Exercise Part 2
- Producing Forecasts of Winter 2013/14 -

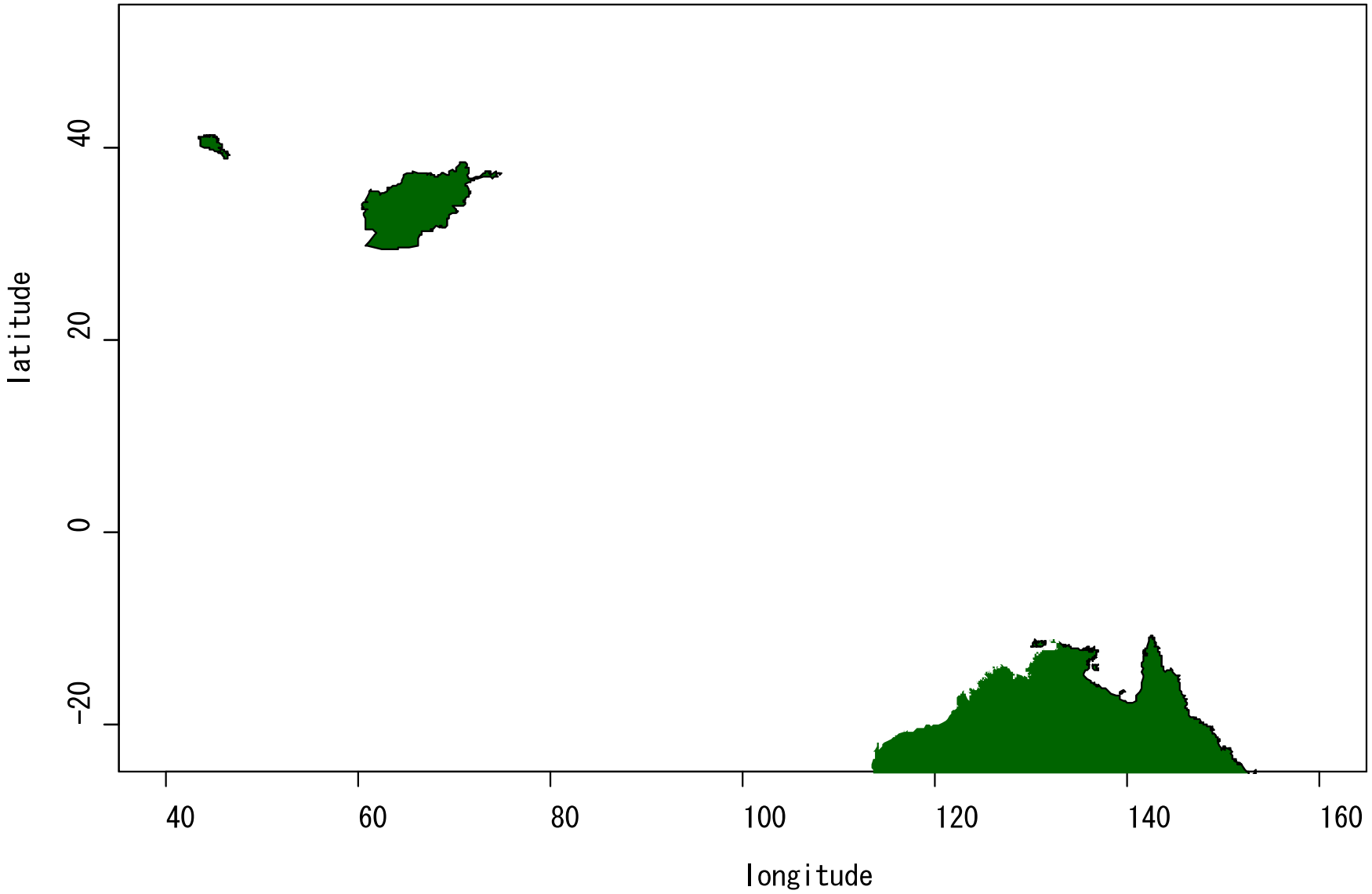
TCC Training Seminar on Seasonal Prediction Products

11-15 November 2013

Objectives

- To produce forecasts of stations in your country for winter 2013/14 using your guidance and the JMA's numerical prediction products.
- To give a presentation about your guidance and your forecast.

Contents


latitude
40
20
0
-20
40
60
80
100
120
140
160
longitude

1. Downloading the JMA's numerical prediction data for winter 2013/14

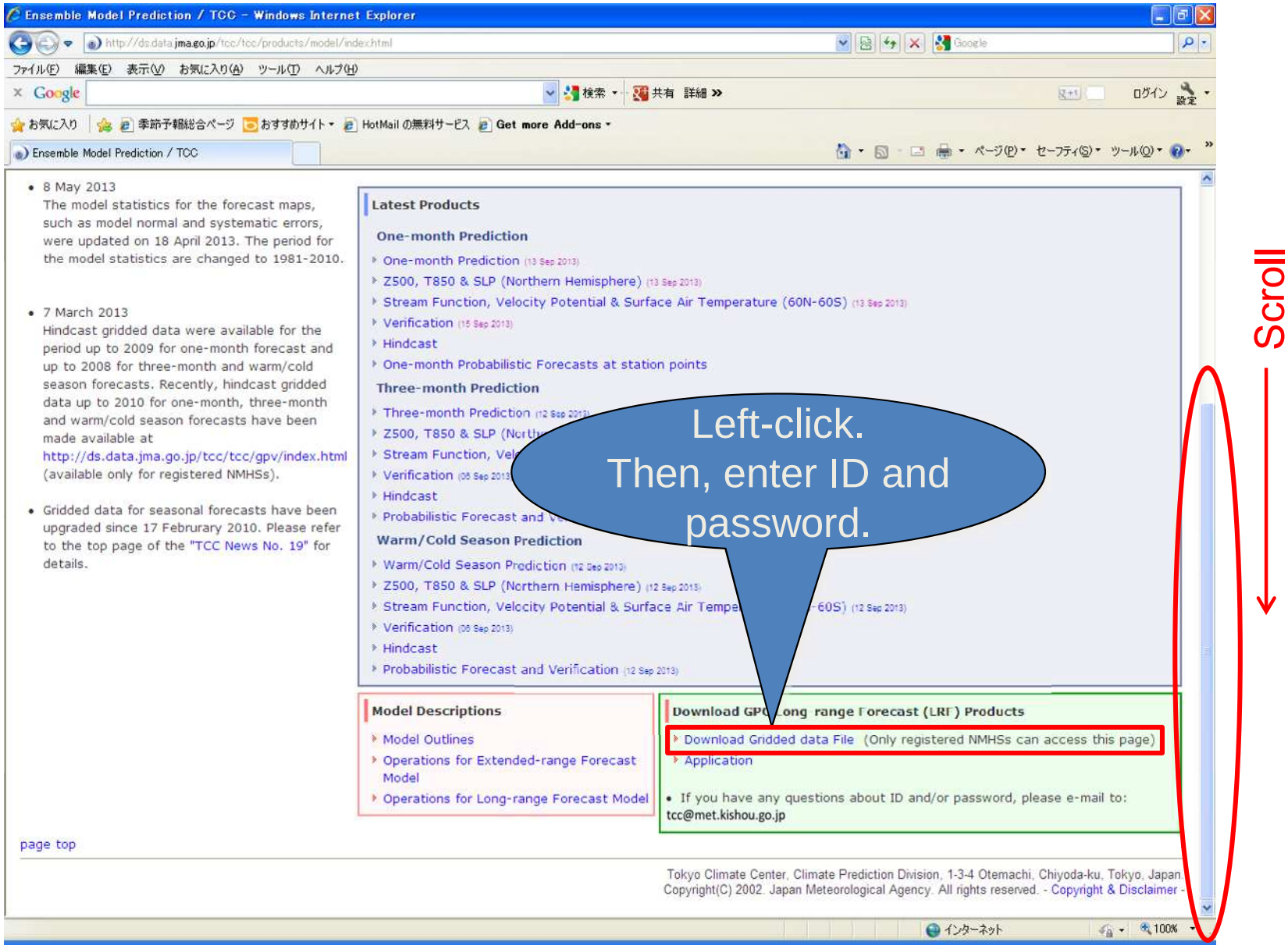
1.1 GPVs

TCC website

http://ds.data.jma.go.jp/tcc/tcc/index.html

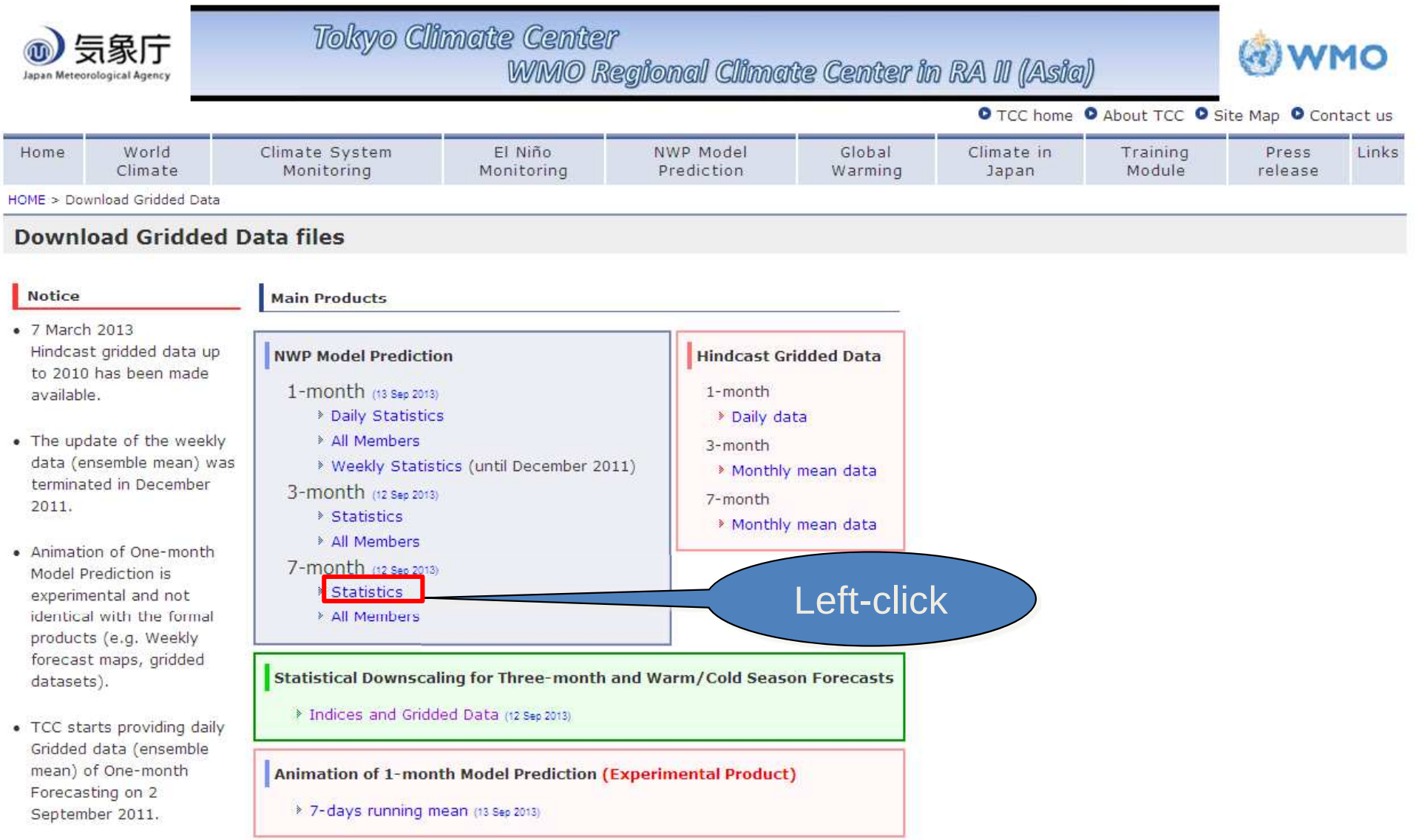
1. Downloading the JMA's numerical prediction data for winter 2013/14

1.1 GPVs



1. Downloading the JMA's numerical prediction data for winter 2013/14

1.1 GPVs



1. Downloading the JMA's numerical prediction data for winter 2013/14
1.1 GPVs

Grid point value products of Warm and Cold Season Outlook in GRIB2 format
(Ensemble statistics)

- download Grid point value (GPV) data (*201002-present*).
  - Each file is located in a folder named as 'yyyymm', which indicates year(four-digit) and month(two-digit) of an initial time. Each file name is referred in the 'File description' of the following 'Data description'.
  - The data made from old models is here: *200402-*

Left-click

- WGRIB2 to read GPV in GRIB2 format : for Linux
- Data description
  - Elements
    - U200,V200,Z500,U850,V850,T850, mean sea level pressure,precipitation,2m temperature, and SST
    - 1-month and 3-month mean and standard deviation
    - Model normals based on hindcast from 1984 to 2005.
  - Area and spatial resolution : global, 2.5° × 2.5°
  - Lead time *(please refer to operation of the EPS)*
    - Monthly mean forecast : June,July,August for Warm Season Outlook or December,January,February for Cold Season Outlook.
    - Three-month mean forecast : average of JJA (for Warm Season Outlook) or DJF (for Cold Season Outlook).
  - Ensemble size : 51 (9 BGM & 6 days with 5-day LAF)
  - Issuance day : no later than 25th
  - Format : Gridded numerical values encoded in GRIB2, which is explained at "FM92 GRIB - Edition 2" in the WMO website (http://www.wmo.int/pages/prog/www/WMOCodes.html)
  - In addition to "FM 92 GRIB - Edition 2", some local parameters are used in this product. They are shown below.
    (These parameters are supported by decoding program provided at TCC website)

Code Table 4.2 Parameter number by product discipline and parameter category

Product Discipline 0: Meteorological products, Parameter Category 1:Moisture

Number	Parameter	Units
210	Daily mean precipitation	kg m^{-2} day^{-1}
211	Daily mean precipitation anomaly	kg m^{-2} day^{-1}
212	Specific humidity anomaly	kg kg^{-1}
213	Relative humidity anomaly	%

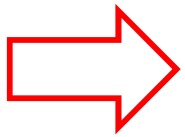
Product Discipline 0: Meteorological products, Parameter Category 2:Momentum

210	u-component of wind anomaly	m s^{-1}
211	v-component of wind anomaly	m s^{-1}

Product Discipline 10: Oceanographic products, Parameter Category 3:Surface Properties

1. Downloading the JMA's numerical prediction data for winter 2013/14

1.1 GPVs



1. Downloading the JMA's numerical prediction data for winter 2013/14

1.1 GPVs

* Information of the GRIB2 data files on the second last page (see the slide 8).

- File description
  * The geopotential height, sea level pressure, temperature and SST are calibrated by subtracting systematic error from direct model output.
    - Systematic error data is here.

File name	Element
surf_Ppp_em.yyyymm	sealevel pressure (Pa) *
surf_Papp_em.yyyymm	sealevel pressure anomaly (Pa)
surf_Pspp_em.yyyymm	standard deviation of sealevel pressure (Pa)
surf_Prr_em.yyyymm	precipitation (mm/day)
surf_Parr_em.yyyymm	precipitation anomaly (mm/day)
surf_Psrr_em.yyyymm	standard deviation of precipitaion (mm/day)
h2_Ptt_em.yyyymm	2m temperature (K) *
h2_Patt_em.yyyymm	2m temperature anomaly (K)
h2_Pstt_em.yyyymm	standard deviation of 2m temperature (K)
surf_Pss_em.yyyymm	sea surface temperature (K) *
surf_Pass_em.yyyymm	sea surface temperature anomaly (K)
p850_Pwu_em.yyyymm	850 hPa wind velocity(U) (m/s)
p850_Pawu_em.yyyymm	850 hPa wind velocity(U) anomaly (m/s)
p850_Pswu_em.yyyymm	standard deviation of 850 hPa wind velocity(U) (m/s)
p850_Pwv_em.yyyymm	850 hPa wind velocity(V) (m/s)
p850_Pawv_em.yyyymm	850 hPa wind velocity(V) anomaly (m/s)
p850_Pswv_em.yyyymm	standard deviation of 850 hPa wind velocity(V) (m/s)
p850_Ptt_em.yyyymm	850 hPa temperature (K) *
p850_Patt_em.yyyymm	850 hPa temperature anomaly (K)
p850_Pstt_em.yyyymm	standard deviation of 850 hPa temperature (K)
p500_Phh_em.yyyymm	500 hPa geopotential height (m) *
p500_Pahh_em.yyyymm	500 hPa geopotential height anomaly (m)
p500_Pshh_em.yyyymm	standard deviation of 500hPa geopotential height (m)
p200_Pwu_em.yyyymm	200 hPa wind velocity(U) (m/s)
p200_Pawu_em.yyyymm	200 hPa wind velocity(U) anomaly (m/s)
p200_Pswu_em.yyyymm	standard deviation of 200 hPa wind velocity(U) (m/s)
p200_Pwv_em.yyyymm	200 hPa wind velocity(V) (m/s)
p200_Pawv_em.yyyymm	200 hPa wind velocity(V) anomaly (m/s)
p200_Pswv_em.yyyymm	standard deviation of 200 hPa wind velocity(V) (m/s)

* In this case, select the data of 2m temperature anomaly (h2_patt_em.yyyymm).

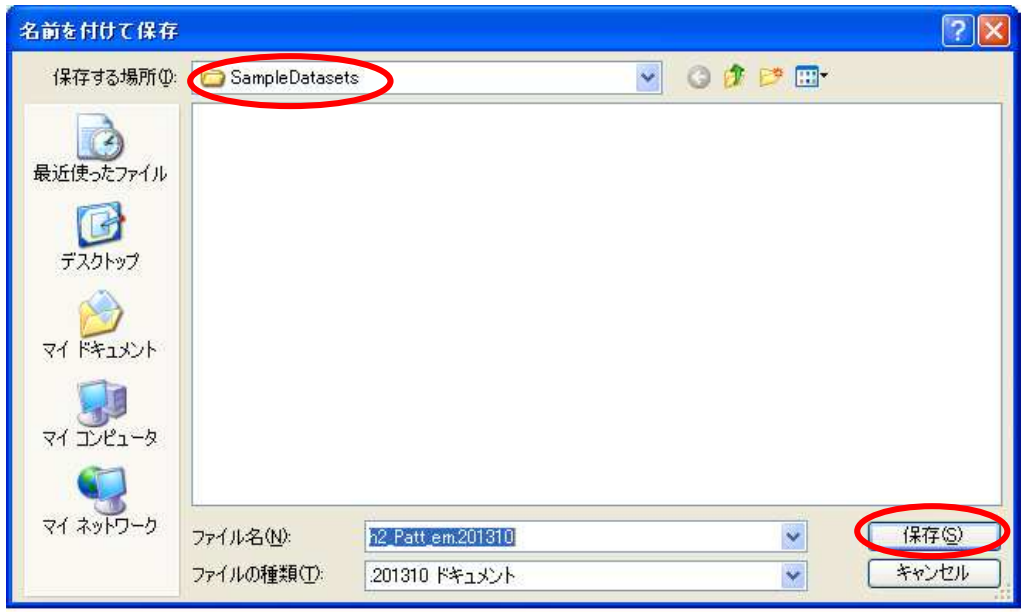
1. Downloading the JMA's numerical prediction data for winter 2013/14

1.1 GPVs

Index of /model/gpv/7mE/GPV/201310

Name	Size
Parent Directory	
h2_Patt_em.201310	83K
h2_Pstt_em.201310	83K
h2_Ptt_em.201310	83K
p200_Pawu_em.201310	83K
p200_Pawv_em.201310	83K
p200_Pswu_em.201310	83K
p200_Pswv_em.201310	83K
p200_Pwu_em.201310	83K
p200_Pwv_em.201310	83K
p500_Pahh_em.201310	83K
p500_Phh_em.201310	83K
p500_Pshh_em.201310	83K
p850_Patt_em.201310	83K
p850_Pawu_em.201310	83K
p850_Pawv_em.201310	83K
p850_Pstt_em.201310	83K
p850_Pswu_em.201310	83K
p850_Pswv_em.201310	83K
p850_Ptt_em.201310	83K
p850_Pwu_em.201310	83K
p850_Pwv_em.201310	83K
surf_Papp_em.201310	83K
surf_Parr_em.201310	83K
surf_Pass_em.201310	59K
surf_Ppp_em.201310	83K
surf_Prr_em.201310	83K

Right-click.
Then, save the file.



Save the file to
"C:¥OpenGrADS¥Contents¥Resources¥SampleDatasets¥".

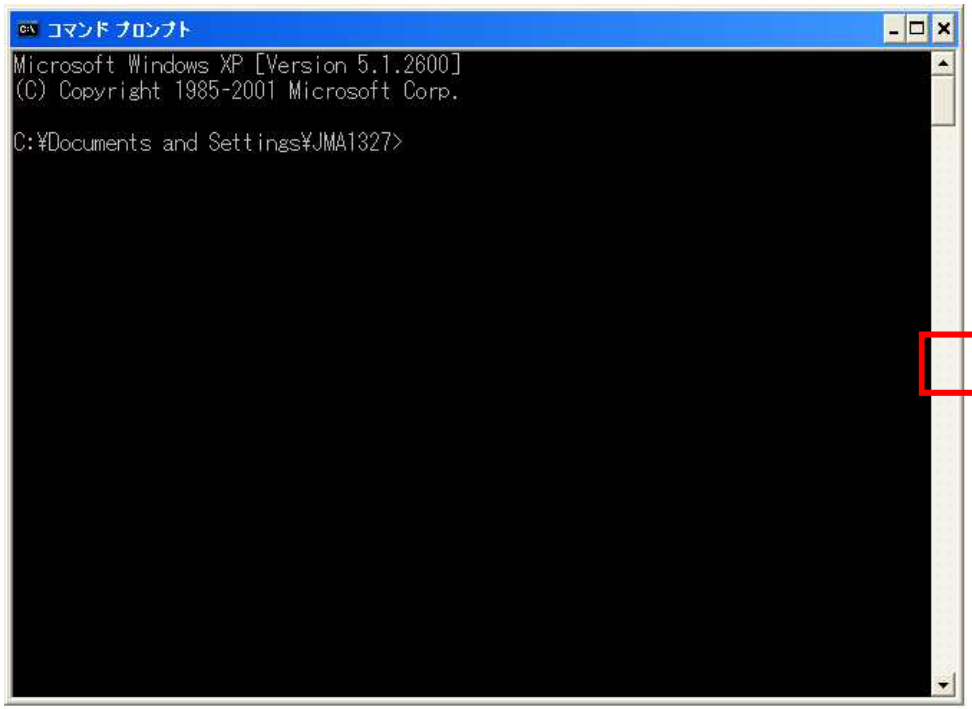
* Install OpenGrADS to "C:¥" in advance (before saving the file).
"Wgrib2" in OpenGrADS will be necessary in the next step.

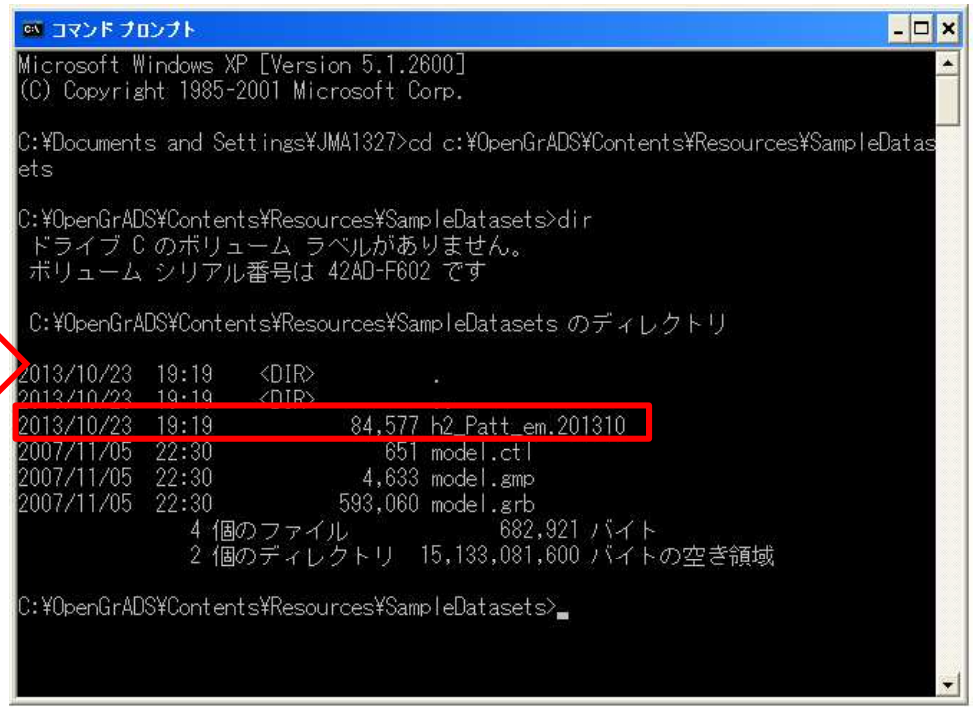
1. Downloading the JMA's numerical prediction data for winter 2013/14

1.1 GPVs

Select Windows "command prompt".

Input
"cd c:¥OpenGrADS¥Contents¥Resources¥SampleDatasets".
and input
"dir".





1. Downloading the JMA's numerical prediction data for winter 2013/14

1.1 GPVs

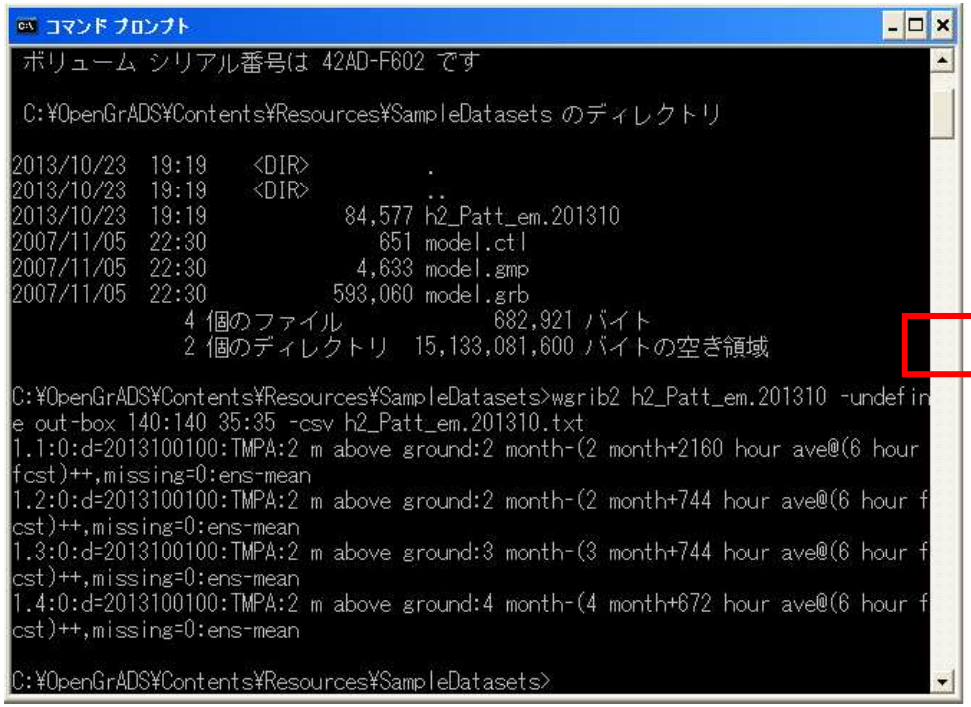
Produce a text data file from the GRIB2 data file. That is to say, input

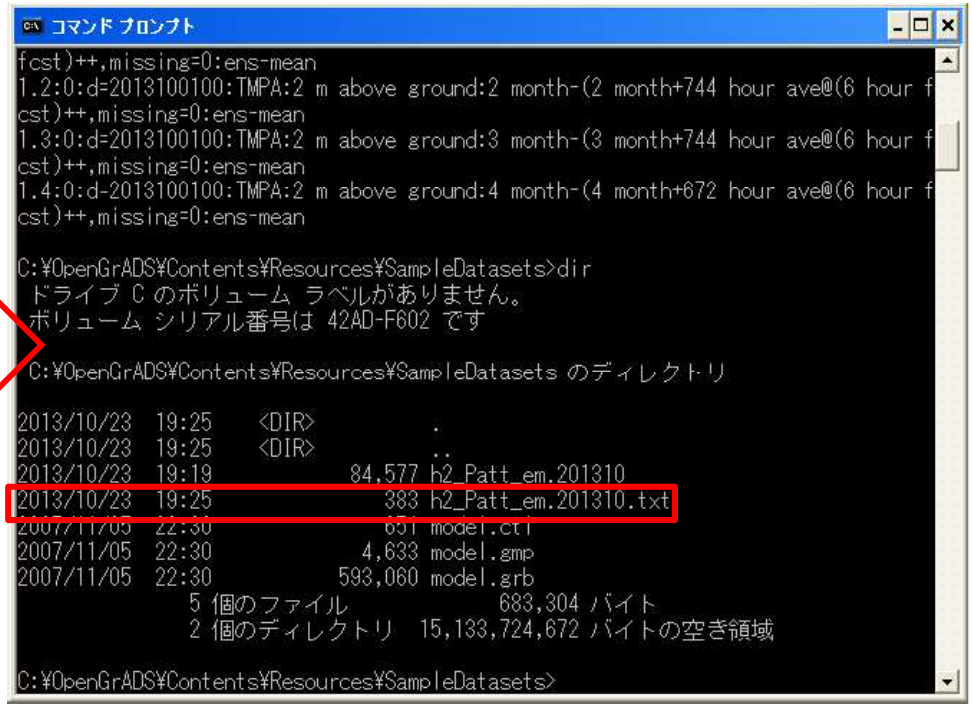
"wgrib2 -undefine out-box $lon:$lon $lat:$lat -csv

$lon : longitude (e.g. 140 for Tokyo)

$lat : latitude (e.g. 35 for Tokyo, 10S => -10)

Then, check the new file has been created in the directory. That is to say, input "dir".

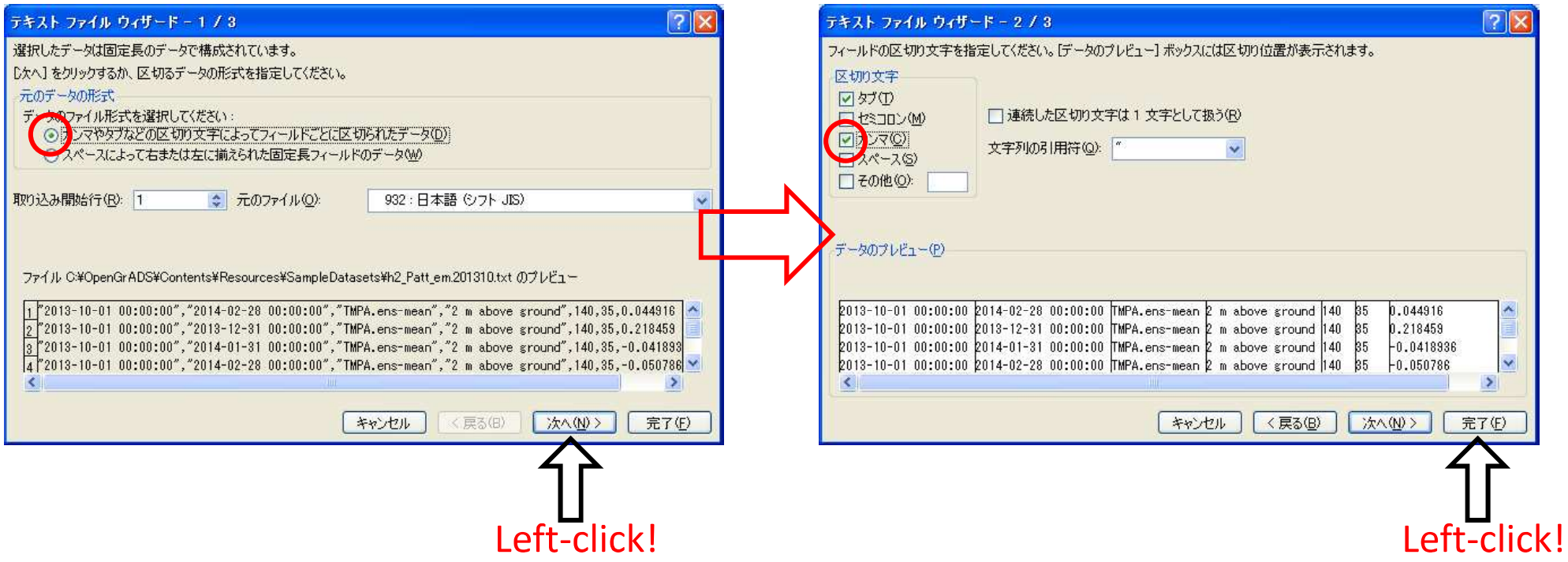




1. Downloading the JMA's numerical prediction data for winter 2013/14

1.1 GPVs

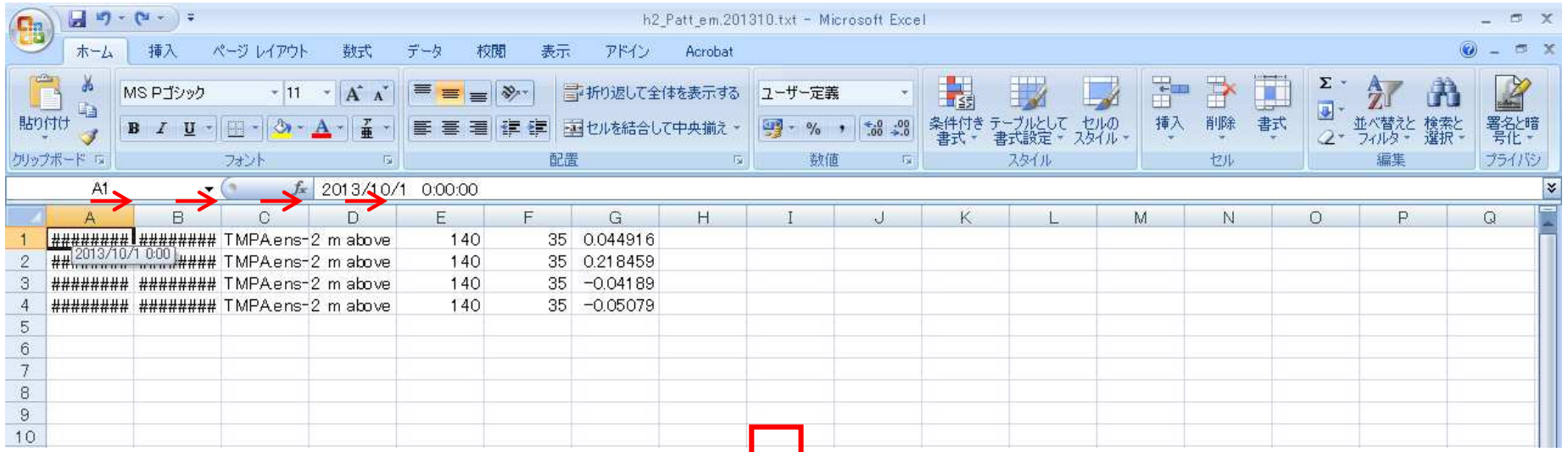
Start up Excel and open
"c:¥OpenGrADS¥Contents¥Resources¥SampleDatasets¥ ".

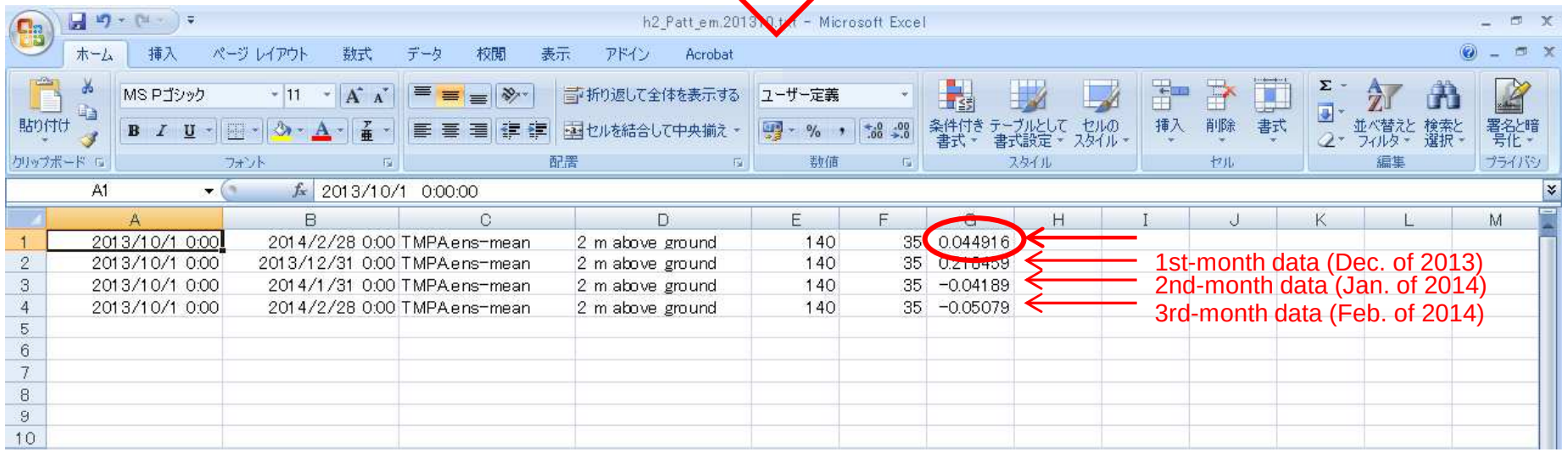


1. Downloading the JMA's numerical prediction data for winter 2013/14

1.1 GPVs

Widen the columns "A", "B", "C", and "D".





You have been able to download the JMA's numerical prediction GPV data!

1. Downloading the JMA's numerical prediction data for winter 2013/14

1.2 Indices

TCC website

http://ds.data.jma.go.jp/tcc/tcc/index.html

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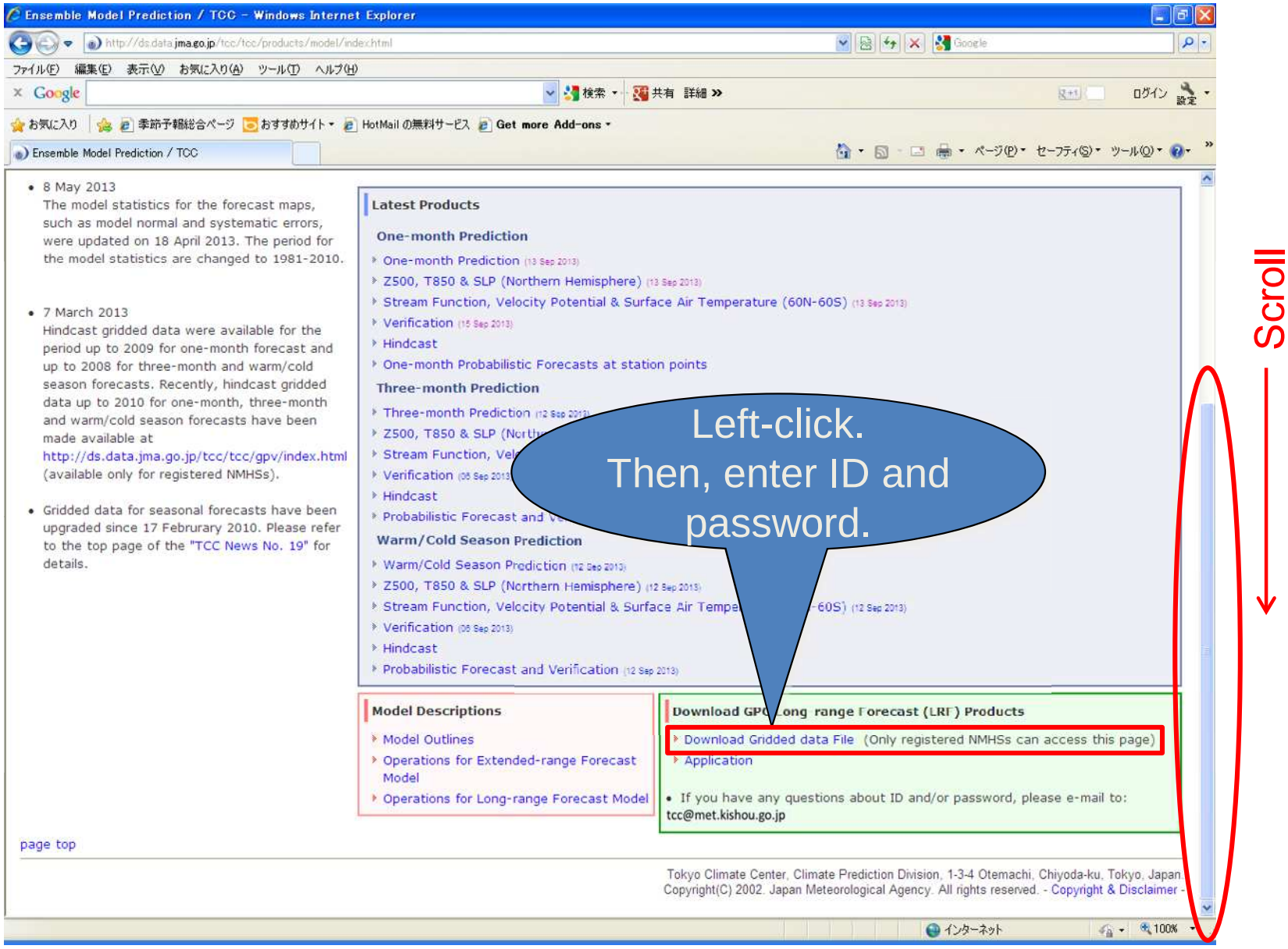
1.2 Indices



1. Downloading the JMA's numerical prediction data for winter 2013/14
1.2 Indices

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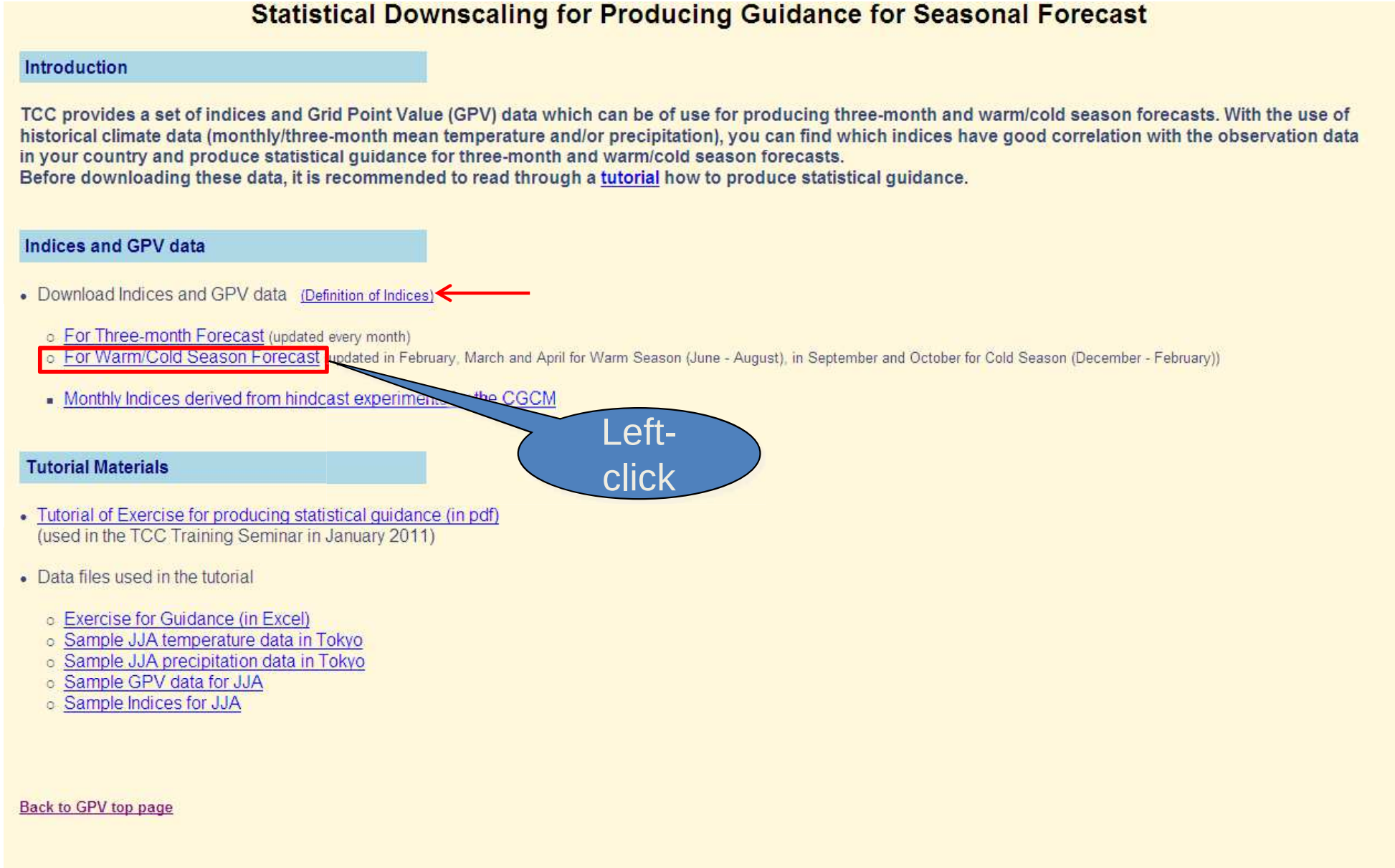

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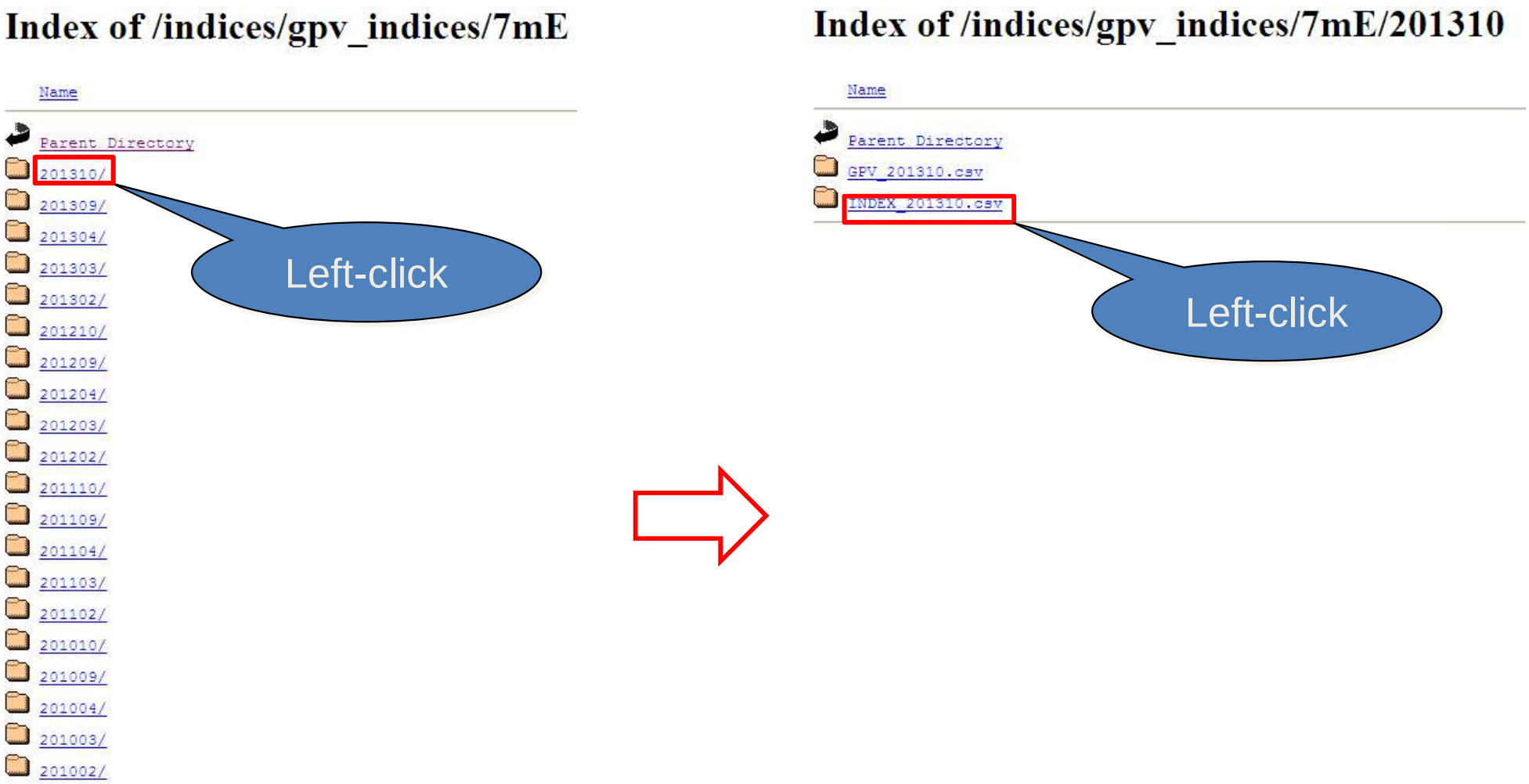
1.2 Indices



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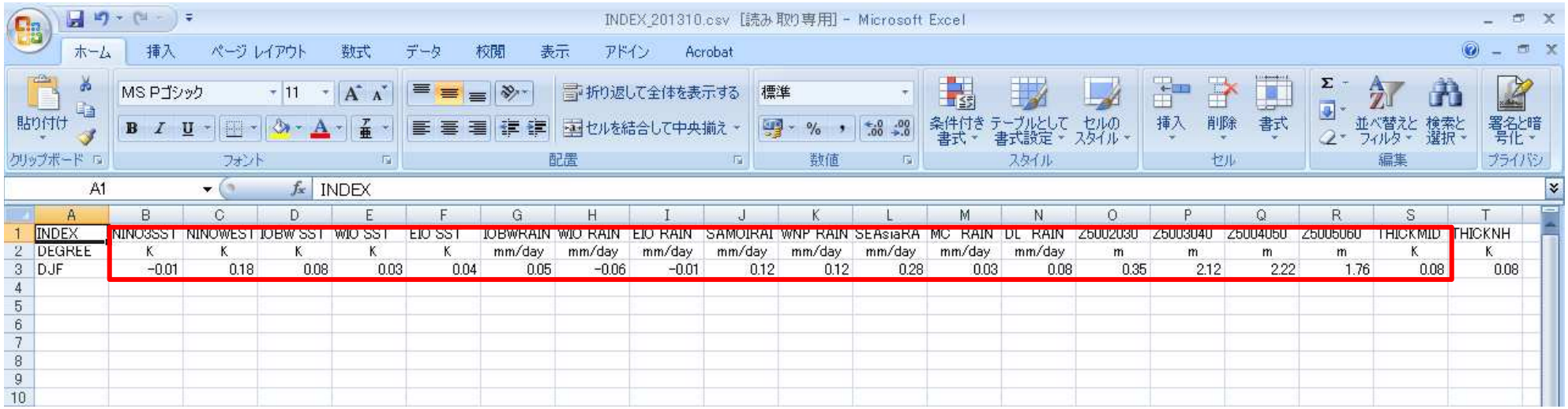
1.2 Indices



INDEX	NINO3SST	NINOWEST	IOBW SST	WIO SST	EIO SST	IOBWRAIN	WIO RAIN	EIO RAIN	SAMOIRAI	WNP RAIN	SEAsiaRA	MC RAIN	DL RAIN	Z5002030	Z5003040	Z5004050	Z5005060	THICKMID	THICKNH
DEGREE	K	K	K	K	K	mm/day	mm/day	mm/day	mm/day	mm/day	mm/day	mm/day	mm/day	m	m	m	m	K	K
DJF	-0.01	0.18	0.08	0.03	0.04	0.05	-0.06	-0.01	0.12	0.12	0.28	0.03	0.08	0.35	2.12	2.22	1.76	0.08	0.08

indices	variables	areas
NINO3 SST	SST	(150W-90W, 5S-5N)
NINOWEST SST	SST	(130E-150E, EQ-15N)
IOBW SST	SST	(40E-100E, 20S-20N)
WIO SST	SST	(40E-70E, 0-20N)
EIO SST	SST	(70E-100E, 0-20N)
IOBW RAIN	RAIN	(40E-100E, 20S-20N)
WIO RAIN	RAIN	(40E-70E, 0-20N)
EIO RAIN	RAIN	(70E-100E, 0-20N)
SAMOI RAIN	RAIN	(80E-140E, 5N-25N)
WNP RAIN	RAIN	(110E-160E, 10N-20N)
SEAsia RAIN	RAIN	(115E-140E, 10N-20N)
MC RAIN	RAIN	(110E-135E, 5S-5N)
DL RAIN	RAIN	(170E-170W, 5S-5N)
Z2030	500hPa Height	(0-360, 20N-30N)
Z3040	500hPa Height	(0-360, 30N-40N)
Z4050	500hPa Height	(0-360, 40N-50N)
Z5060	500hPa Height	(0-360, 50N-60N)
THMD	Thickness Middle	(0-360, 30N-50N, 300hPa-850hPa)
THEX	Thickness extratropic	(0-360, 30N-90N, 300hPa-850hPa)
THTR	Thickness tropic	(0-360, 25S-25N, 100hPa-850hPa)

Please use the following values, if necessary.

THEX: 0.09

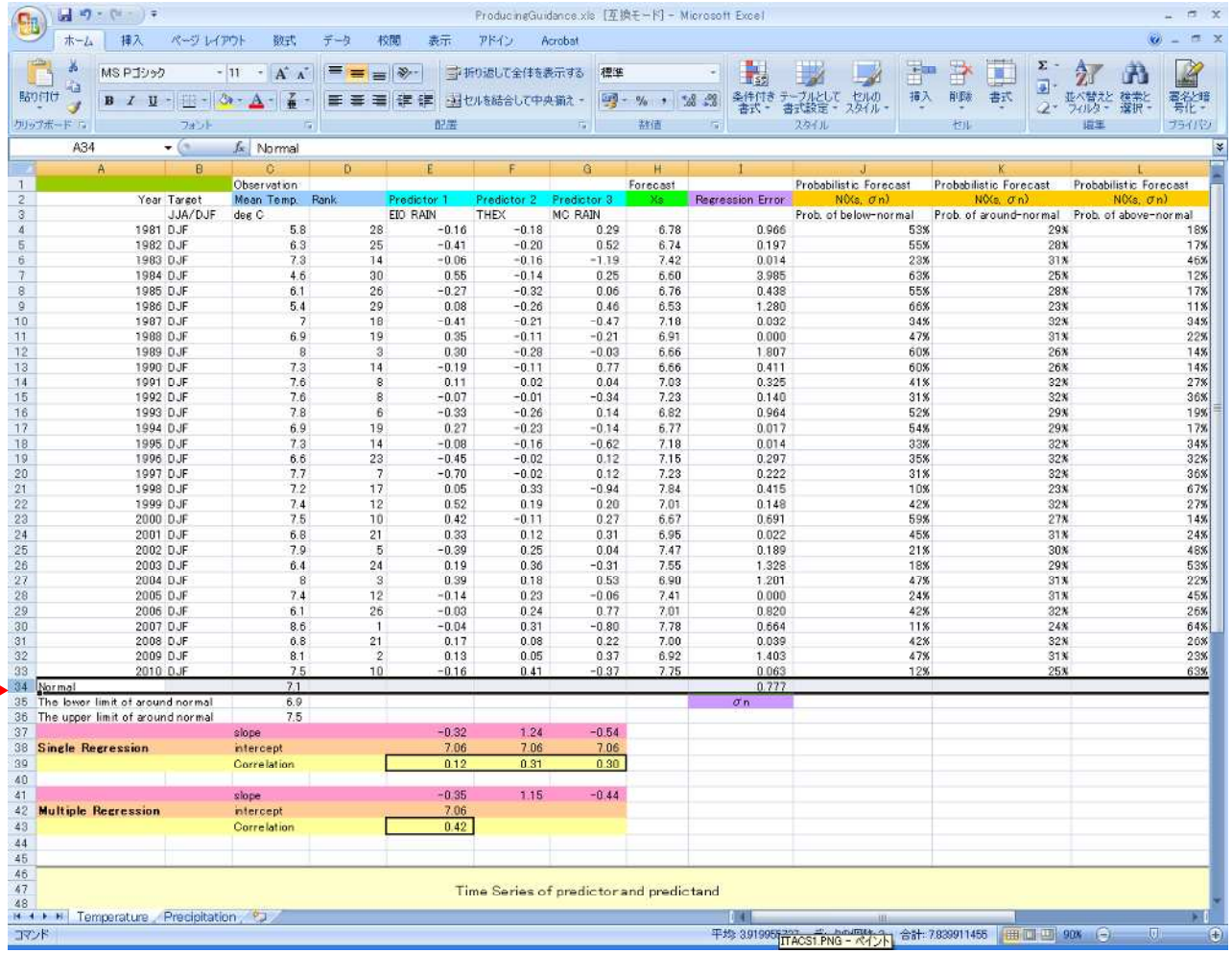
THTR: 0.23

Sorry, not available now.

2. Performing calculations of your guidance for winter 2013/14

- Open your ProducingGuidance.xls.
- Select the line 34.

Select!

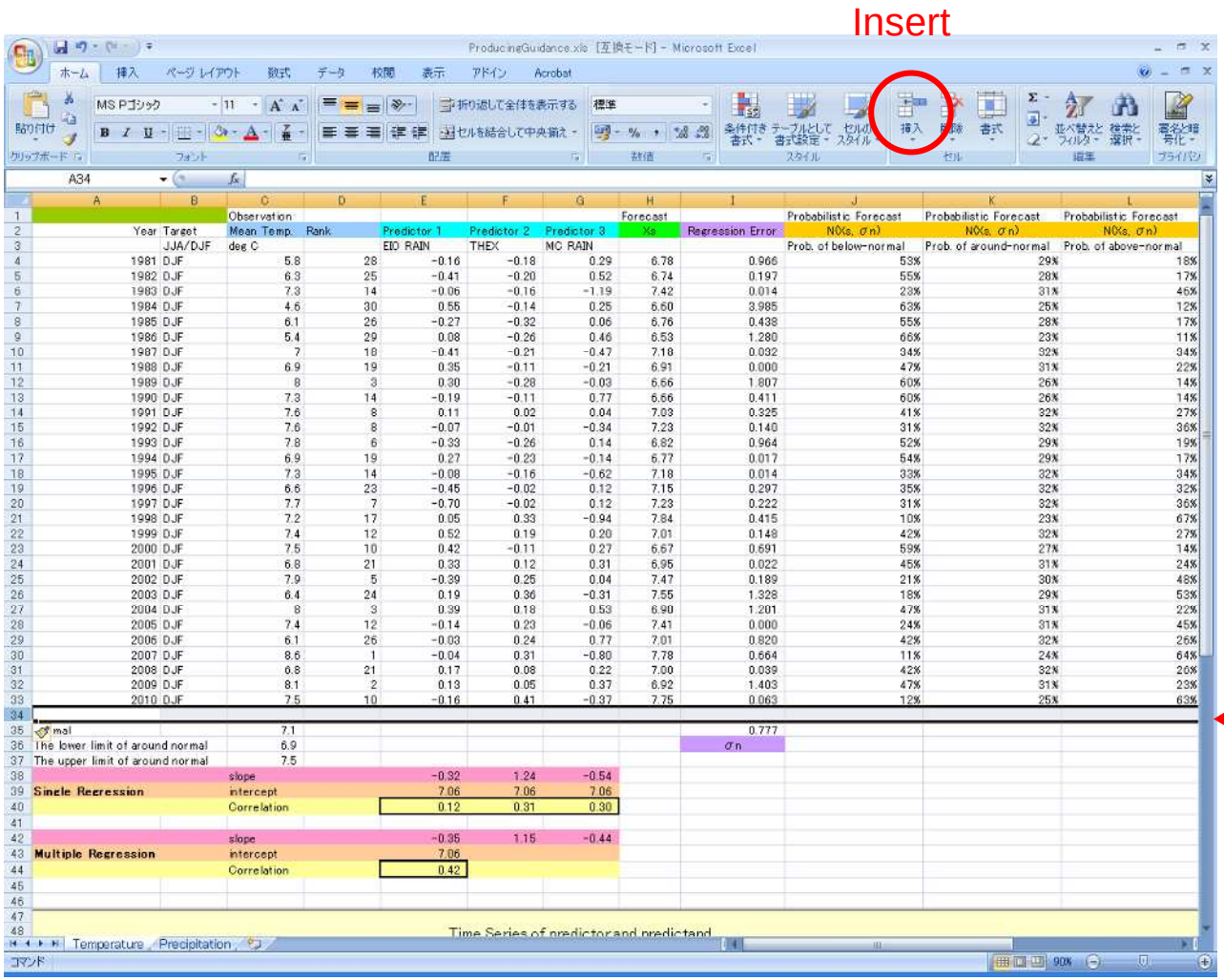


	A	B	C	D	E	F	G	H	I	J	K	L
1			Observation					Forecast		Probabilistic Forecast	Probabilistic Forecast	Probabilistic Forecast
2	Year	Target	Mean Temp.	Rank	Predictor 1	Predictor 2	Predictor 3	Xs	Regression Error	N(Xs, σ'n)	N(Xs, σ'n)	N(Xs, σ'n)
3		JJA/DJF	deg C		EIO RAIN	THEX	MC RAIN			Prob. of below-normal	Prob. of around-normal	Prob. of above-normal
4	1981	DJF	5.8	28	-0.16	-0.18	0.29	6.78	0.966	53%	29%	18%
5	1982	DJF	6.3	25	-0.41	-0.20	0.52	6.74	0.197	55%	28%	17%
6	1983	DJF	7.3	14	-0.06	-0.16	-1.19	7.42	0.014	23%	31%	46%
7	1984	DJF	4.6	30	0.55	-0.14	0.25	6.60	3.985	63%	25%	12%
8	1985	DJF	6.1	26	-0.27	-0.32	0.06	6.76	0.438	55%	28%	17%
9	1986	DJF	5.4	29	0.08	-0.26	0.46	6.53	1.280	66%	23%	11%
10	1987	DJF	7	18	-0.41	-0.21	-0.47	7.18	0.032	34%	32%	34%
11	1988	DJF	6.9	19	0.35	-0.11	-0.21	6.91	0.000	47%	31%	22%
12	1989	DJF	8	3	0.30	-0.28	-0.03	6.66	1.807	60%	26%	14%
13	1990	DJF	7.3	14	-0.19	-0.11	0.77	6.66	0.411	60%	26%	14%
14	1991	DJF	7.6	8	0.11	0.02	0.04	7.03	0.325	41%	32%	27%
15	1992	DJF	7.6	8	-0.07	-0.01	-0.34	7.23	0.140	31%	32%	36%
16	1993	DJF	7.8	6	-0.33	-0.26	0.14	6.82	0.964	52%	29%	19%
17	1994	DJF	6.9	19	0.27	-0.23	-0.14	6.77	0.017	54%	29%	17%
18	1995	DJF	7.3	14	-0.08	-0.16	-0.62	7.18	0.014	33%	32%	34%
19	1996	DJF	6.6	23	-0.45	-0.02	0.12	7.15	0.297	35%	32%	32%
20	1997	DJF	7.7	7	-0.70	-0.02	0.12	7.23	0.222	31%	32%	36%
21	1998	DJF	7.2	17	0.05	0.33	-0.94	7.84	0.415	10%	23%	67%
22	1999	DJF	7.4	12	0.52	0.19	0.20	7.01	0.148	42%	32%	27%
23	2000	DJF	7.5	10	0.42	-0.11	0.27	6.57	0.691	59%	27%	14%
24	2001	DJF	6.8	21	0.33	0.12	0.31	6.95	0.022	45%	31%	24%
25	2002	DJF	7.9	5	-0.39	0.25	0.04	7.47	0.189	21%	30%	48%
26	2003	DJF	6.4	24	0.19	0.36	-0.31	7.55	1.328	18%	29%	53%
27	2004	DJF	8	3	0.39	0.18	0.53	6.90	1.201	47%	31%	22%
28	2005	DJF	7.4	12	-0.14	0.23	-0.06	7.41	0.000	24%	31%	45%
29	2006	DJF	6.1	26	-0.03	0.24	0.77	7.01	0.820	42%	32%	26%
30	2007	DJF	8.6	1	-0.04	0.31	-0.80	7.78	0.664	11%	24%	64%
31	2008	DJF	6.8	21	0.17	0.08	0.22	7.00	0.039	42%	32%	26%
32	2009	DJF	8.1	2	0.13	0.05	0.37	6.92	1.403	47%	31%	23%
33	2010	DJF	7.5	10	-0.16	0.41	-0.37	7.75	0.063	12%	25%	63%
34	Normal		7.1						0.777			
35	The lower limit of around normal		6.9						σ'n			
36	The upper limit of around normal		7.5									
37			slope		-0.32	1.24	-0.54					
38	Single Regression		intercept		7.06	7.06	7.06					
39			Correlation		0.12	0.31	0.30					
40												
41			slope		-0.35	1.15	-0.44					
42	Multiple Regression		intercept		7.06							
43			Correlation		0.42							
44												
45												
46												
47					Time Series of predictor and predictand							
48												

In this case, the predictand is temperature and the station is Tokyo.

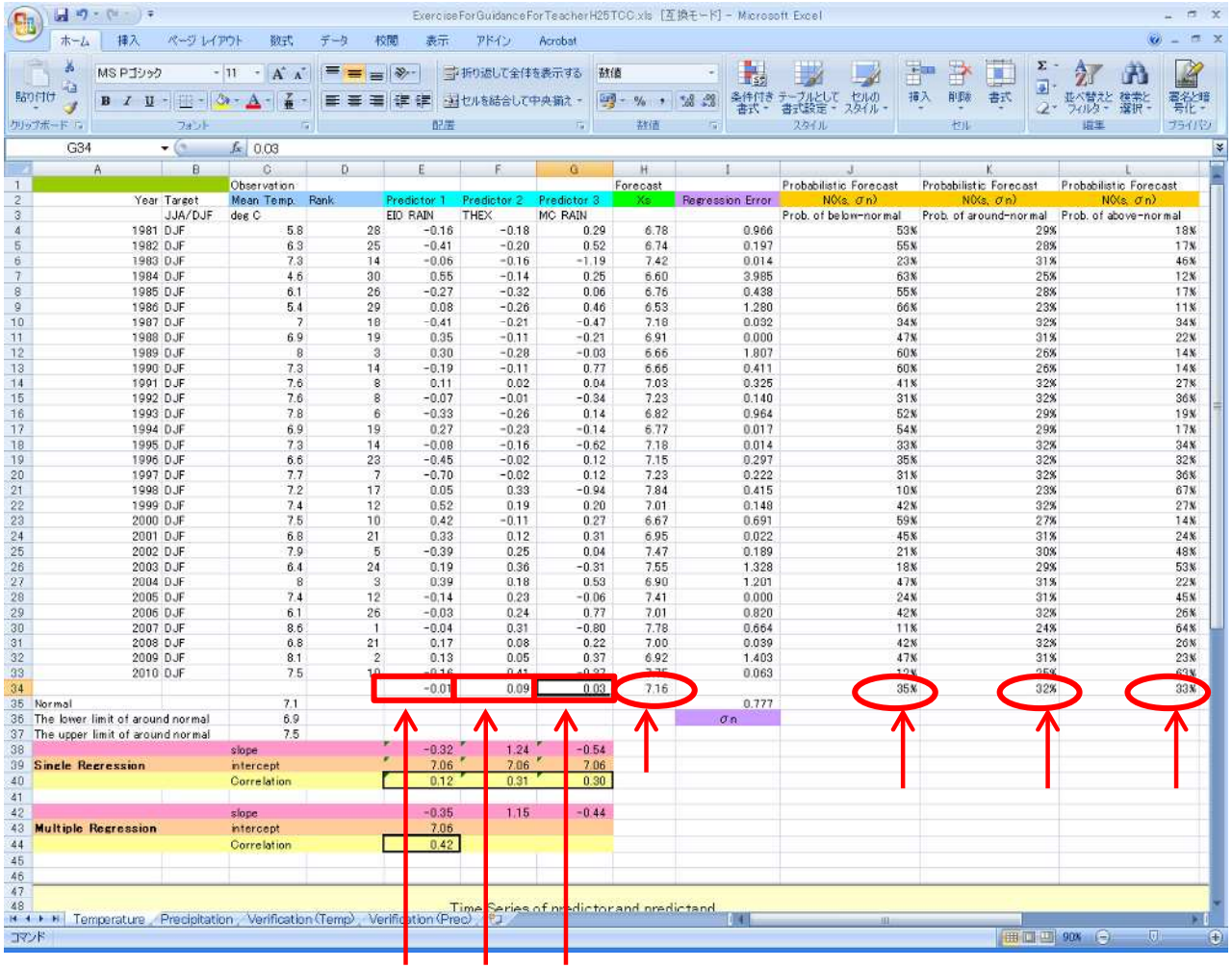
2. Performing calculations of your guidance for winter 2013/14

- Select “Insert” Select “Insert-line”



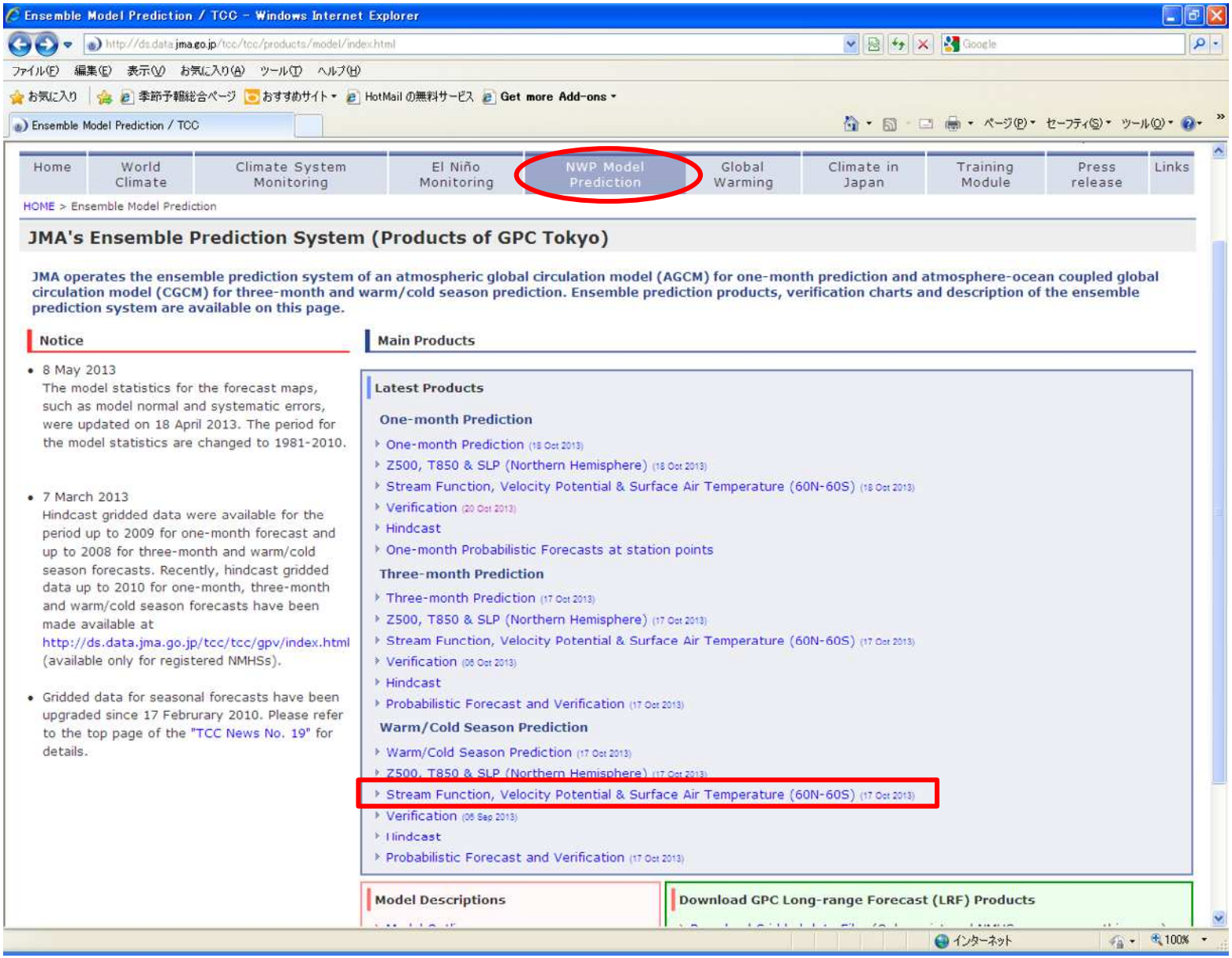
2. Performing calculations of your guidance for winter 2013/14

- Input the values of the downloaded predictor data into the cells E34, F34, and G34.
- The predicted value and probabilities are automatically shown at H34 and from J34 to L34.



3. Interpreting the JMA's numerical prediction products for winter 2013/14

How to obtain forecast maps of warm/cold season prediction



3. Interpreting the JMA's numerical prediction products for winter 2013/14

How to obtain forecast maps of warm/cold season prediction

forecast map

initial date
2013.10.13.00Z

Forecast range : 3 months mean
[initial : Feb,Mar,Apr
=> average of JJA (for worm season outlook)]
[initial : Sep,Oct
=> average of DJF (for cold season outlook)]

area
- (•) 60N-60S
- ( ) Asia

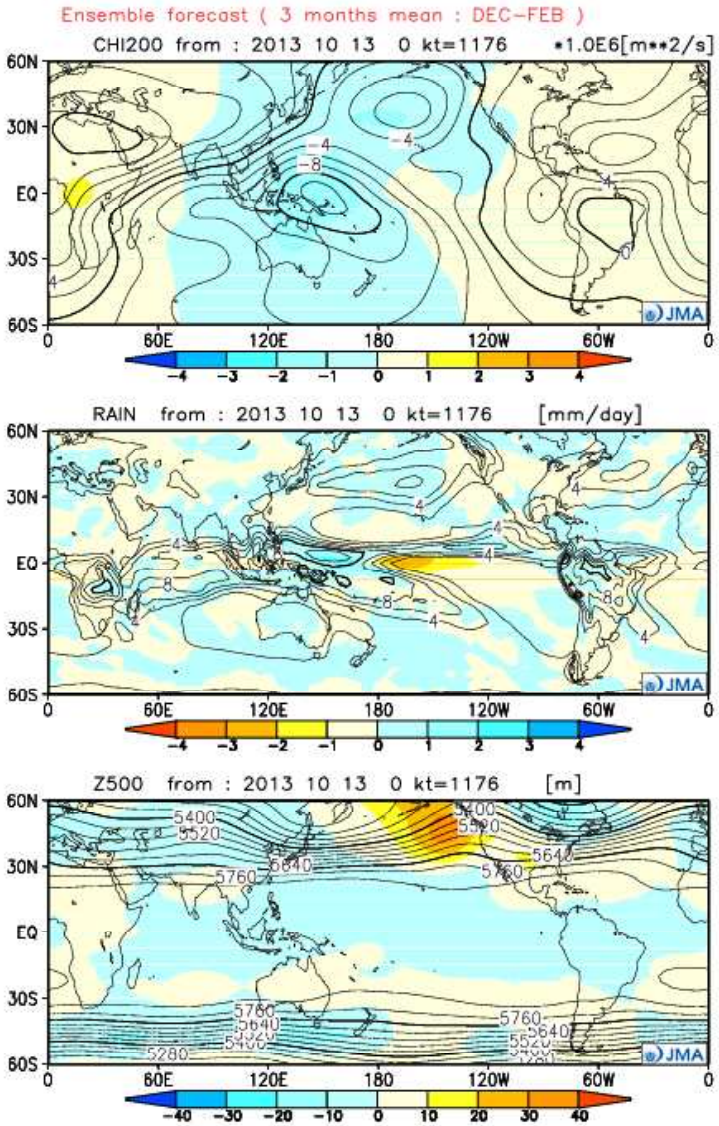
data
- (•) ensemble mean forecast
- ( ) ensemble mean forecast (mask [msss < 0] area)

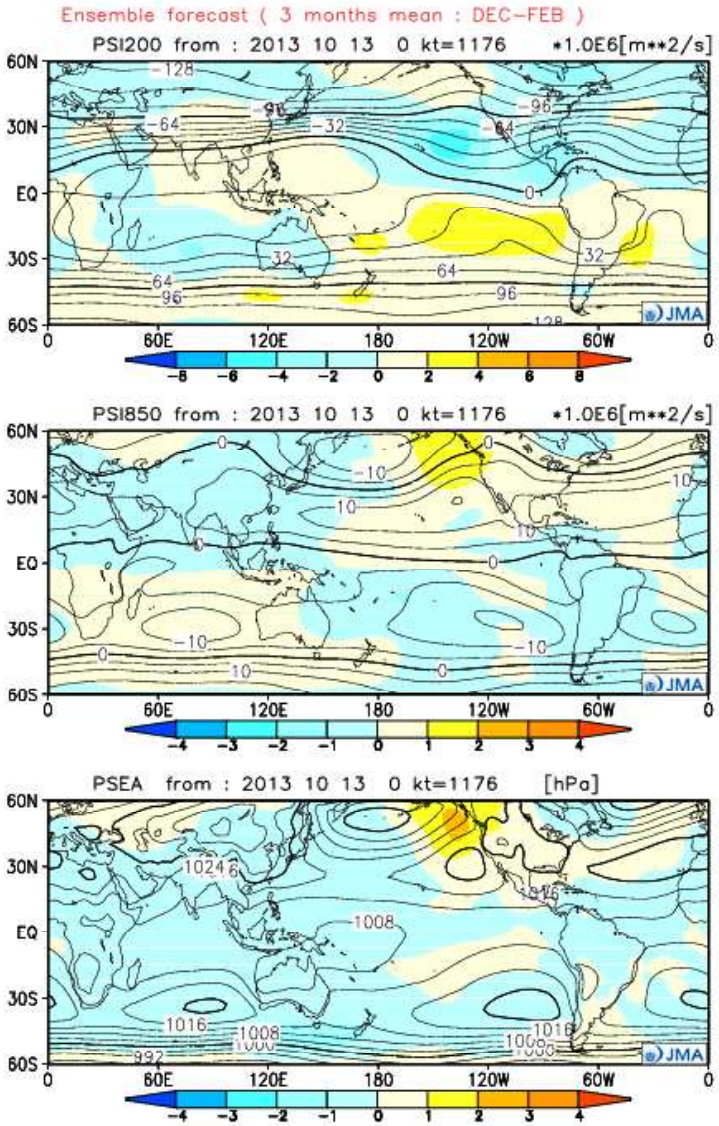
msss : Mean Square Skill Score

- ( ) spread and anomaly

coresponding verification

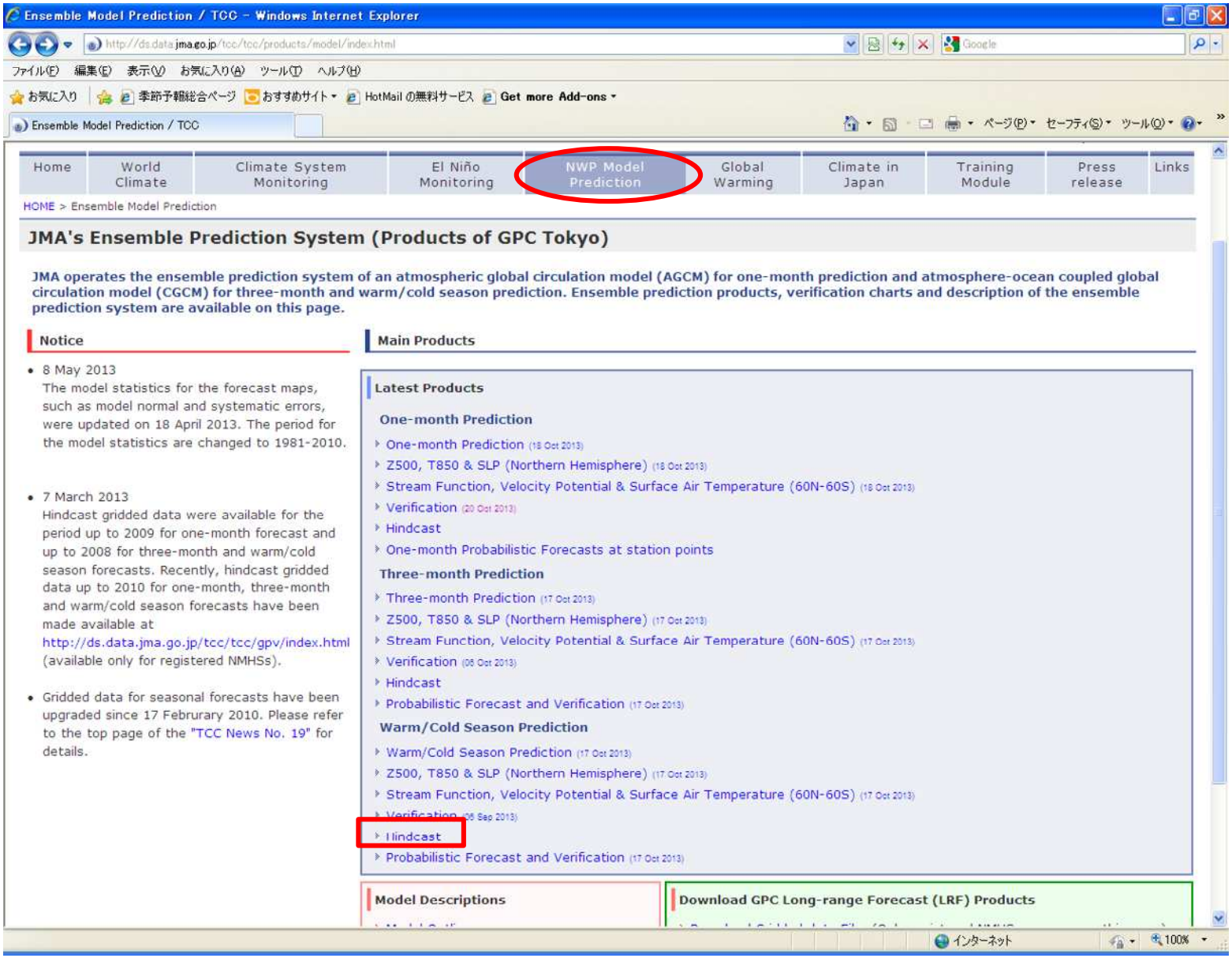
[forecast]
Contour show forecast, and shaded pattern show anomalies. Contour interval
CHI200 : 2x1.0E6m^2/s
RAIN : 2mm/day
Z500 : 60m(area:60N-60S), 20m (area:Asia)
TS : 4C
SST : 2C





3. Interpreting the JMA's numerical prediction products for winter 2013/14

How to obtain verification maps of warm/cold season prediction (hindcast)



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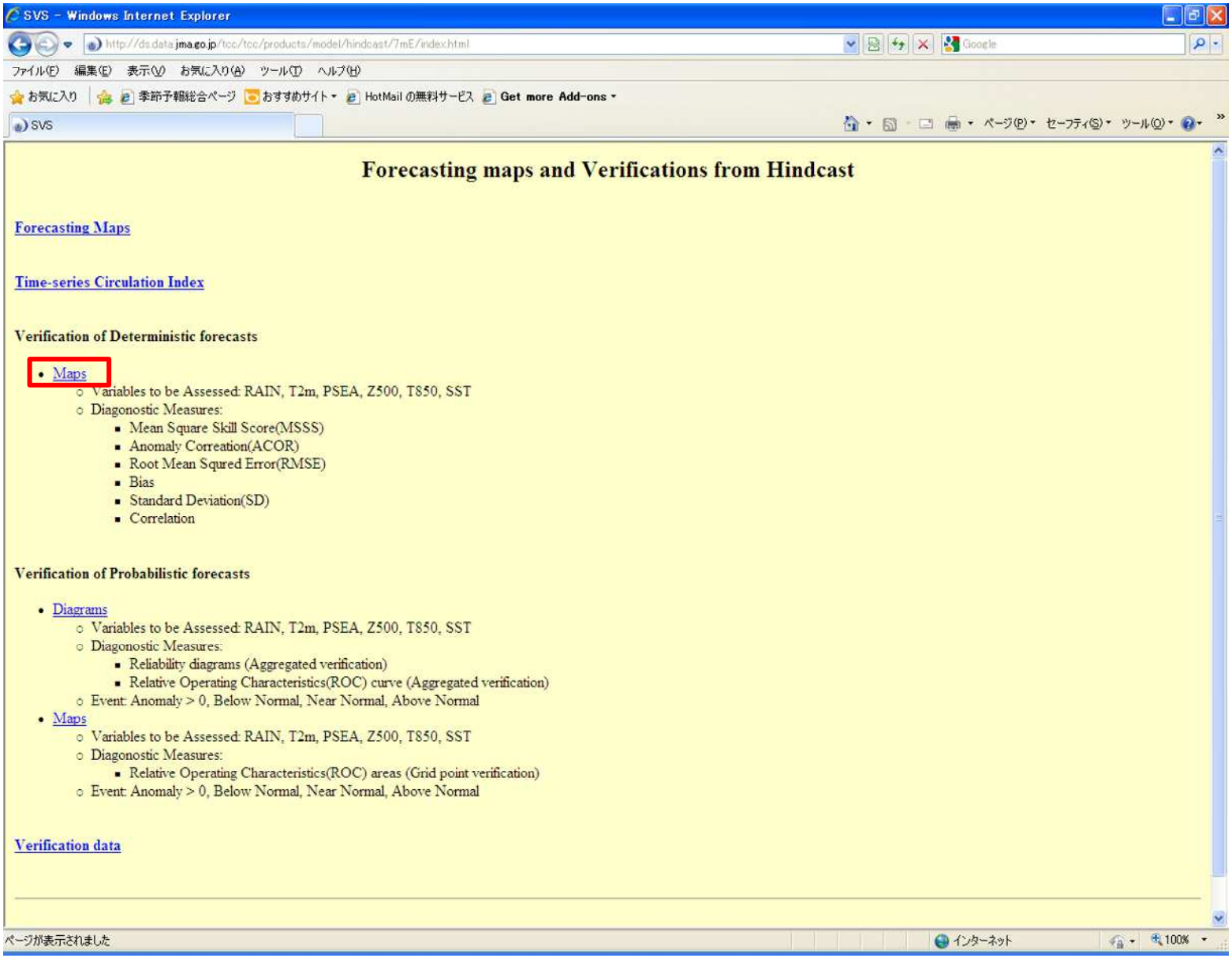
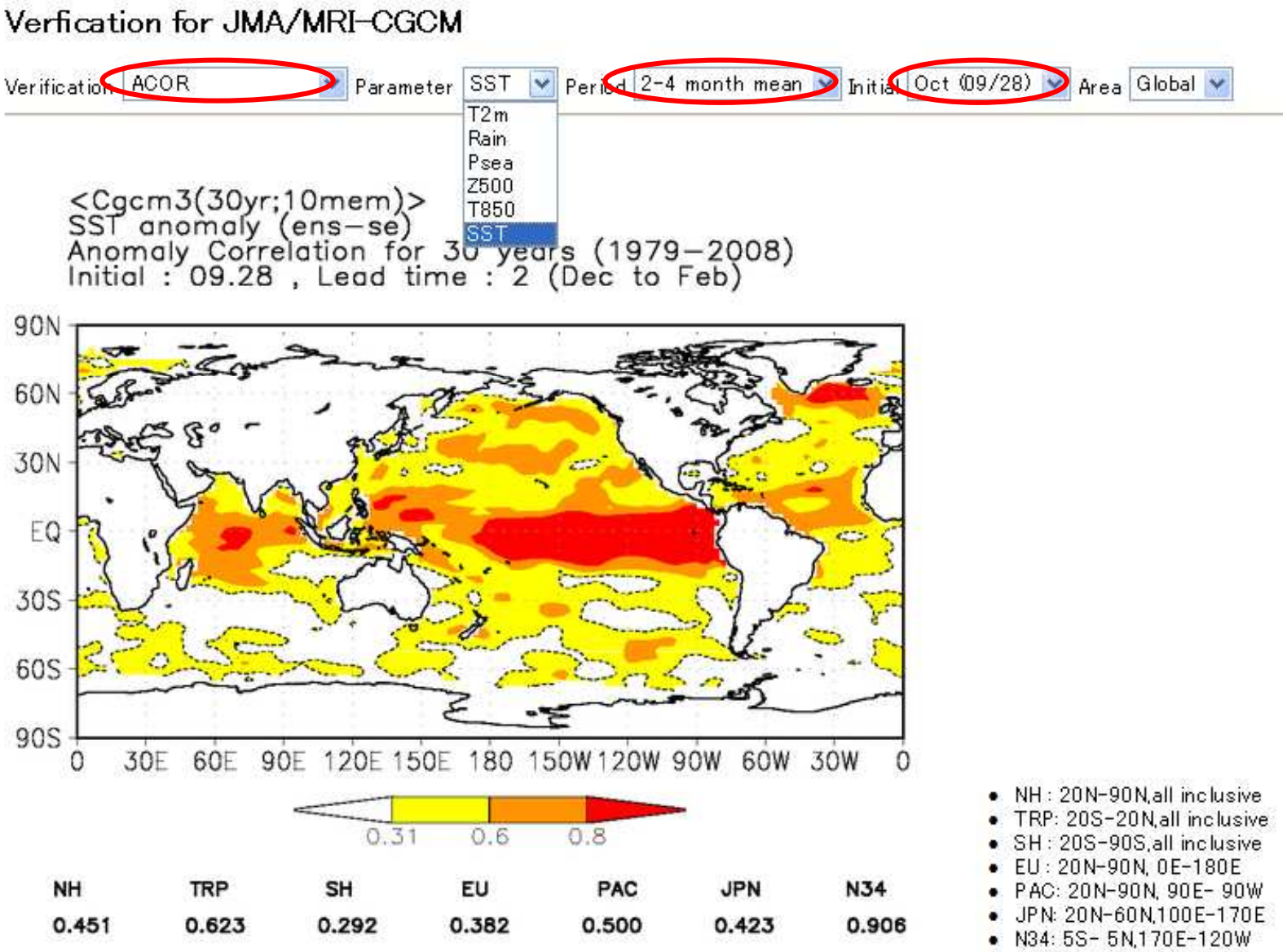


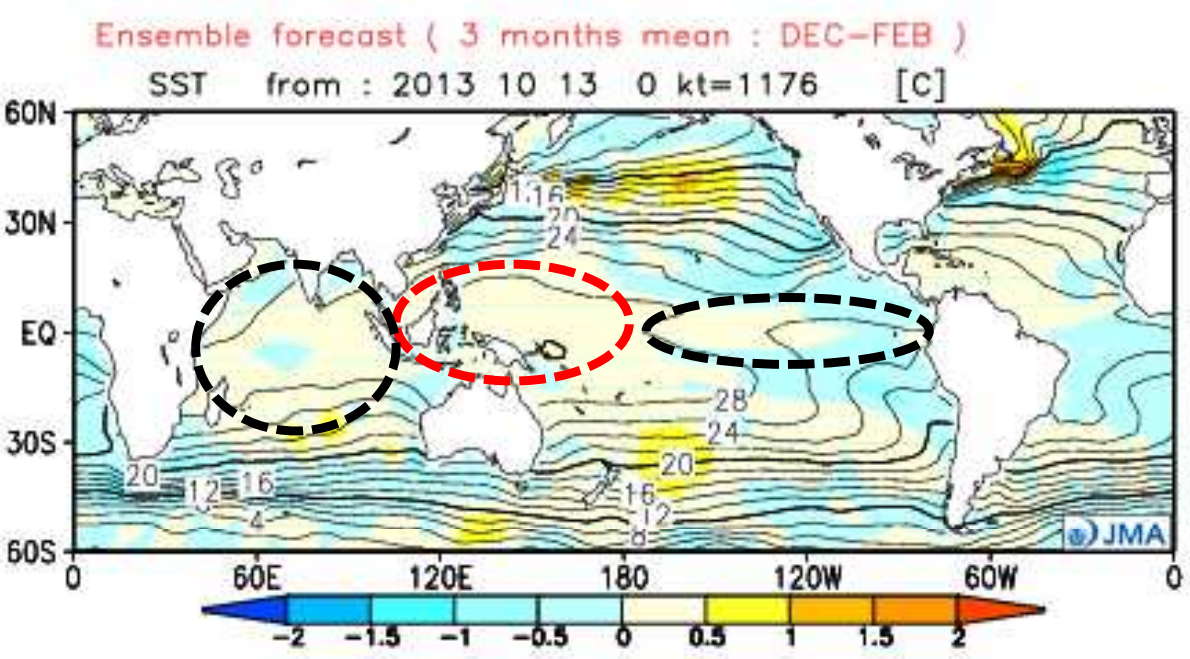
3. Interpreting the JMA's numerical prediction products for winter 2013/14

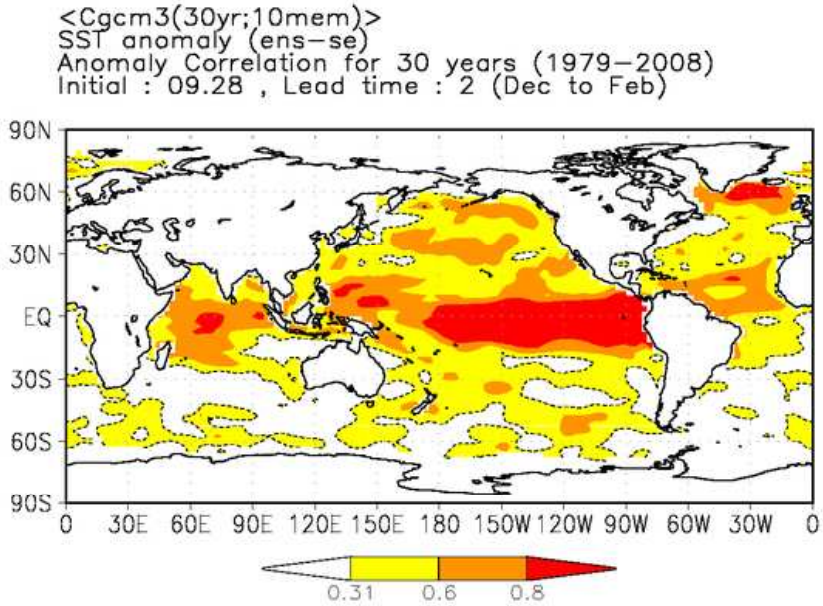
How to obtain verification maps of warm/cold season prediction (hindcast)



3. Interpreting the JMA's numerical prediction products for winter 2013/14

* What are distinctive features of them?
* Do they have enough skill?





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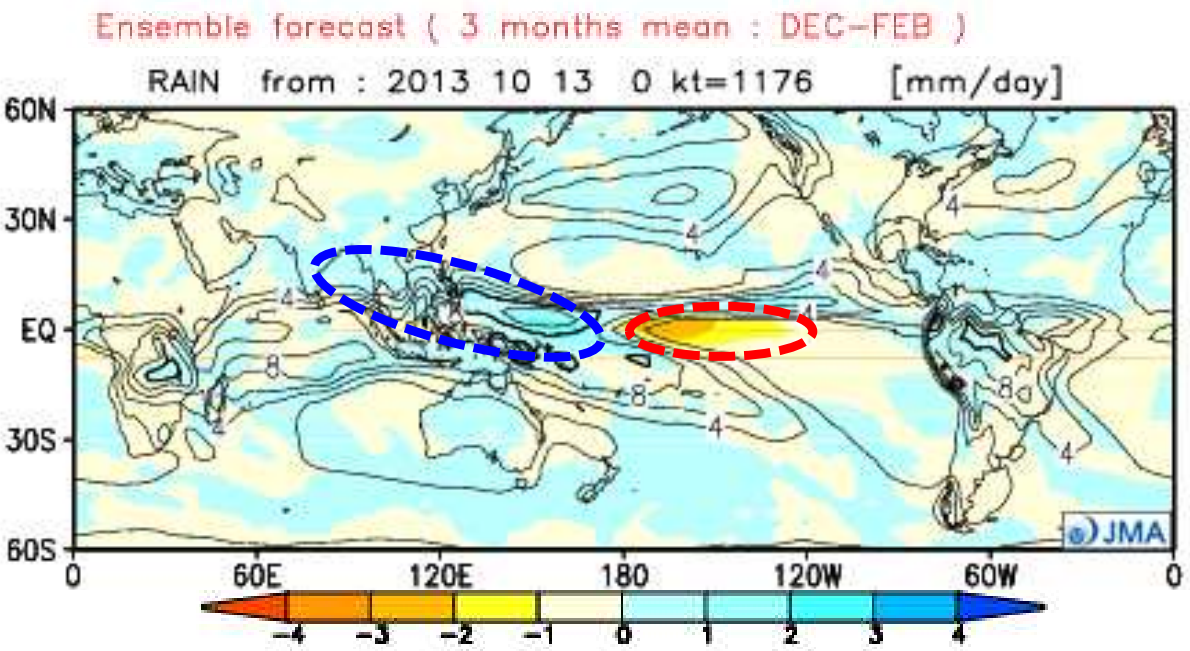

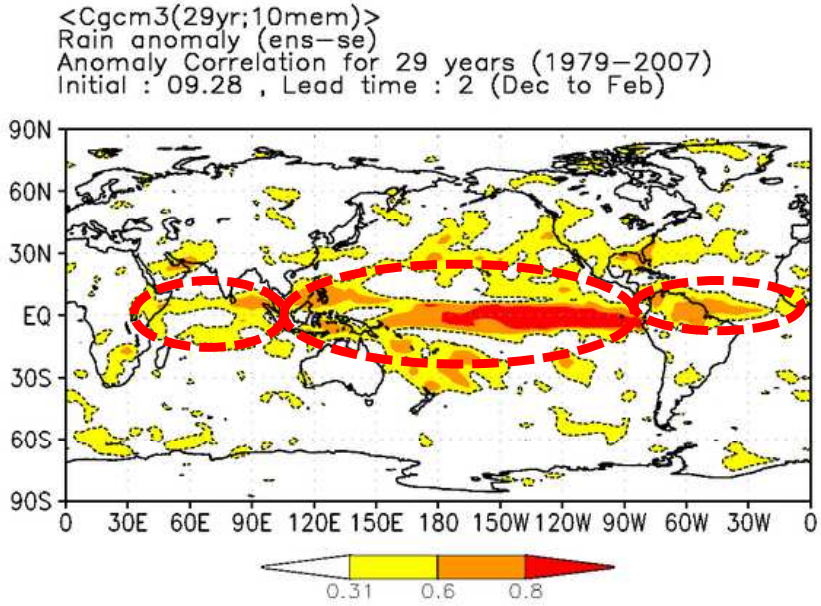

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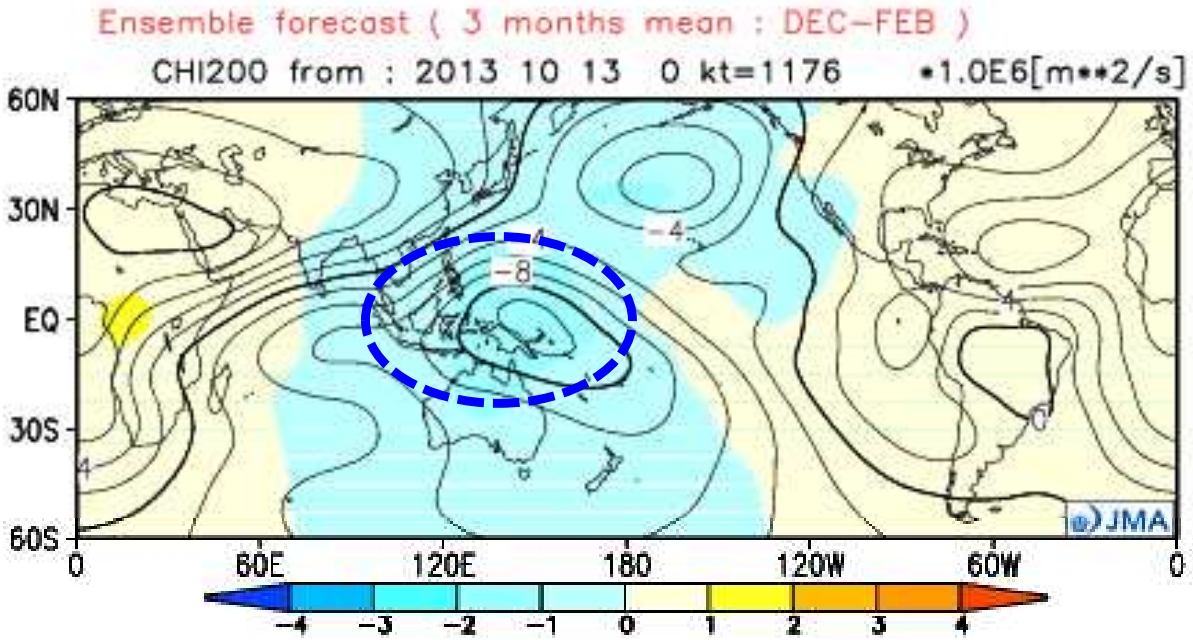

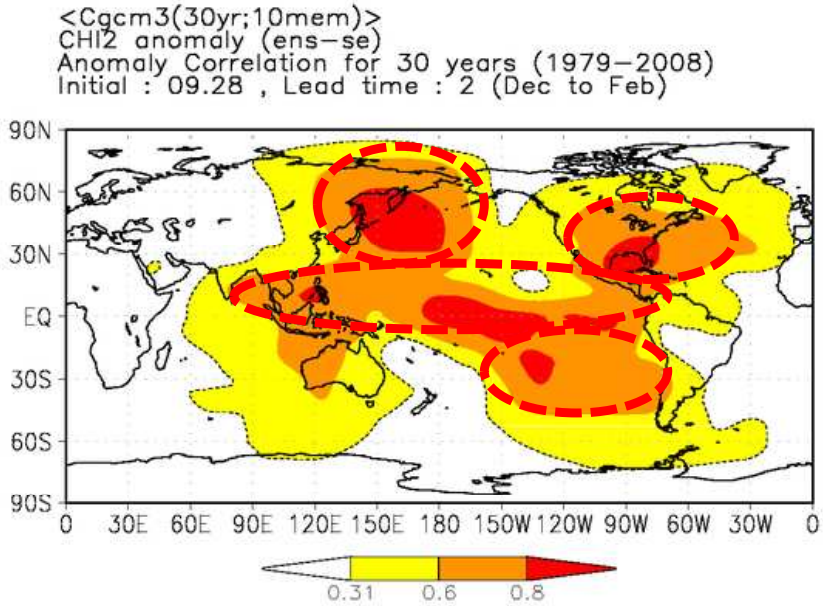

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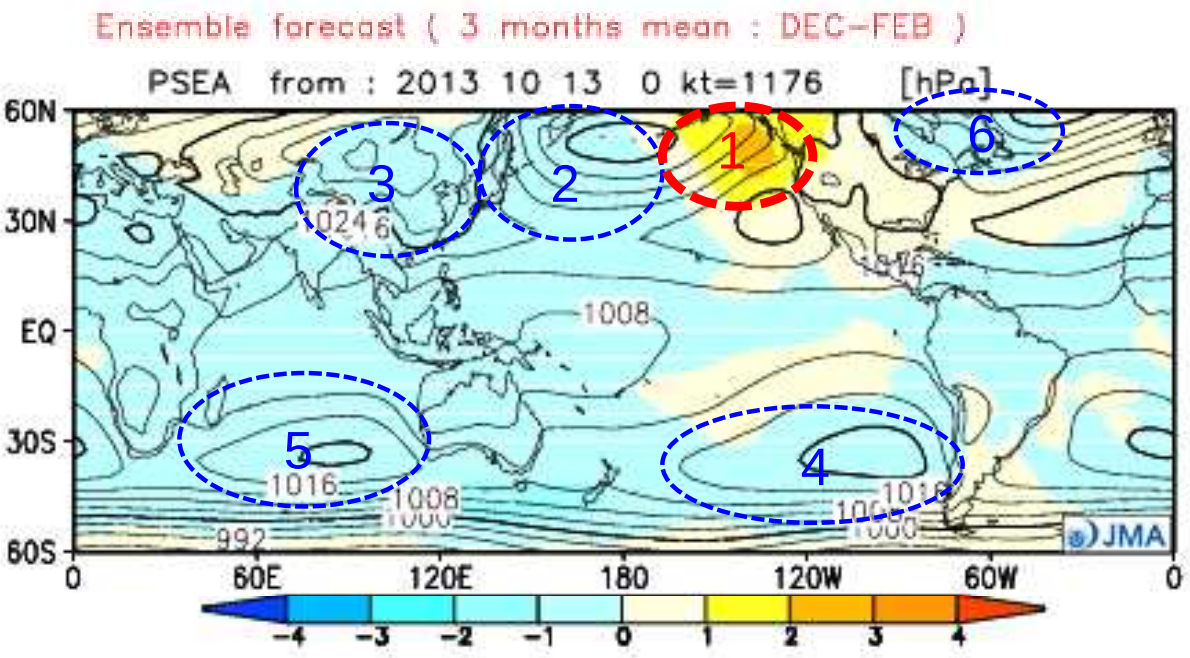

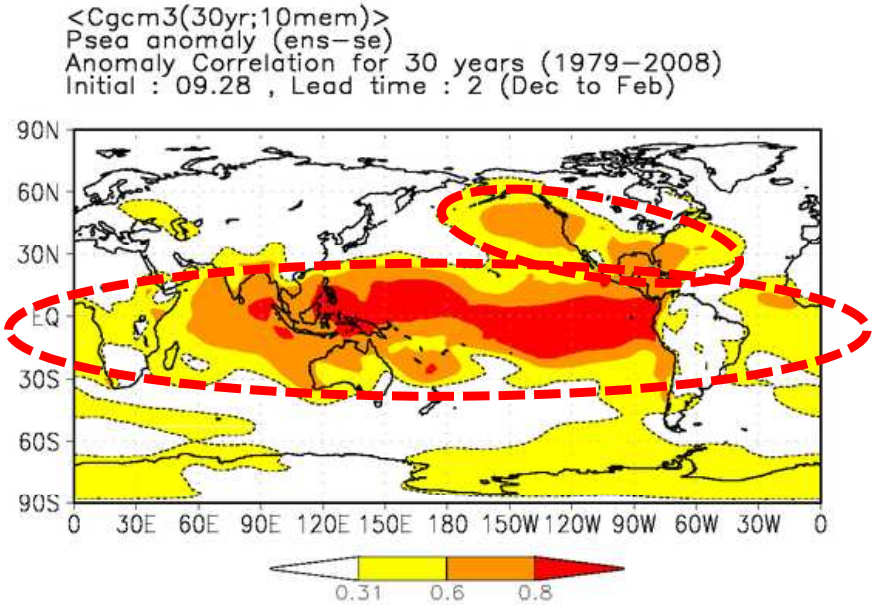

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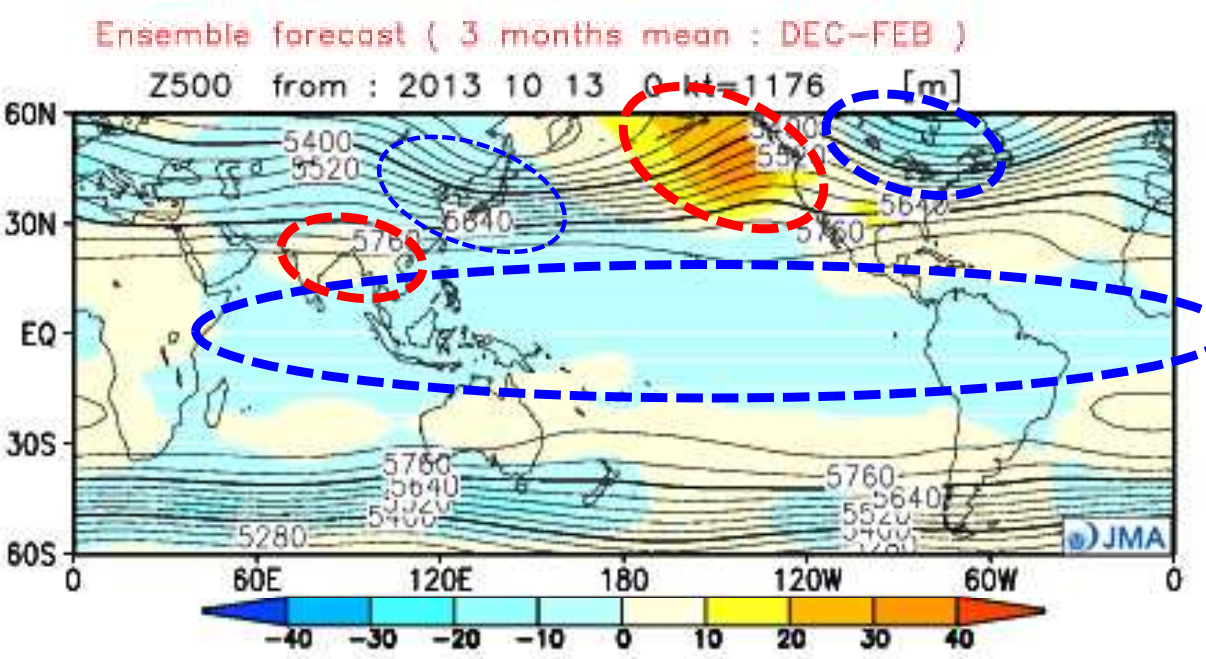

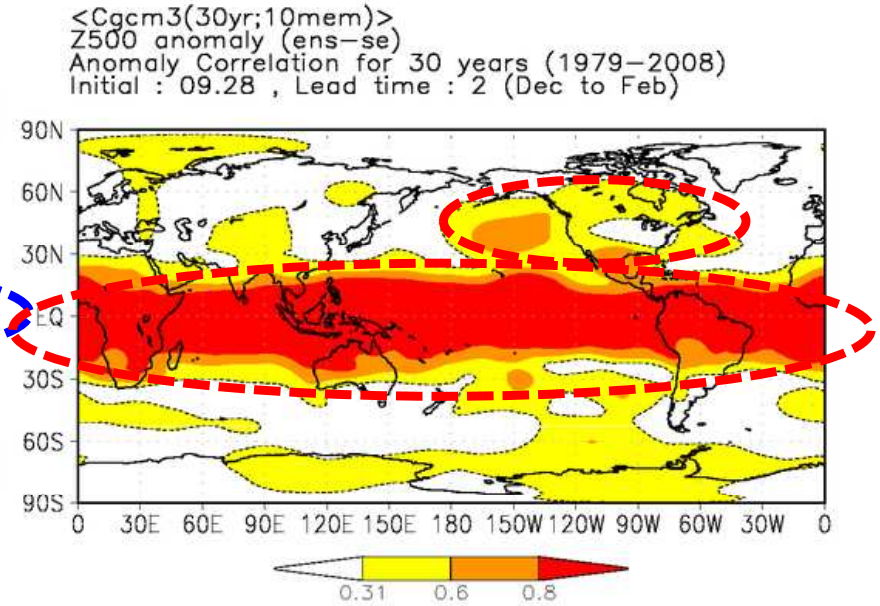

3. Interpreting the JMA's numerical prediction products for winter 2013/14

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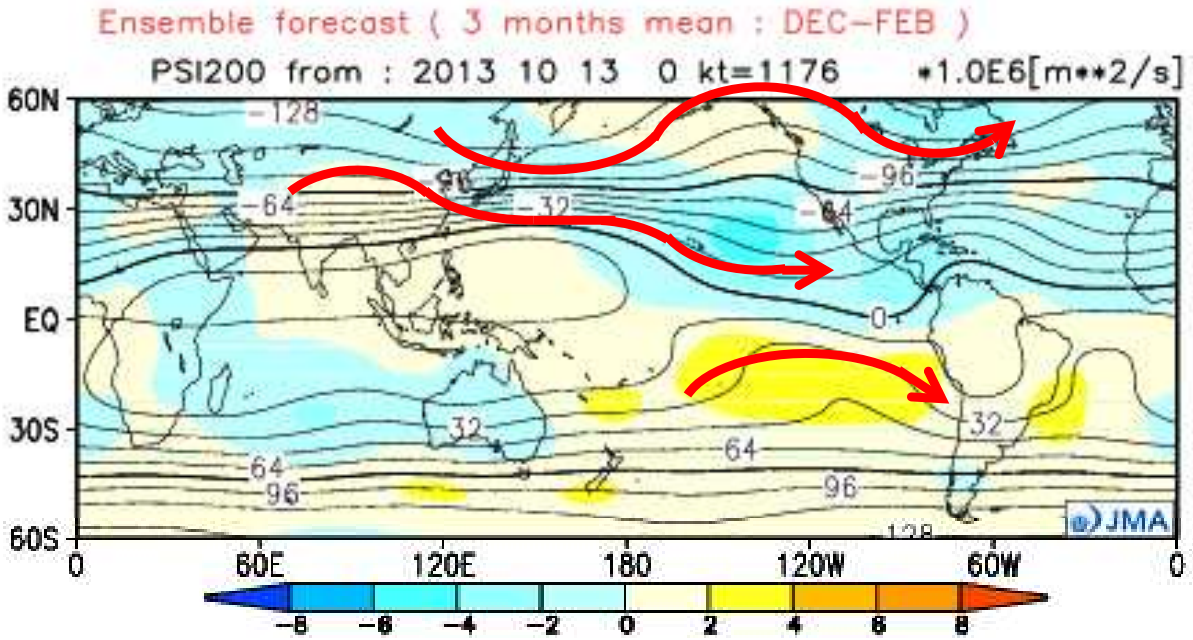
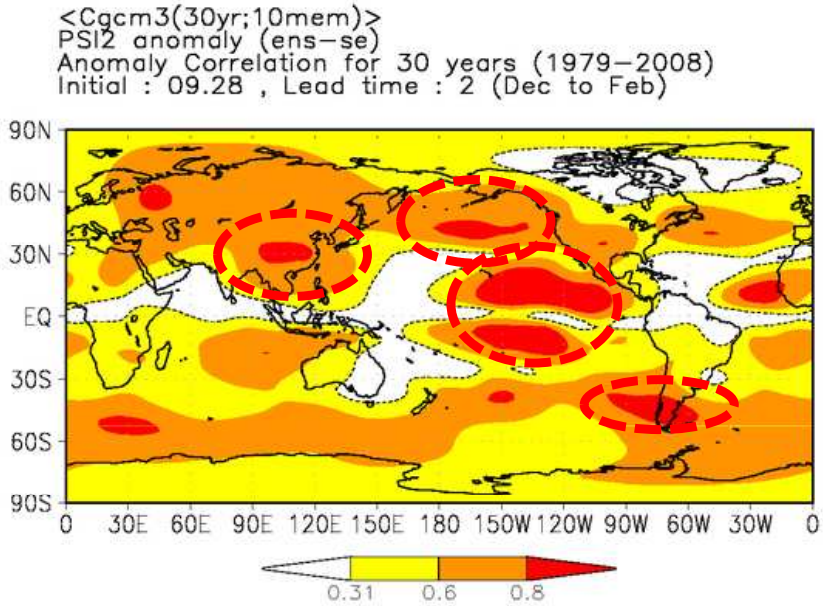




3. Interpreting the JMA's numerical prediction products for winter 2013/14

SST anomalies affect the distribution of precipitation anomalies.

⇩

Precipitation anomalies affect the circulation anomalies
(sea level pressure, 500hPa height, and so on).

⇩

If the circulation in and around your country is statistically well correlated with the surface temperature (precipitation) in your country, you can have the perspective of the surface temperature (precipitation) (*).

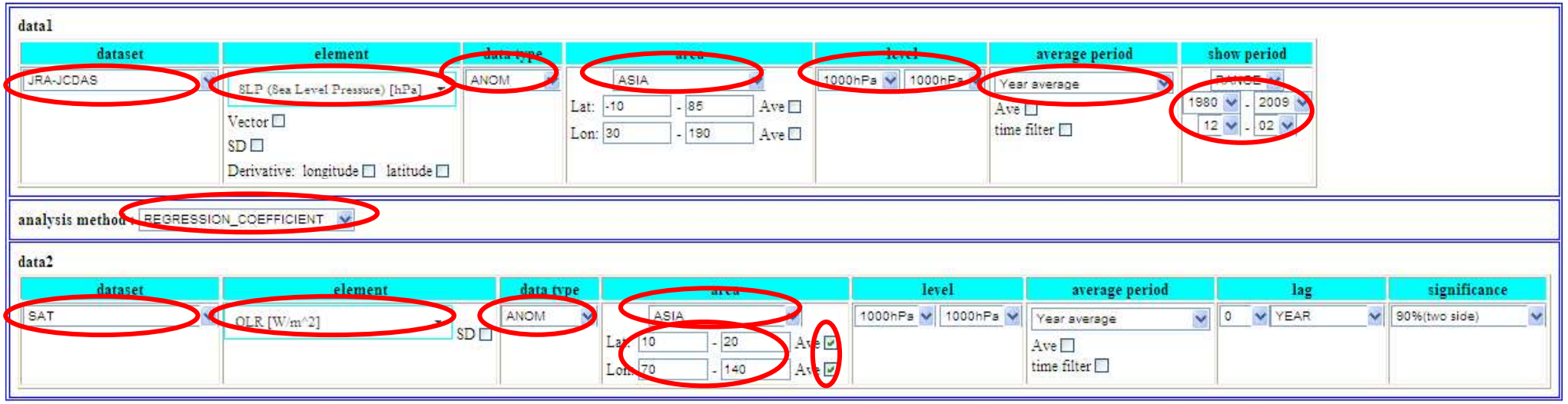
* If the prediction skill of the 2-m height temperature (precipitation) anomaly in your country is good, you can use it.

However, if the prediction skill of the circulation anomalies in and around your country is not good, you can't use them without more examination.

3. Interpreting the JMA's numerical prediction products for winter 2013/14

Confirm the observational relationship between the circulation in and around your country and an element for which the model has good skill with using ITACS.

In this case, the observational relationship between SLP / Z500 in and around Japan and OLR from the northeastern Indian Ocean to the western tropical Pacific...



Graphic Option

Drawing: CONTOUR

⇨

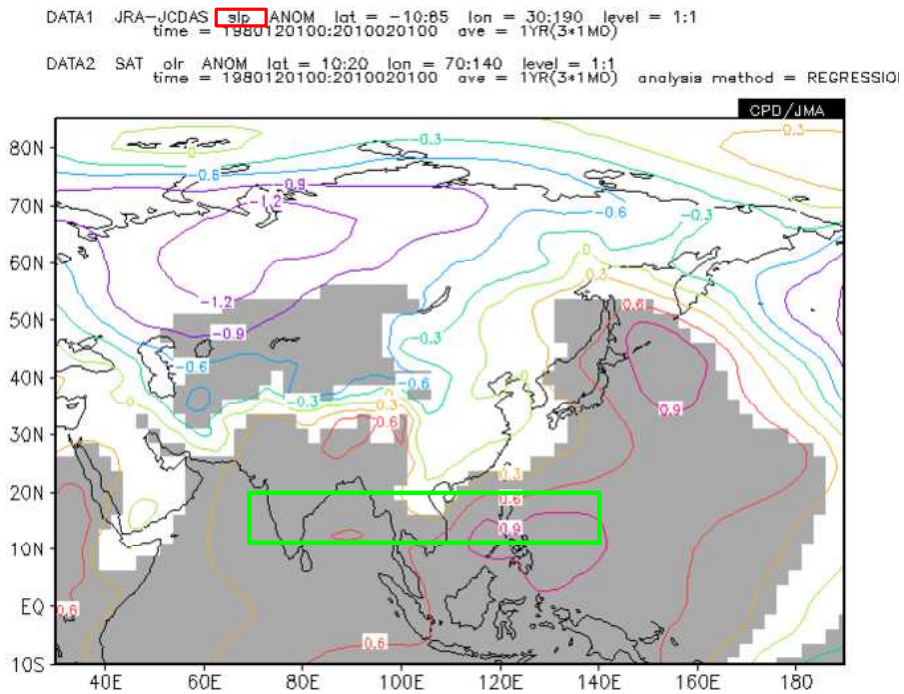
Left-click

Submit

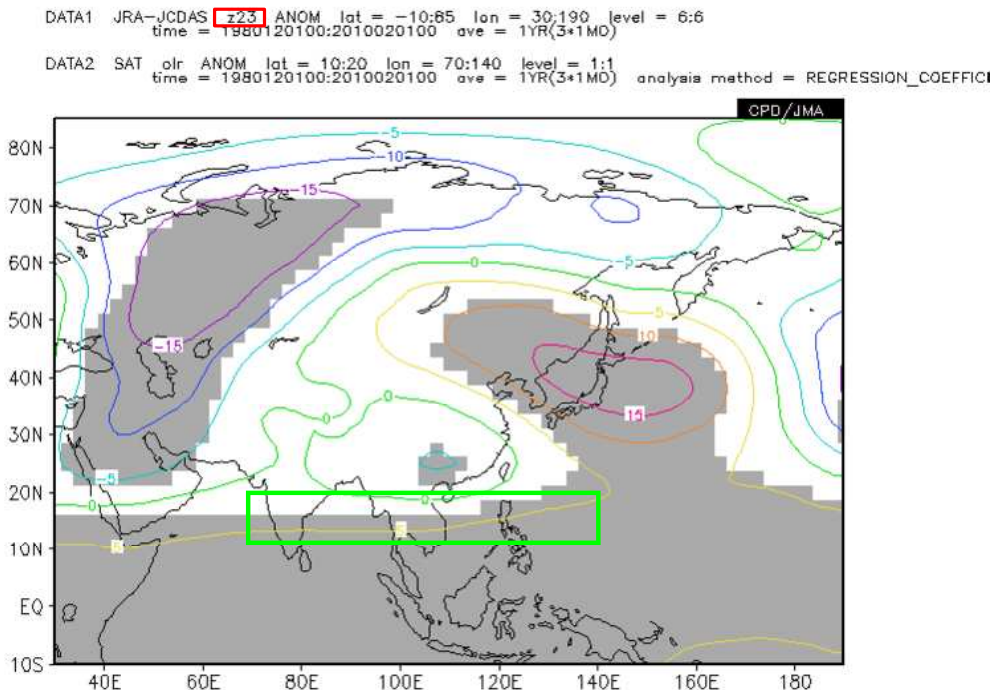
3. Interpreting the JMA's numerical prediction products for winter 2013/14

The observational relationship between SLP / Z500 and OLR from the northeastern Indian Ocean to the western tropical Pacific

SLP



Z500



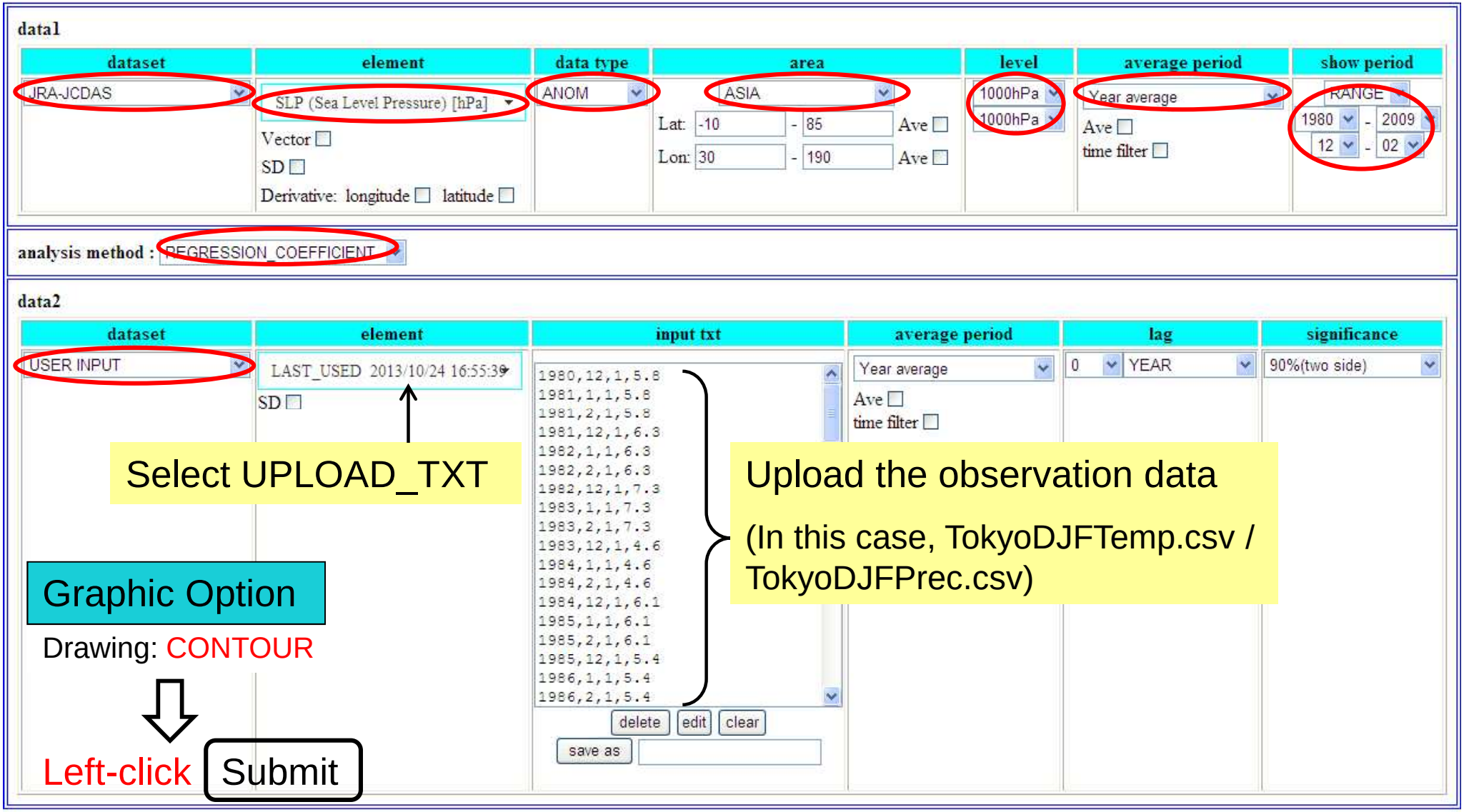
These figures show surface low pressure systems (the western part of the Aleutian low) and upper cold airs tend to prevail in and around Japan when convection is active (OLR anomalies are negative) from the northeastern Indian Ocean to the western tropical Pacific.

The model prediction is valid at least for the circulation in and around Japan (though the model rainfall prediction skill in the northeastern Indian ocean is not good).

3. Interpreting the JMA's numerical prediction products for winter 2013/14

Is the circulation in and around your country (*) statistically well correlated with the surface temperature / precipitation in your country?

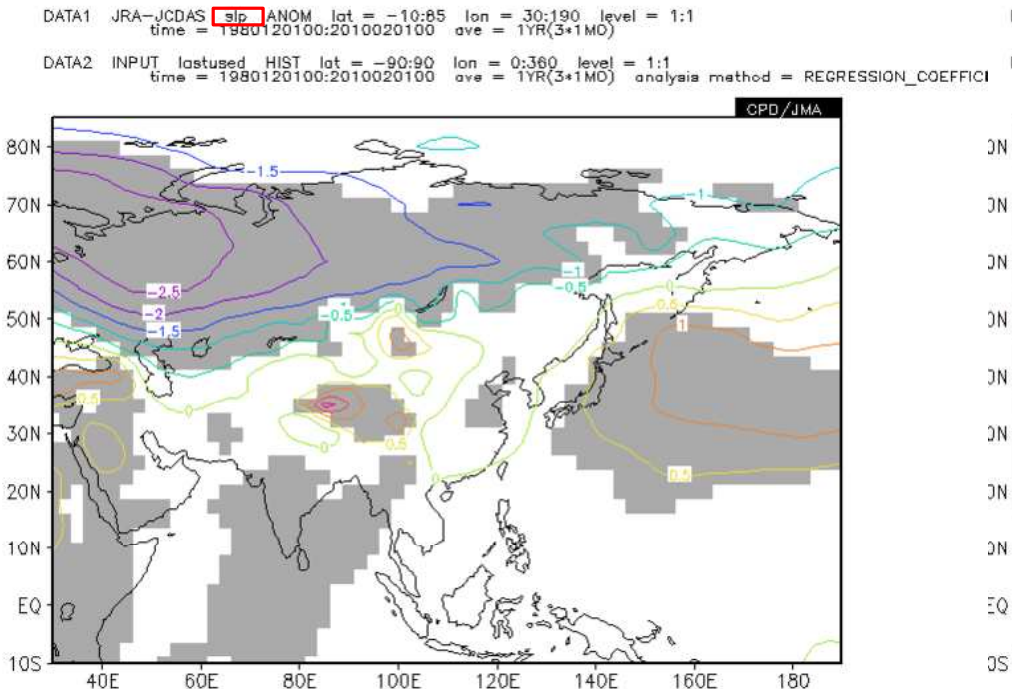
* predicted by the model or deduced from an observational relationship



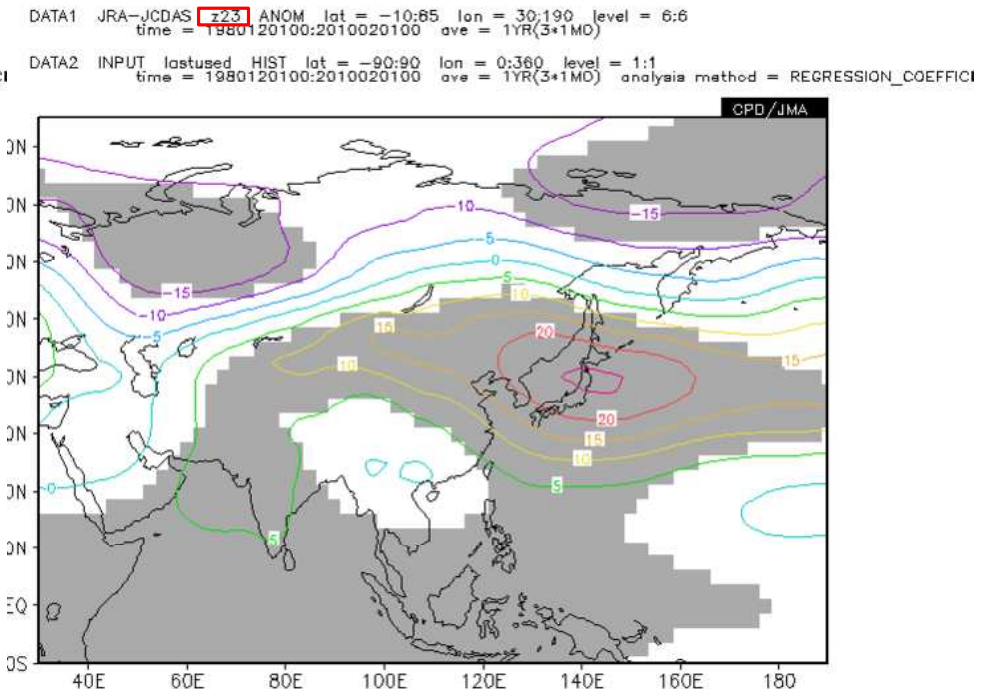
3. Interpreting the JMA's numerical prediction products for winter 2013/14

The observational relationship between SLP / Z500 and the surface temperature in Tokyo

SLP



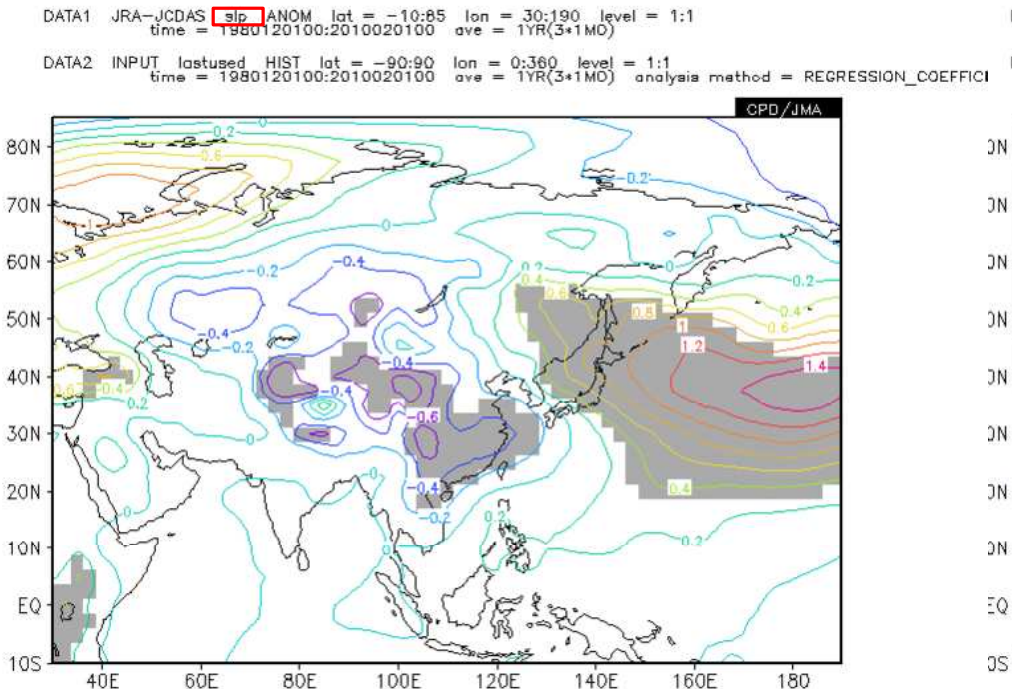
Z500



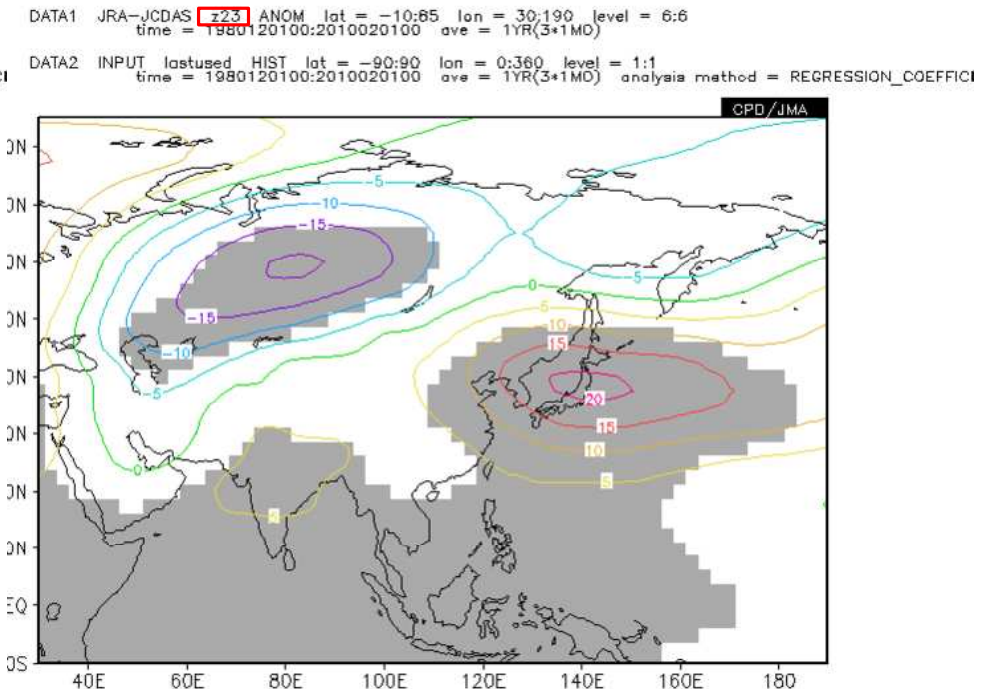
3. Interpreting the JMA's numerical prediction products for winter 2013/14

The observational relationship between SLP / Z500 and the precipitation amount in Tokyo

SLP



Z500



Cold and dry conditions are expected for Tokyo in winter 2013/14!

Please note that such analysis provides only the representative circulation pattern. In general, it is necessary for you to grasp various circulation patterns which bring hot/cold/wet/dry condition to your country.

Please build a forecast for your country in winter 2013/14.

- What predictors did you select for your guidance?
- How did the guidance predict the hottest/coldest/wettest/driest year in your country?
- Is the guidance skillful from the viewpoints of deterministic forecast and probabilistic forecast?
- Is the guidance result for winter 2013/14 considered to be valid? Does the model predict distinct anomalies of the predictors?

We will hold the presentation session from 3PM. Please make a short (17 minutes) presentation on your forecast.

An example

Summary of Tokyo guidance

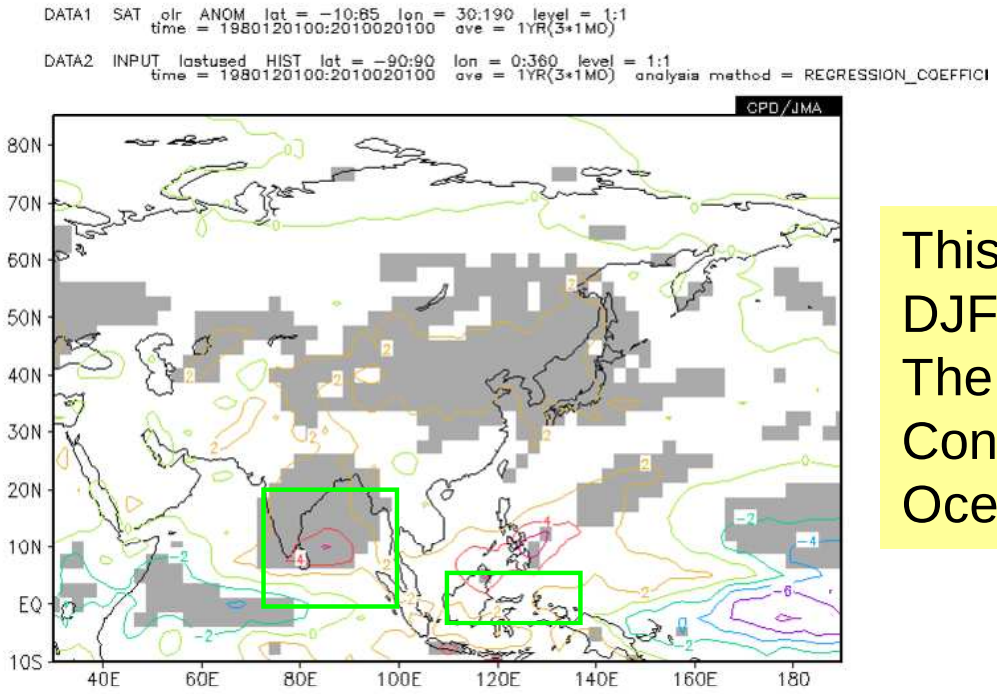
Station	Tokyo
Season	DJF
Predictand	Temperature
Predictors	EIO RAIN, Extratropical Thickness, MC RAIN
Correlation	0.42
Brier Skill Score	0.00

	slope	−0.35	1.15	−0.44
Multiple Regression	intercept	7.06		
	Correlation	0.42		

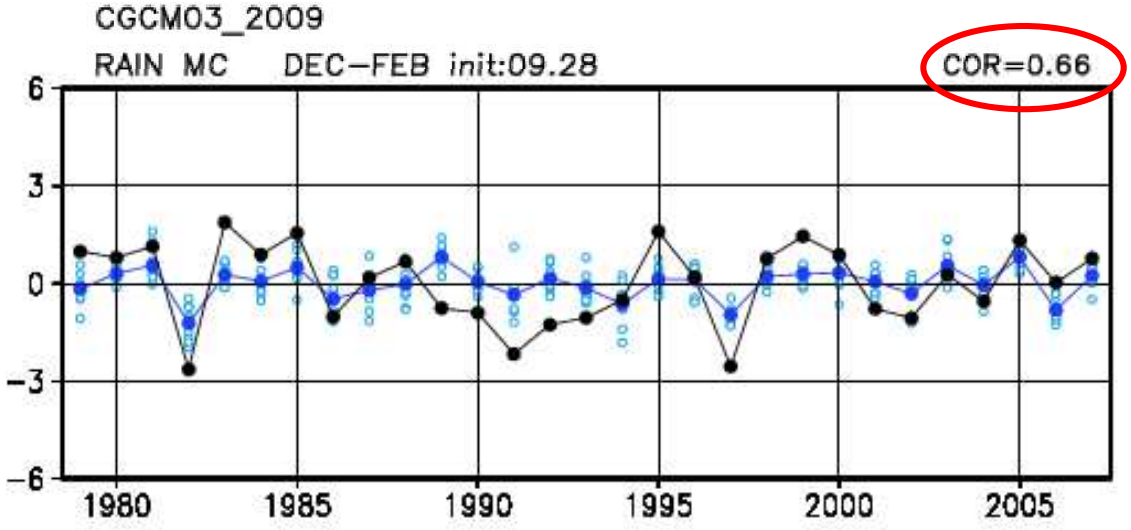
An example

4. Building a forecast for your country in winter 2013/14

The reason I have selected these predictors



This is the relationship between OLR and DJF temperature in Tokyo.
The OLR (convective activity) in Maritime Continent and that in the eastern Indian Ocean look possible predictors.

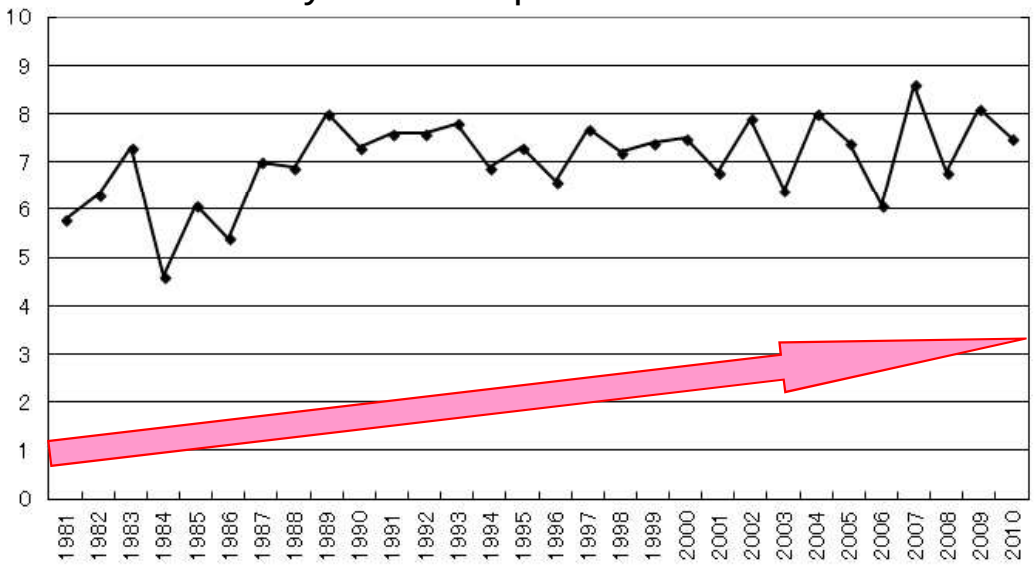


Anomaly correlation between the observed and forecasted DJF rainfall amounts in Maritime Continent is more than 0.6.
Prediction skill is good.

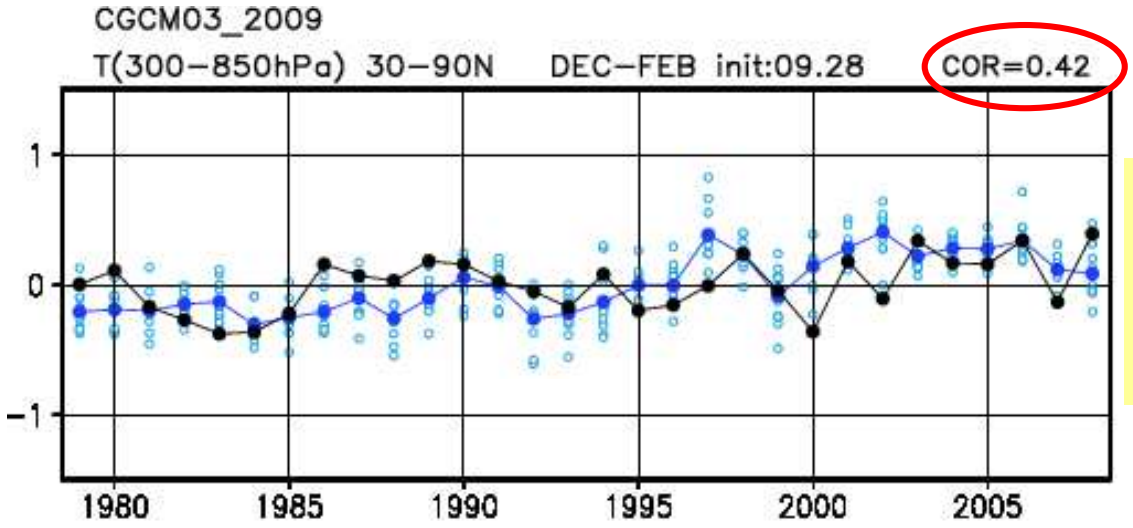
An example

The reason I have selected these predictors

Observed Tokyo DJF temperature



Observed Tokyo DJF temperature has upward long-term trend.



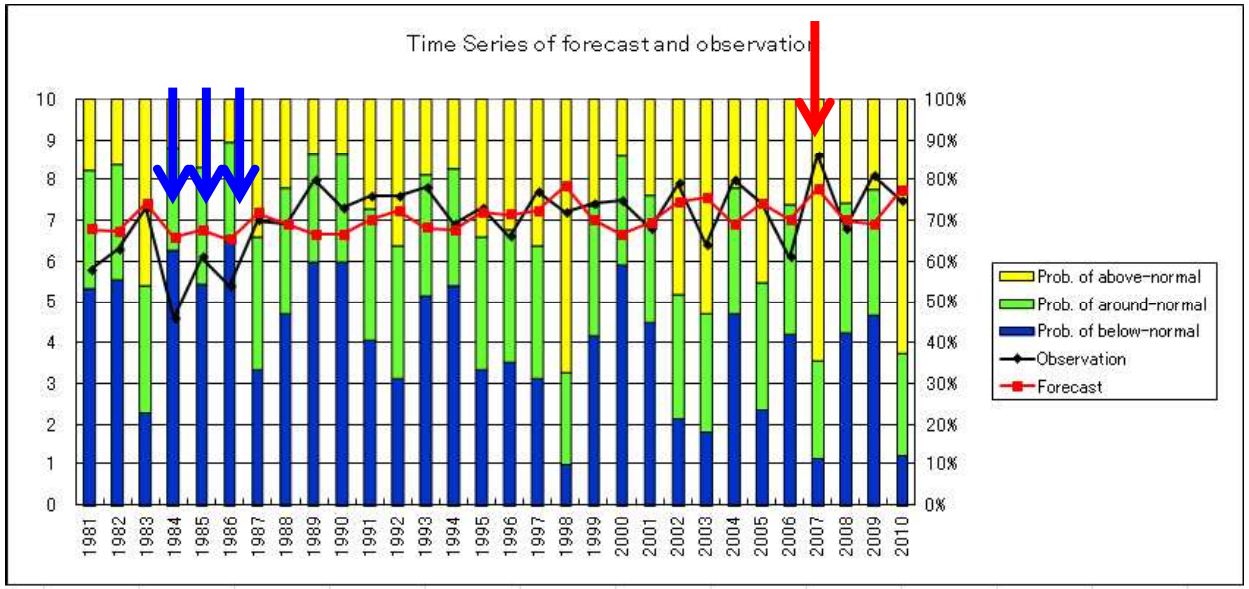
Extratropical thickness is a good indicator of global warming.

Its prediction skill is good (tolerable).

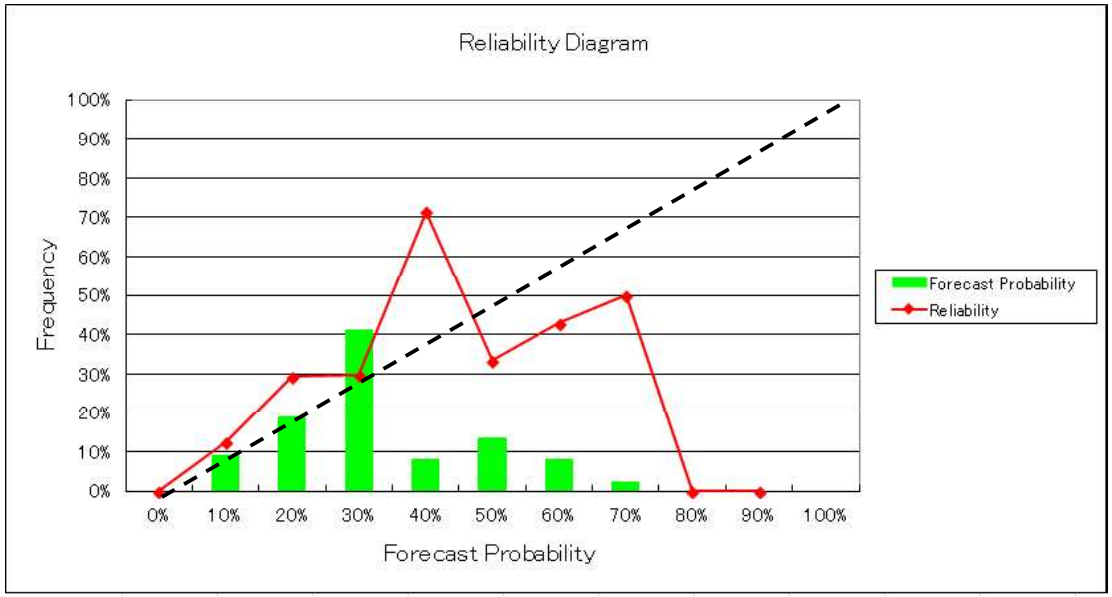
An example

4. Building a forecast for your country in winter 2013/14

Verification



The upward trend is well predicted. Moreover, the guidance can predict extreme cold winters from 1984 to 1986 and extreme warm winter in 2007.



The figure shows reliability diagram of DJF temperature in Tokyo.
The forecast probability is reliable for the forecasts 10% - 50%.

An example

4. Building a forecast for your country in winter 2013/14

Forecast of winter 2013/14

Temperature

	−		+
	40	40	20

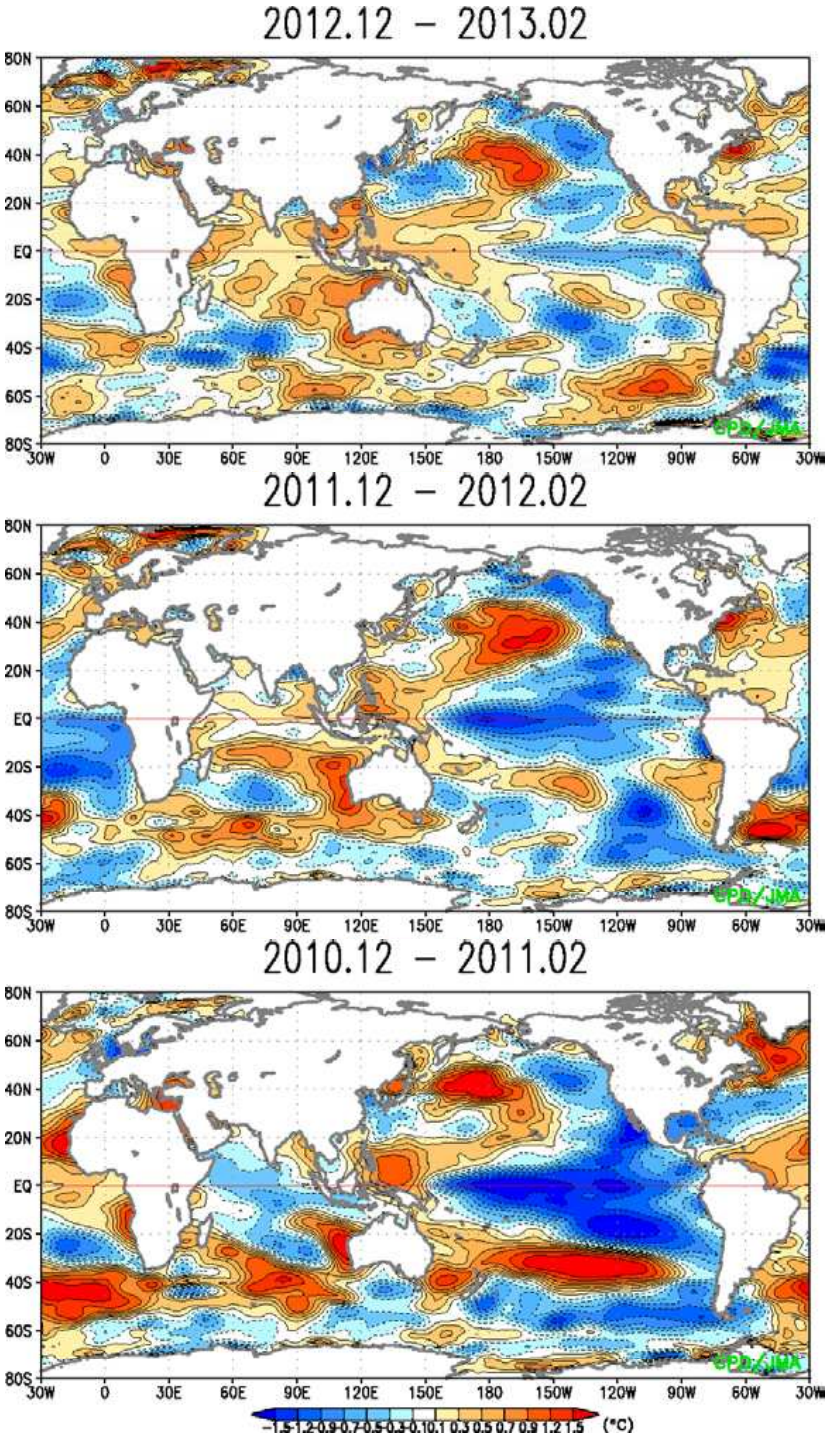
The Tokyo temperature guidance predicts 35%, 32%, and 33% for below-normal, around-normal, and above-normal, respectively.

The model predicts that convection will be active from the northeastern Indian Ocean to the western tropical North Pacific. The area of EIO RAIN index used in the guidance covers not only the northeastern Indian Ocean but also the eastern equatorial Indian Ocean, where the model predicts that convection will be inactive.

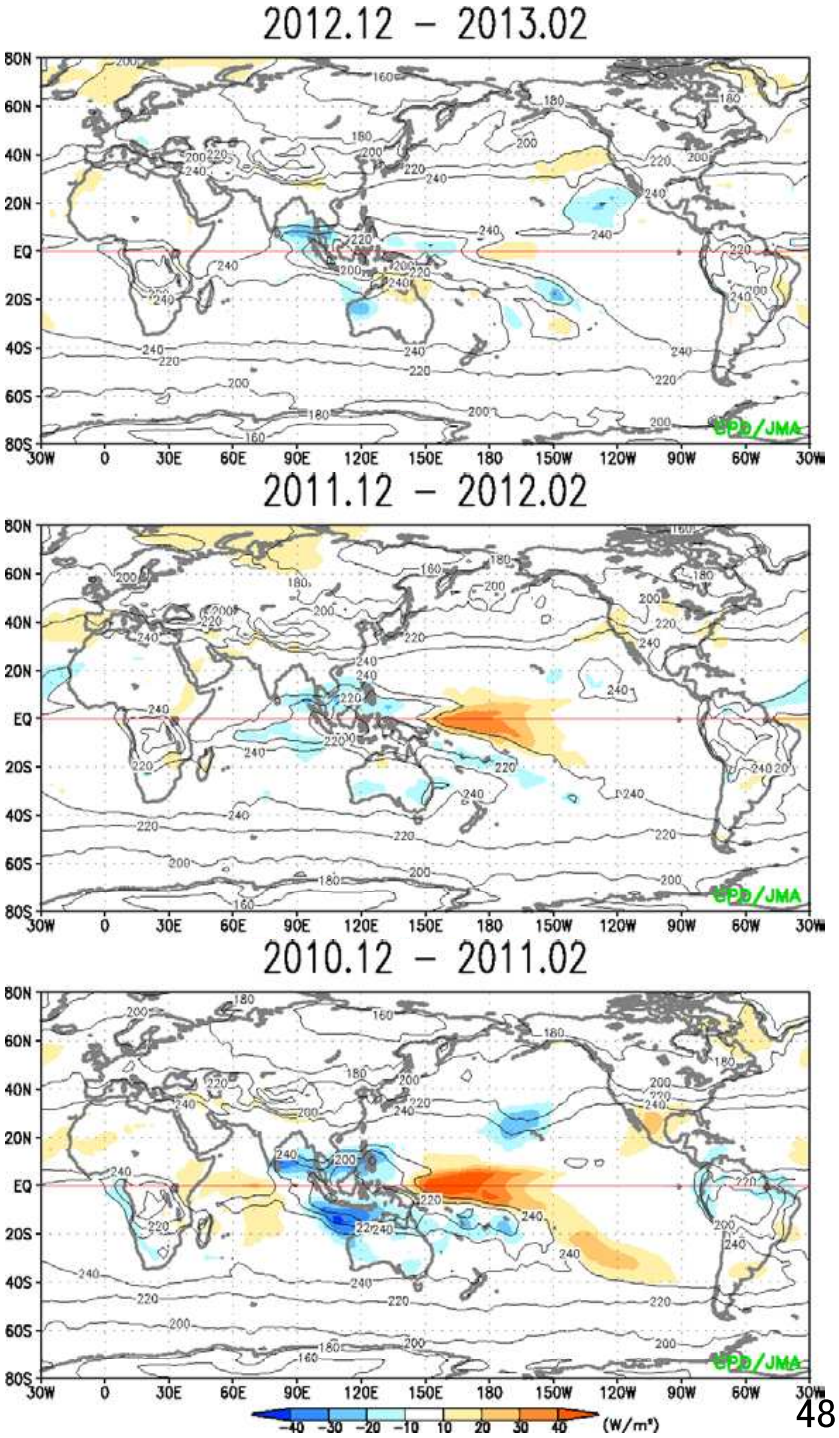
In fact, the OLR from the northeastern Indian Ocean to the western tropical North Pacific is correlated with the SLP and Z500 in and around Japan. The SLP and Z500 in and around Japan, which are good indicators of northwesterly surface cold winds and upper cold airs over Japan respectively, are well correlated with Tokyo temperature.

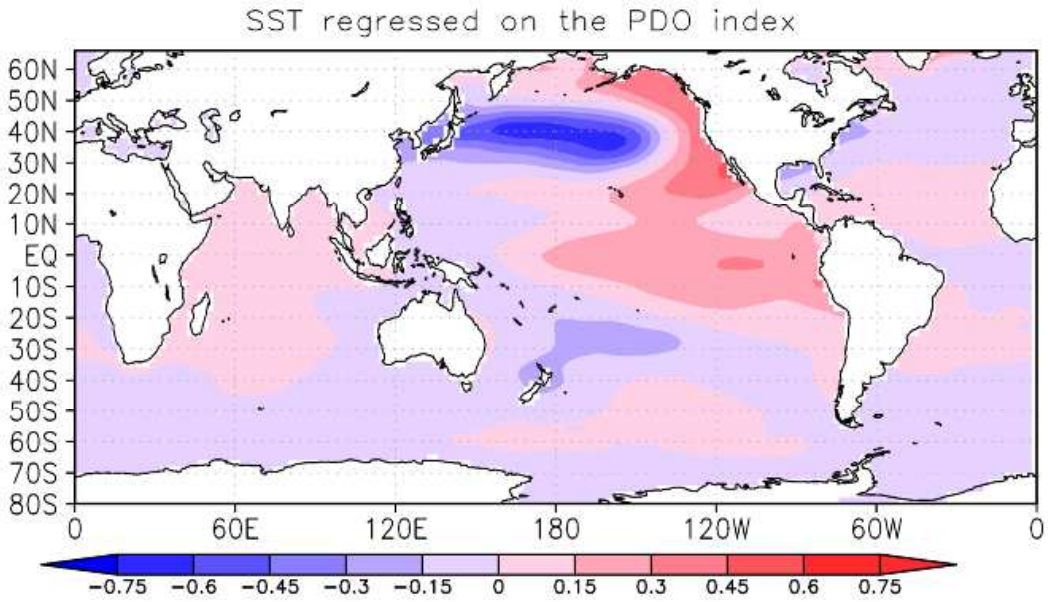
Therefore, we correct the guidance result, and expect Tokyo temperature in winter 2013/14 will be near or below normal, both with a 40% probability.

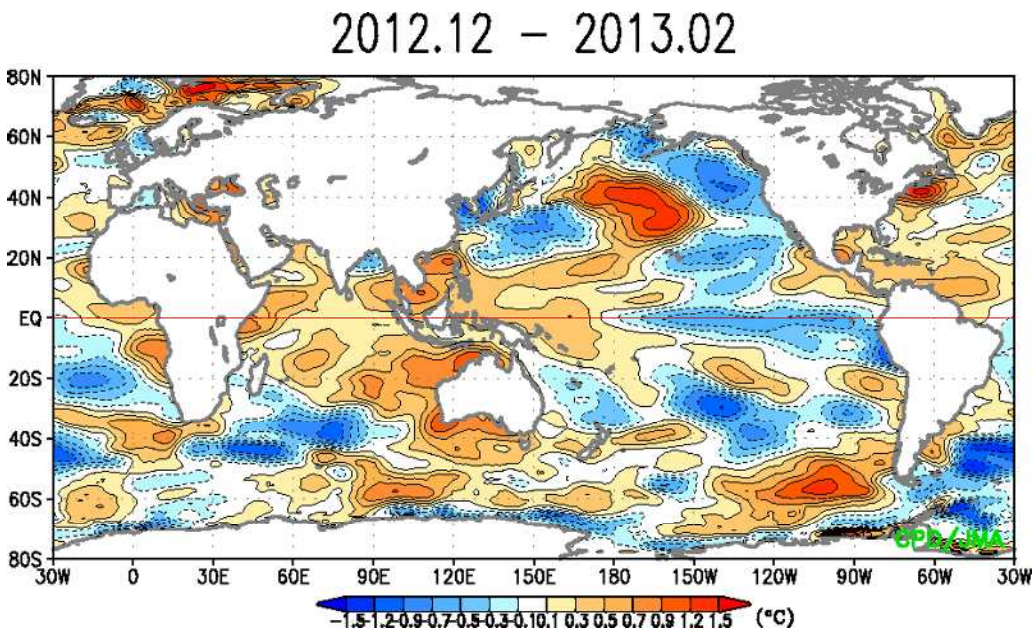
Observed SST anomaly



Observed OLR and its anomaly





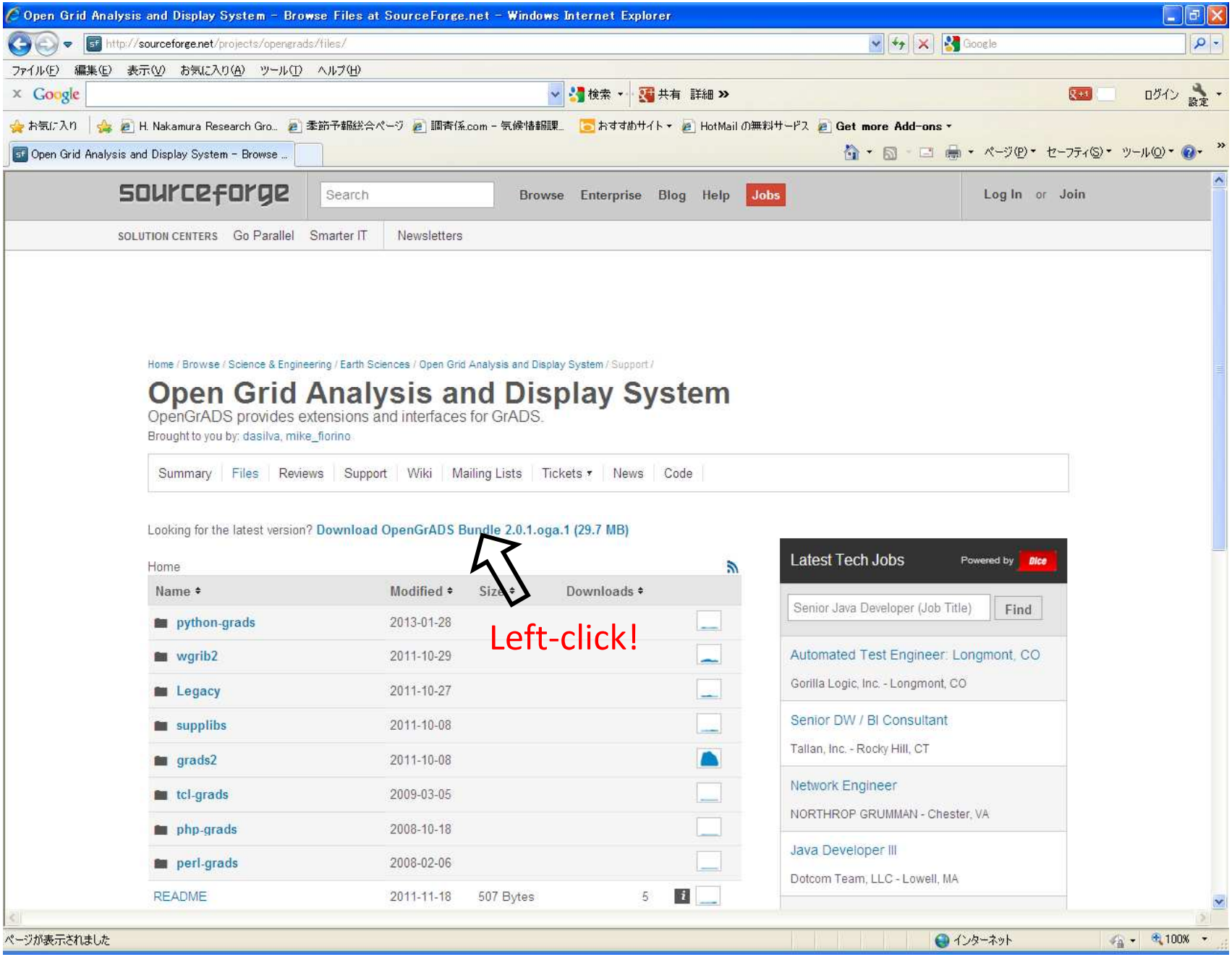


In recent years, the spatial pattern of the negative phase of PDO (Pacific Decadal Oscillation) prevails (including 2010/11 La Niña). Warm SST and active convection in and around the western tropical Pacific are expected also in the view point of decadal oscillation.

Appendix

OpenGrADS Download page

http://sourceforge.net/projects/opengrads/files/



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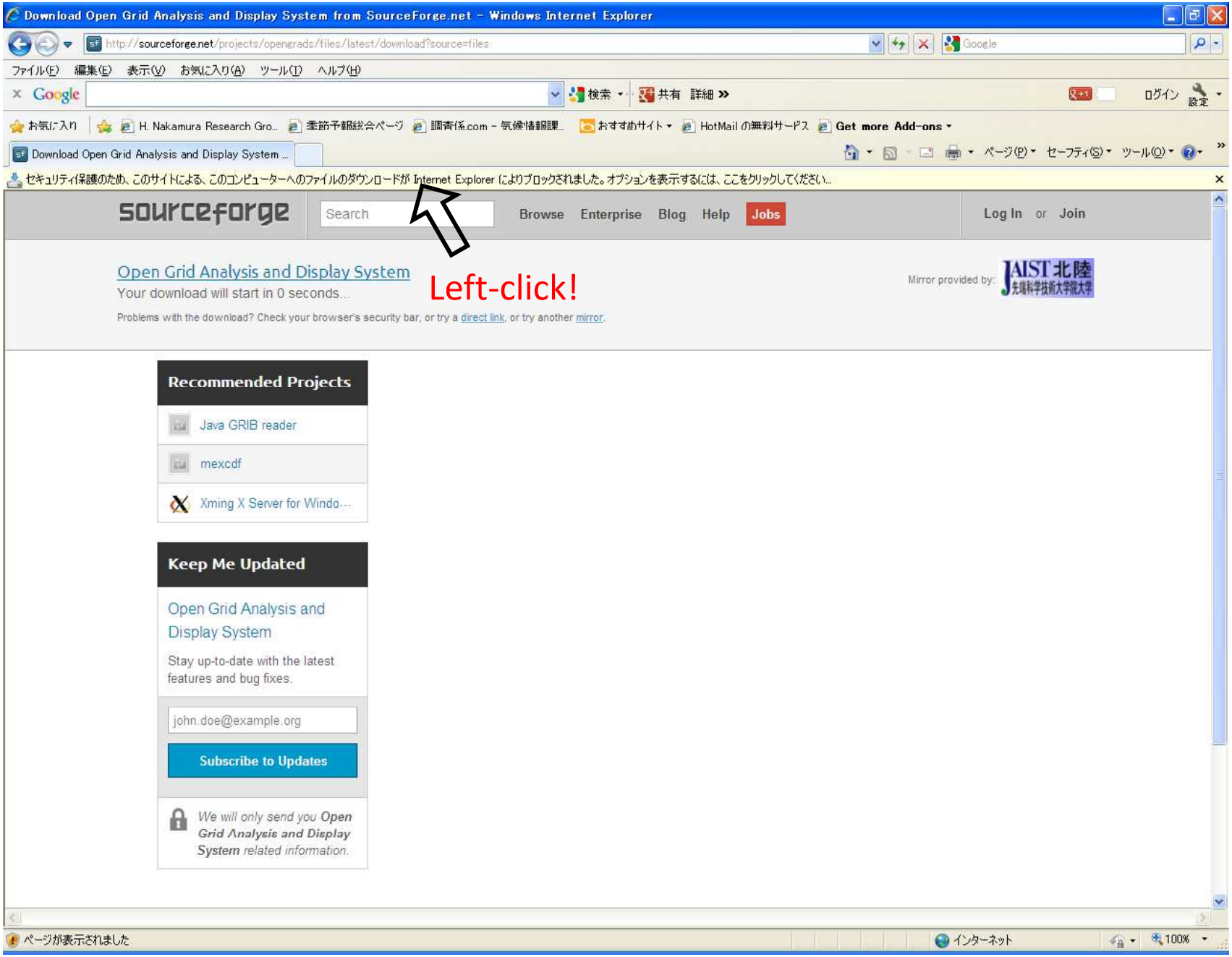

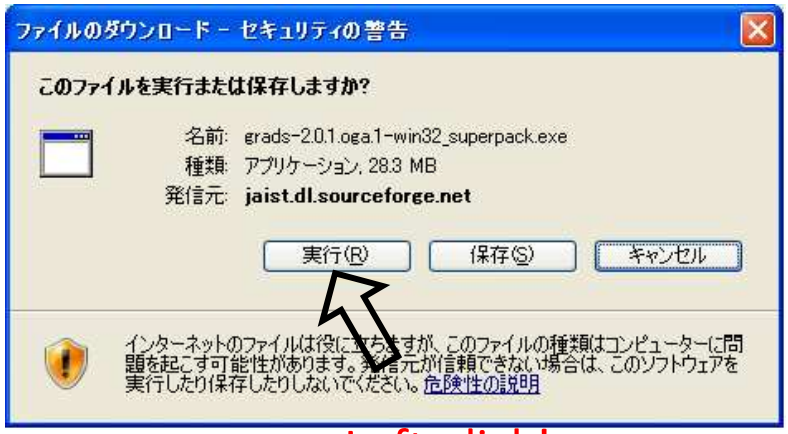

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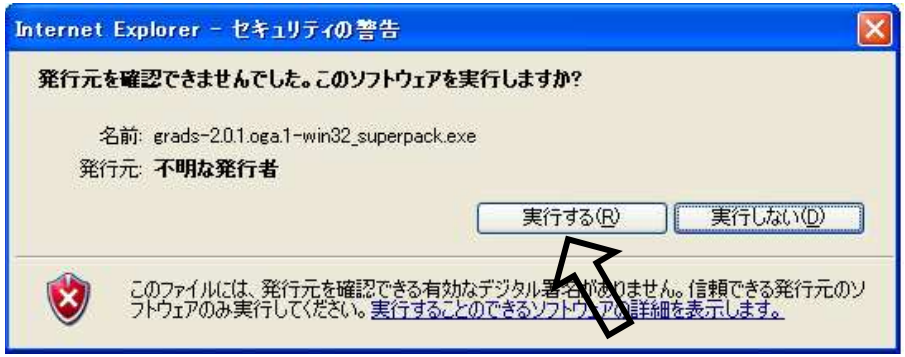

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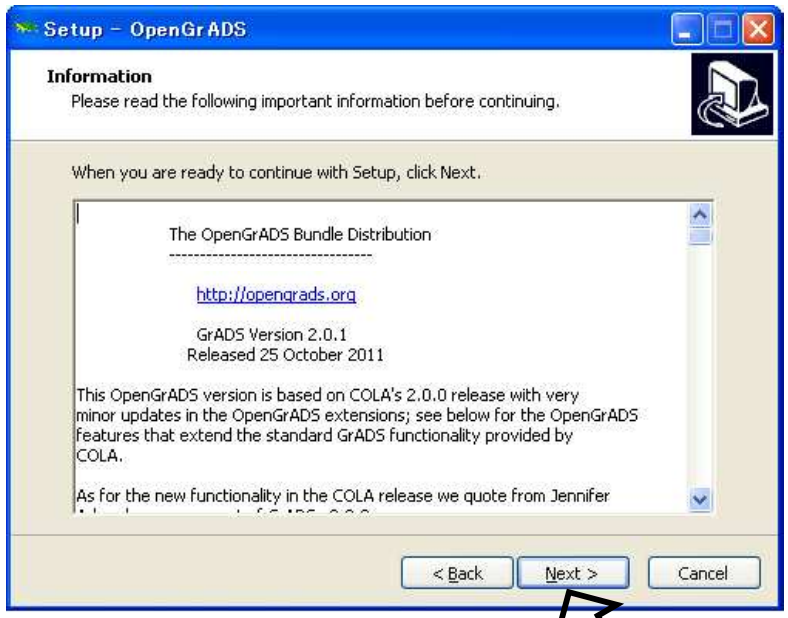

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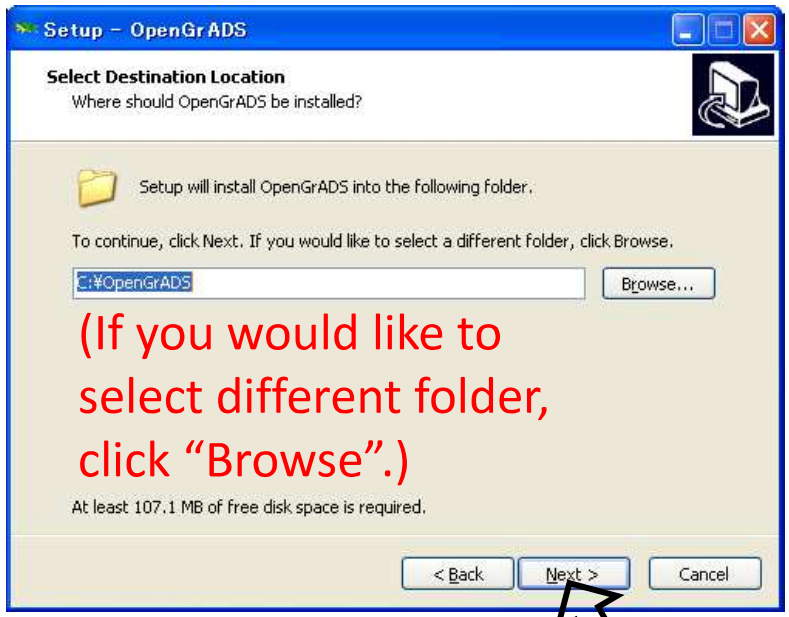

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click “Browse”.)

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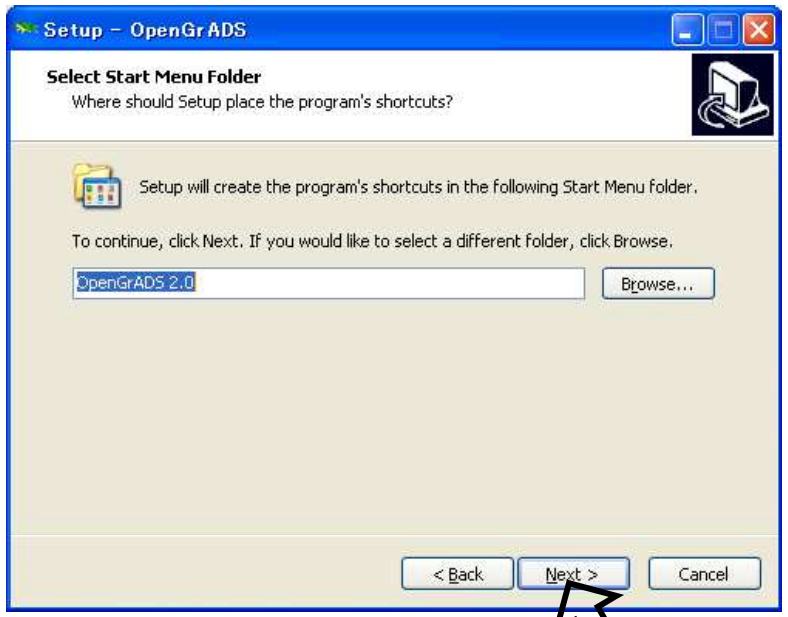

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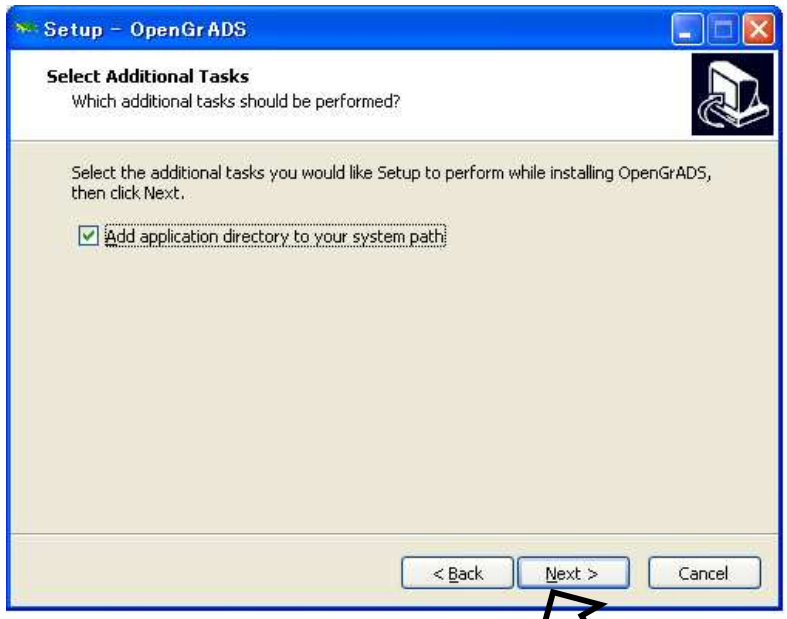

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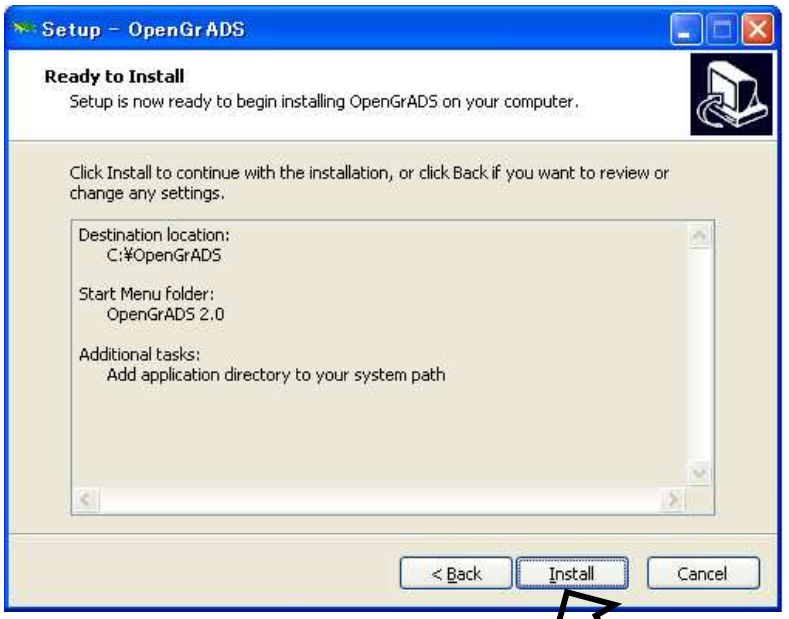

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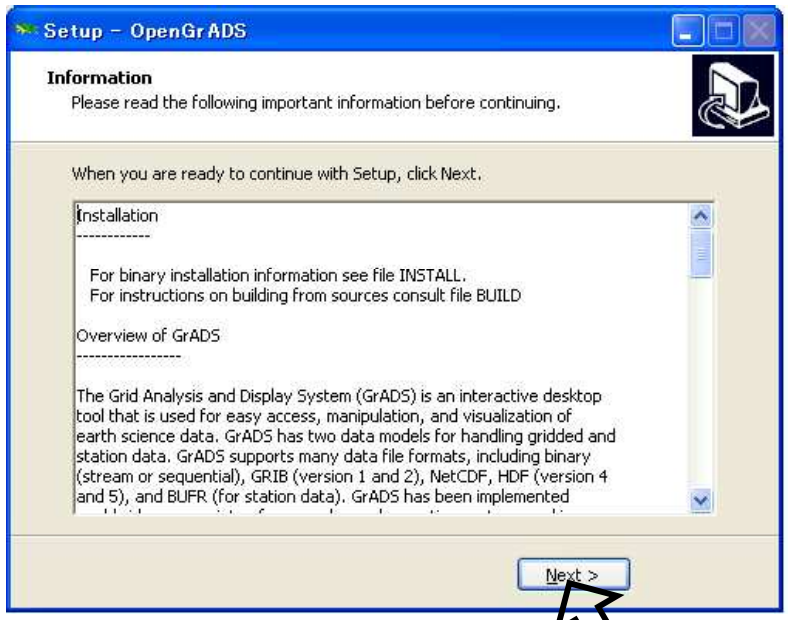

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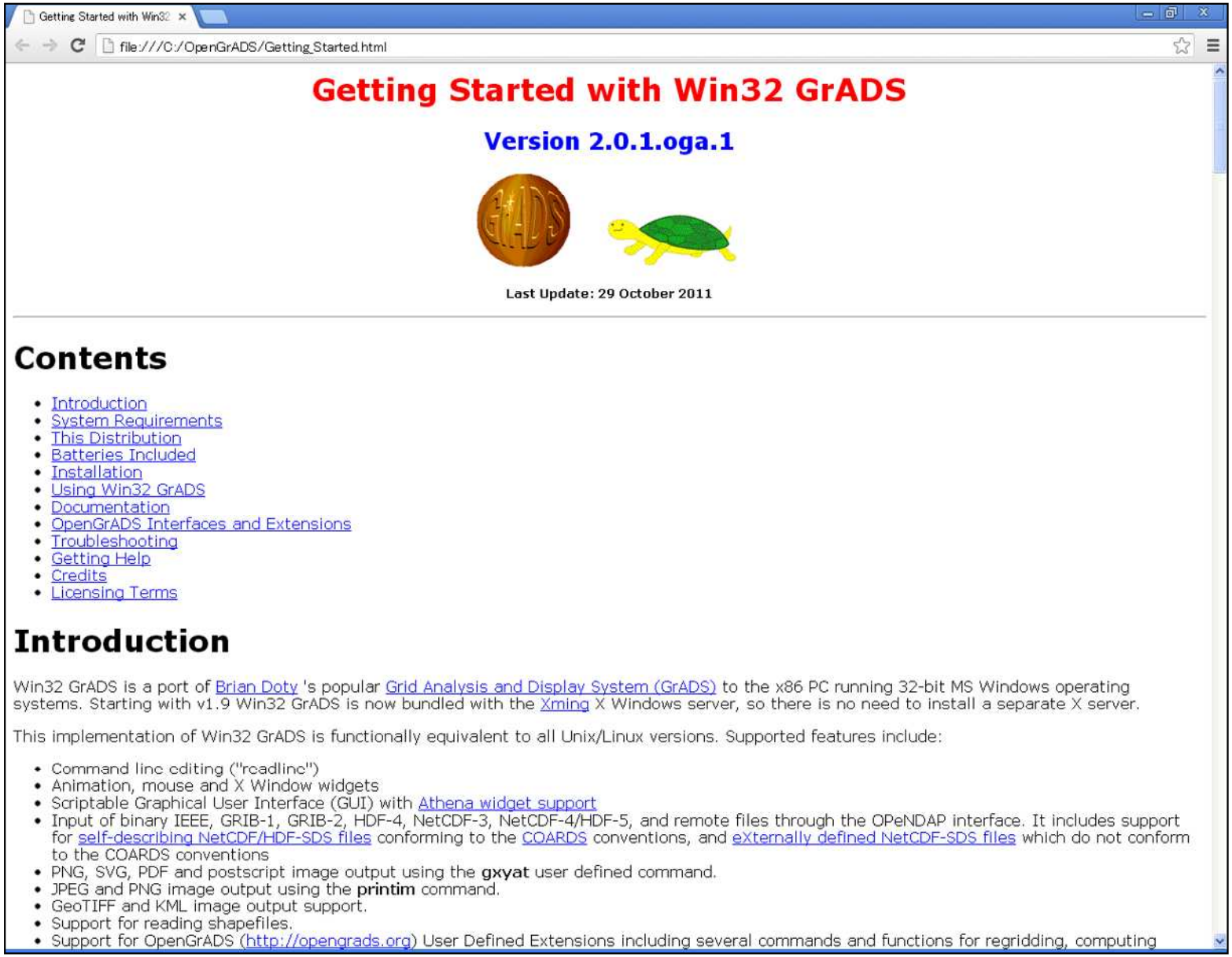
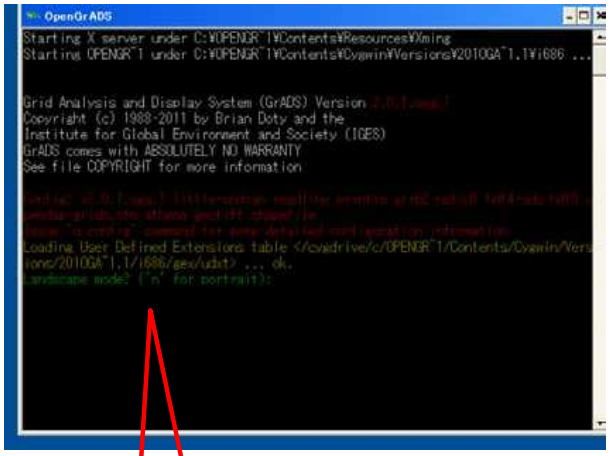
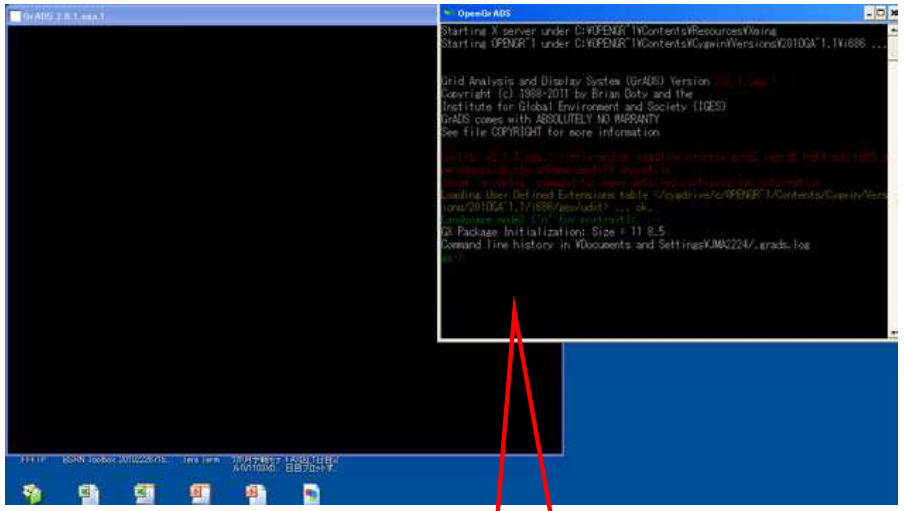

Getting Started with Win32
file:///C:/OpenGrADS/Getting_Started.html
Getting Started with Win32 GrADS
Version 2.0.1.oga.1
Last Update: 29 October 2011
Contents
Introduction
System Requirements
This Distribution
Batteries Included
Installation
Using Win32 GrADS
Documentation
OpenGrADS Interfaces and Extensions
Troubleshooting
Getting Help
Credits
Licensing Terms
Introduction
Win32 GrADS is a port of Brian Doty 's popular Grid Analysis and Display System (GrADS) to the x86 PC running 32-bit MS Windows operating systems. Starting with v1.9 Win32 GrADS is now bundled with the Xming X Windows server, so there is no need to install a separate X server.
This implementation of Win32 GrADS is functionally equivalent to all Unix/Linux versions. Supported features include:
Command line editing ("readline")
Animation, mouse and X Window widgets
Scriptable Graphical User Interface (GUI) with Athena widget support
Input of binary IEEE, GRIB-1, GRIB-2, HDF-4, NetCDF-3, NetCDF-4/HDF-5, and remote files through the OPeNDAP interface. It includes support for self-describing NetCDF/HDF-SDS files conforming to the COARDS conventions, and eXternally defined NetCDF-SDS files which do not conform to the COARDS conventions
PNG, SVG, PDF and postscript image output using the gxyat user defined command.
JPEG and PNG image output using the printim command.
GeoTIFF and KML image output support.
Support for reading shapefiles.
Support for OpenGrADS (http://opengrads.org) User Defined Extensions including several commands and functions for regridding, computing

Start-up of GrADS





CLICK
(OpenGrADS)

Opening message of GrADS

Push “Return” key

Two windows open.

Input command “quit” for exit GrADS.