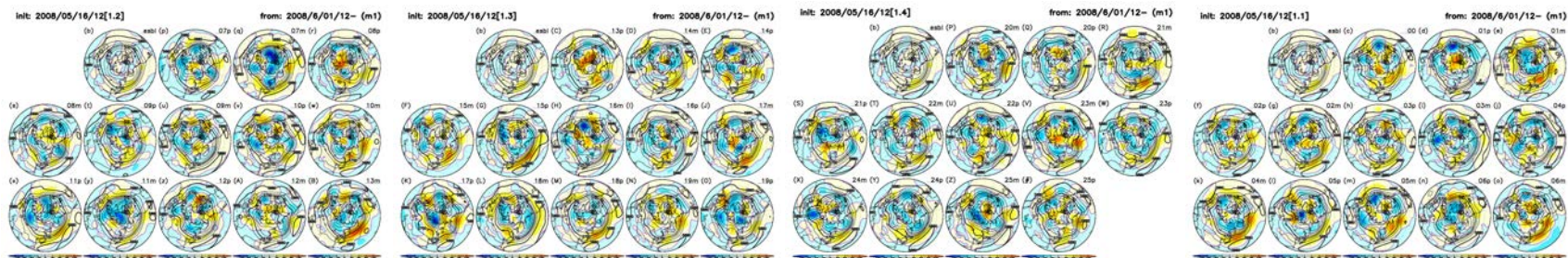
File name (for example):

Z__C_RJTD_20181021000000_EPSW_GPV_Rgl_FD0812-1100_grib2.bin

Global Ensemble Prediction System (GEPS) for one-month forecasts on DIAS

Domain : Global
Resolution : 2.5 deg.
Vertical Levels: 8
Ensemble : 50 members

creation	Forecast range	Time step	files
Wednesday	33 days	1 day	38 (variables)
Sunday	16 days		



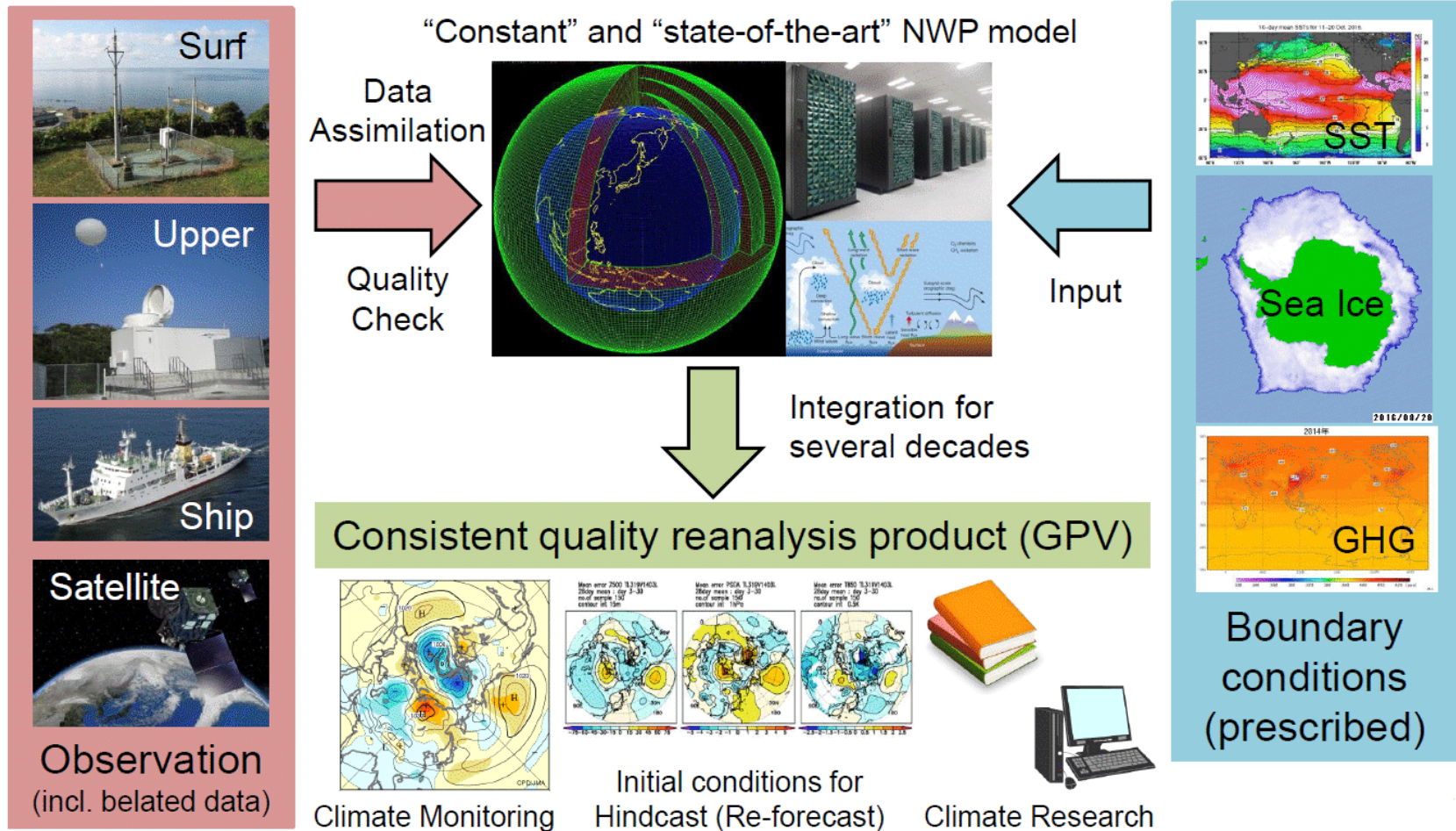
File name (for example):

Z_C_RJTD_20181017120000_EPS1_MGPV_Rgl_Lh2_Ptt_Emb_grib2.bin

Z_C_RJTD_20181021120000_EPS1_MGPV_Rgl_FD00-16_Lh2_Ptt_Emb_grib2.bin

Reanalysis

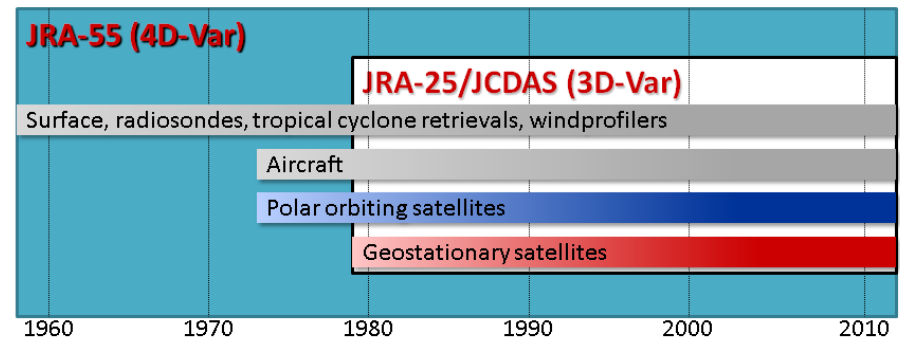
“analysis of the past atmospheric conditions using a constant, state-of-the-art NWP model and data assimilation system with the latest observation to produce a high-quality, spatially and temporally consistent dataset”



JRA-55 on DIAS



- The second JMA reanalysis (1958-2012: 55 years)
- The first comprehensive global atmospheric reanalysis that applies 4D-Var to the last half century
- Real time analysis after 2013 on going
- ~55km resolution, 60 levels



On DIAS web site:

Data access to JRA-55 (an atmospheric reanalysis) :

<http://search.diasjp.net/en/dataset/JRA55>

Data access to JRA-55C (an atmospheric reanalysis assimilating conventional observations only) :

http://search.diasjp.net/en/dataset/JRA55_C

Data access to JRA-55AMIP (JRA-55 AMIP-type simulation) :

http://search.diasjp.net/en/dataset/JRA55_AMIP

Other JMA products available on DIAS

- Global Wave Model
- Himawari8/9
- JMA Global Warming Projection
- Oceanic and Atmospheric Greenhouse Gases
Observations on JMA Research Vessels
- JMA Total ozone Dataset
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Thank you!
Danke!
谢谢!
Merci!
Благодарю вас!
Obrigado!
ありがとうございました!