

문서번호 APCC-출장-17-1414(2017-11-24)

TRAVEL REPORT FORM

출장보고서

결 재	선임연구 원	팀장	부서장	원장
	11/22 김유진	11/23 이우섭	11/24 유진호	11/24 정홍상
협 조				

I. Reporter 보고자

Department 소속	Position 직위(직급)	Name 성명	Travel Date 날짜	Note 비고
기후예측팀	선임연구원	김유진	11/14-11/18	

II. Major Activities 주요업무 수행내용

1. Main Contents and Activities 주요내용 및 활동

가. 개요

- 참가 회의명: ASEAN Climate Outlook Forum (ASEANCOF-9, 15-17, Nov)
 - ASEANCOF는 WMO가 공식적으로 후원하는 Regional Climate Outlook Forum (RCOF) 중 하나로, ASEAN (Association of Southeast Asian Nations) 지역의 기후 전망을 위한 회의임
 - 이번 ASEANCOF는 WMO 장기예보 선도센터, International Research Institute for Climate and Society (IRI), Bureau of Meteorology (BOM) 등이 참석하여 이 지역 각국 기상청 참석자들과 함께 겨울 몬순 시기의 기후 전망에 대한 전문가들의 의견을 공유하고 계절예측 end-user와의 의견을 교환함
- 일시: 2017년 11월 15-17일 (3일간)
- 장소: National Hydro-Meteorological Service, Ha Noi City, Viet Nam
- ★ 붙임1. ASEANCOF 프로그램

나. 활동

- ASEAN 지역(Indonesia, Thailand, Vietnam, Malaysia, Philippines, Singapore, Myanmar, Cambodia, Laos, Brunei)의 2017/18년 겨울 몬순 (12월-2월) 기온 및 강수 전망에 대한 여러 기관 (WMO LC-LRFMME, IRI, BOM, ASEAN 회원국 기상청)의 예보 결과를 공유하고, 계절 예측의 농업/식량 분야 활용에 대한 토의를 진행함. 이를 위해 end user격인 ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre), Global Water Partnership-Southeast Asia (GWP SEA), Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES) 등의 기관이 참석하여 기후 자료의 활용에 대해 발표하였음
- WMO LC-LRFMME 소개 및 ASEAN지역 2017/18 겨울 몬순 시기 전망 발표
 - 발표 제목: Seasonal Climate Outlook for the 2017 Winter Monsoon Season from WMO

- 발표 내용: WMO LC-LRFMME 소개 및 MME 자료를 이용한 DJF 기온, 강수 전망

★ 붙임2. WMO LC outlook 발표 자료

2. Relevance to APEC Climate Center's Activities 결론 및 소감

○ ENSO에 대한 감시 및 전망

- El Nino/Southern Oscillation (ENSO)는 ASEAN 지역 겨울철 강수와 기온의 경년변동에 영향을 미치는 중요한 요인 중 하나이다. 현재의 cool neutral ENSO 상태가 겨울철에 cool neutral ENSO 또는 borderline La Nina가 되고 이후 봄철에 neutral 상태가 될 것으로 전망하였음

○ IOD에 대한 감시 및 전망

- ASEAN 지역 겨울철에 영향을 미치는 또 다른 요인인 Indian Ocean Dipole (IOD)는 positive 상태였는데 겨울철에는 neutral 상태가 될 것으로 전망하였음

○ Consensus Outlook

- 2017/18년 겨울 온도는 많은 지역에서 above normal이 될 것이라고 전망함. Eastern Maritime Continent, northern Mainland, Sumatra에서 가장 높은 온도 예상함. Northern Philippines, Southern Vietnam에서는 below normal 온도를 전망함 (그림 1)

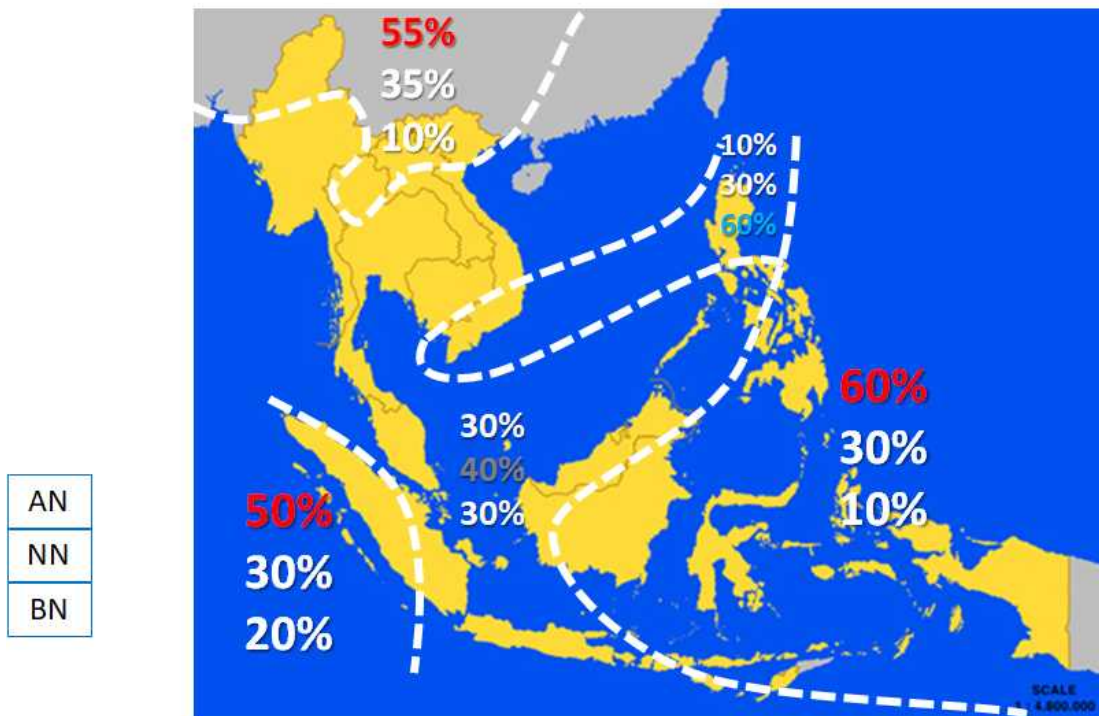


그림 1 Consensus DJF temperature forecast

- 강수는 지역별 격차가 큼. Eastern Maritime Continent, Southern Vietnam, Central and Southern Thailand에서는 above normal이 될 것이라고 전망함. Western Borneo and Northern Mainland에서는 below normal 강수를 전망하고, 다른 곳에서는 near normal 강수를 예상함 (그림 2)

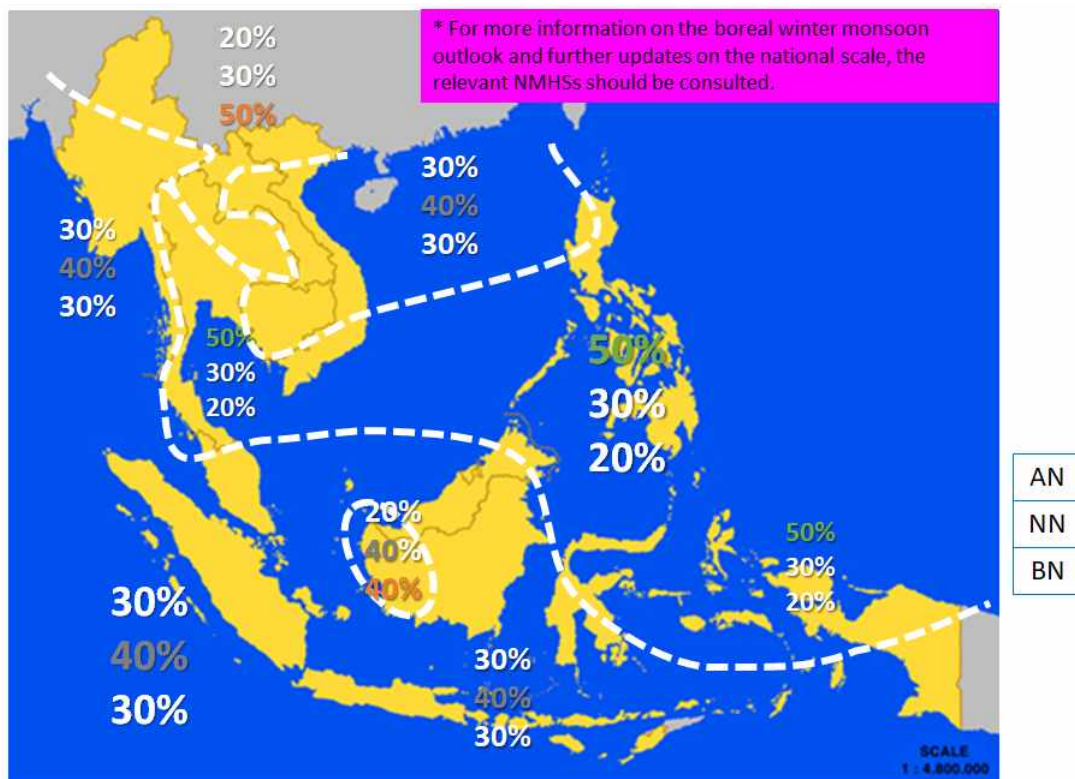


그림 2 Consensus DJF rainfall forecast

★ 붙임3. ASEANCOF-9 final consensus

III. References 참고사항

(with attachment of any information or report in case of attendance of conferences, workshops and meetings) 학술대회, 워크숍, 회의 등 참석 시 관련 정보 및 문서 첨부

1. Presented and Collected Materials 주요 수집자료

2. Suggestions and Remarks 건의사항

Ninth ASEAN Climate Outlook Forum (ASEANCOF-9)

15 – 17 November 2017, Hanoi



WORLD
METEOROLOGICAL
ORGANIZATION



This project was undertaken with the financial support of:
Ce projet a été réalisé avec l'appui financier de :



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

ASEANCOF-9 PROGRAMME

Meeting Venue: National Hydro-Meteorological Service of Viet Nam (NHMS)

No 8 Phao Dai Lang, Dong Da, Ha Noi ([Google Map](#)), Room: TBC

15 Nov (Wed): Pre-COF Consensus Building for GPCs, Int'l Climate Centres, and NMHSs only

16-17 Nov (Thu, Fri): Main COF Day 1 and Day 2 for all participants including end-users

	Activity	Presenter/Remarks
PRE-COF (15 Nov, WEDNESDAY)		
08:30-09:00	Registration	Local Organising Committee
Opening Remarks		
MC: NHMS of Viet Nam		
09:00	Welcome Address by NHMS of Viet Nam	Mr. Tran Hong Thai Deputy Director General NHMS of Viet Nam
09:15	Opening Remarks by WMO Representative	Mr Jochen Luther Project Officer Development and Regional Activities Department World Meteorological Organization
09:30	Overview presentation on the sponsoring project: <i>Building Resilience to High-Impact Hydro-meteorological Events through Strengthening Multi-Hazard Early Warning Systems in Small Island Developing States (SIDS) and Southeast Asia (SEA)</i>	Mr Jochen Luther
10:00-10:30	Tea Break	Local Organising Committee <i>Group photo-taking</i>

Ninth ASEAN Climate Outlook Forum (ASEANCOF-9)

15 – 17 November 2017, Hanoi

	Activity	Presenter/Remarks
PRE-COF (15 Nov, WEDNESDAY)		
Session 1 (Chair: Dr Hoang Phuc Lam) Global model forecasts for DJF 2017-2018 - Brief description of the current status of WMO Global Producing Centres' (GPCs) of Long Range Forecasts and activities of other centres producing global long range forecasts. - Models' skill for Southeast Asia region based on verification of historical forecasts (hindcasts). <u>Seasonal forecasts for temperature and rainfall DJF 2017-2018 for Southeast Asia region, including the seasonal evolution of large-scale circulation features of importance to Southeast Asian climate, such as ENSO, IOD and monsoon circulation.</u>		
10:30	BoM Climate Outlook	Dr Paul Gregory Bureau of Meteorology (BoM)
11:00	IRI Climate Outlook	Dr Simon Mason International Research Institute for Climate and Society (IRI) Columbia University
11:30	WMO LC-LRFMME Climate Outlook	Ms Yoojin Kim WMO Lead Centre for Long-Range Forecast MME (WMO LC LRFMME)
12:00	JMA and UKMO Climate Outlook	Presentations on behalf of JMA and UK MetOffice
12:30	ECMWF Climate Outlook (remote)	Dr Linus Magnusson European Centre for Medium-range Weather Forecasts (ECMWF)
13:00-14:00	Lunch	Local Organising Committee
Session 2 (Chair: Dr Paul Gregory) Long Range Forecast activities of ASEAN NMHSs and country-level forecasts for DJF 2017-2018 - Basis/techniques/model used by ASEAN National Meteorological and Hydrological Services' (NMHSs) to make seasonal predictions. - Climate drivers/features of importance for the respective countries. <u>Country-level seasonal forecasts for temperature and rainfall for DJF 2017-2018.</u>		
14:00	Seasonal Outlook for Brunei	Ms Harnina Morani Brunei Darussalam Meteorological Department (BDMD)
14:15	Seasonal Outlook for Indonesia	Mrs Evi Lutfiati Indonesian Agency for Meteorological, Climatological and Geophysics (BMKG)
14:30	Seasonal Outlook for Laos	Mr Phouthanoxay Sengduangduan Department of Meteorology and Hydrology, Lao PDR (DMH)
14:45	Seasonal Outlook for Malaysia	Mr Afizal Haqem Malaysian Meteorological Department (MMD)
15:00	Seasonal Outlook for Myanmar	Dr Than Naing Department of Meteorology and Hydrology, Myanmar (DMH)

Ninth ASEAN Climate Outlook Forum (ASEANCOF-9)

15 – 17 November 2017, Hanoi

	Activity	Presenter/Remarks
PRE-COF (15 Nov, WEDNESDAY)		
15:15	Seasonal Outlook for Philippines	Ms Ana Liza Solis Philippine Atmospheric, Geophysical & Astronomical Services Administration (PAGASA)
15:30-16:00	Tea Break	Local Organising Committee
(Chair: Mr Raizan Rahmat)		
16:00	Seasonal Outlook for Singapore	Mr Ryan Kang Centre for Climate Research Singapore, Meteorological Service Singapore (MSS)
16:15	Seasonal Outlook for Thailand	Ms Kannika Jaikham Thai Meteorological Department (TMD)
16:30	Seasonal Outlook for Vietnam	Dr Hoang Phuc Lam National Hydro-Meteorological Service of Viet Nam (NHMS)
16:45	Summary/Open Discussions	Dr Paul Gregory Bureau of Meteorology (BoM)
17:00	Consensus Outlook Discussions and Formulation	Dr Hoang Phuc Lam National Hydro-Meteorological Service of Viet Nam (NHMS) Mr Raizan Rahmat ASEAN Specialised Meteorological Centre (ASMC)
18:00	End of Pre-COF	

Ninth ASEAN Climate Outlook Forum (ASEANCOF-9)

15 – 17 November 2017, Hanoi

	Activity	Presenter/Remarks
MAIN COF DAY 1 (16 Nov, THURSDAY)		
Session 3 Applications to the agricultural community - impacts, user requirements and forecast communications • Applications of seasonal predictions to agricultural management • Products and services that agricultural end-users of seasonal forecasts consider useful at the national or regional level • Collaboration initiatives between global/national seasonal forecasts providers and the agricultural sector		
08:30-09:00	Registration	Local Organising Committee
Session 3a (Chair: Dr Yoojin Kim)		
09:00	<i>AHA Centre's activities relating to food security/climate risk</i>	Mr Qingyuan Pang ASEAN Coordinating Centre for Humanitarian Assistance on disaster management (AHA Centre)
09:20	<i>GWP SEA's activities and links with the agricultural community</i>	Mr Do Manh Hung Global Water Partnership - Southeast Asia (GWP SEA), Vietnam
09:40	<i>RIMES's activities and links with the agricultural community</i>	Dr Jothiganesh Shanmugasundaram Regional Integrated Multi-Hazard Early Warning System for Africa and Asia (RIMES)
10:00	Presentation of Consensus Outlook DJF 2017-2018 <i>Including review of outlook for JJA 2017</i>	Mr Raizan Rahmat ASEAN Specialised Meteorological Centre (ASMC)
10:30-11:00	Tea Break	Local Organising Committee
Session 3b (Chair: Ms Jihye Lee)		
11:00	Collaborations with agricultural community of Vietnam and their requirements	To-be-confirmed National Hydro-Meteorological Service of Viet Nam (NHMS)
11:15	Collaborations with agricultural community of Thailand and their requirements	Ms Kannika Jaikham Thai Meteorological Department (TMD)
11:30	Collaborations with agricultural community of Philippines and their requirements	Ms Ana Liza Solis Philippine Atmospheric, Geophysical & Astronomical Services Administration (PAGASA)
11:45	Collaborations with agricultural community of Myanmar and their requirements	Dr Than Naing Department of Meteorology and Hydrology, Myanmar (DMH)
12:00	Collaborations with agricultural community of Malaysia and their requirements	Mr Afizal Haqem Malaysian Meteorological Department (MMD)
12:15	Collaborations with agricultural community of Laos and their requirements	Mr Phouthanoxay Sengduangduan Department of Meteorology and Hydrology, Lao PDR (DMH)

Ninth ASEAN Climate Outlook Forum (ASEANCOF-9)

15 – 17 November 2017, Hanoi

	Activity	Presenter/Remarks
MAIN COF DAY 1 (16 Nov, THURSDAY)		
12:30	Collaborations with agricultural community of Indonesia and their requirements	Mrs Evi Lutfiati Indonesian Agency for Meteorological, Climatological and Geophysics (BMKG)
12:45	Collaborations with agricultural community of Brunei and their requirements	Ms Harnina Morani Brunei Darussalam Meteorological Department (BDMD)
13:00-14:00	Lunch	Local Organising Committee
Session 3c (Chair: Ms Ana Liza Solis)		
14:00	SPREP's collaborations with agricultural community and their requirements (PICOE)	Mr. Alexander Montoro Secretariat of the Pacific Regional Environment Programme (SPREP)
14:20	The recent activities of the WMO LC_LRFMME	Ms Jihye Lee Korea Meteorological Agency (KMA)
14:40	IRI's collaborations with agricultural community and their requirements	Dr Simon Mason International Research Institute for Climate and Society (IRI) Columbia University
15:00	BoM's collaborations with agricultural community and their requirements	Dr Paul Gregory Bureau of Meteorology (BoM)
15:20-15:50	Tea Break	Local Organising Committee
Session 4 (Chair: Dr Simon Mason)		
Breakout group activity		
15:50	Group discussions on effective/potential use of seasonal predictions to agriculture <i>Discussions and preceding presentations will contribute to a short report on agricultural applications of seasonal predictions in Southeast Asia.</i>	Dr Simon Mason International Research Institute for Climate and Society (IRI) Columbia University
17:30	End of Main COF Day 1	
18:00	Assemble for Welcome Reception/Cultural Show	Local Organising Committee

Ninth ASEAN Climate Outlook Forum (ASEANCOF-9)

15 – 17 November 2017, Hanoi

	Activity	Presenter/Remarks
MAIN COF DAY 2 (17 Nov, FRIDAY)		
Session 5 (Chair: Dr Simon Mason) Seasonal Consensus Forecast/Discussions		
08:30-09:00	Registration	Local Organising Committee
09:00	Summary of breakout group activity and discussions <i>Discussions and preceding presentations will contribute to a short report on agricultural applications of seasonal predictions in Southeast Asia.</i>	Dr Simon Mason International Research Institute for Climate and Society (IRI) Columbia University Mr Raizan Rahmat ASEAN Specialised Meteorological Centre (ASMC)
10:30-11:00	Tea Break	Local Organising Committee
11:00	Southeast Asia Regional Climate Centre Network (SEA RCC-Network) and Climate Monitoring Activities (Climate Watch/ENSO Watch) <i>To inform progress of the SEA RCC-Network and to discuss on the development of the Climate Watch/ENSO Watch for the region.</i>	Ms Ana Liza Solis (PAGASA) Climate Monitoring Lead Node SEA RCC-Network
12:00-13:00	Lunch	Local Organising Committee
Session 6 Educational tour/visit		
13:30	Tour of the National Hydro-Meteorological Service of Viet Nam (NHMS)	Local Organising Committee
14:30	Meteorological Observation Station Visit (with elements of agriculture)	Local Organising Committee
17:30	Closing Remarks <i>Wrap-up and feedback</i> End of Main COF Day 2	Local Organising Committee

- End of Programme -



WMO Lead Centre for
Long-Range Forecast Multi-Model Ensemble

Seasonal Climate Outlook for the 2017 Winter Monsoon Season from WMO LC-LRFMME

Yoojin Kim and WMO LC-LRFMME team

The 9th ASEAN Climate Outlook Forum (ASEANCOF-9)
15-17 November 2017
Ha noi City, Vietnam



01

Introduction of WMO Lead Centre for Long Range
Forecast Multi Model Ensemble (**WMO LC-LRFMME**)

02

Seasonal Outlook for DJF 2017
- Ocean condition and outlook
- Forecast for DJF 2017

03

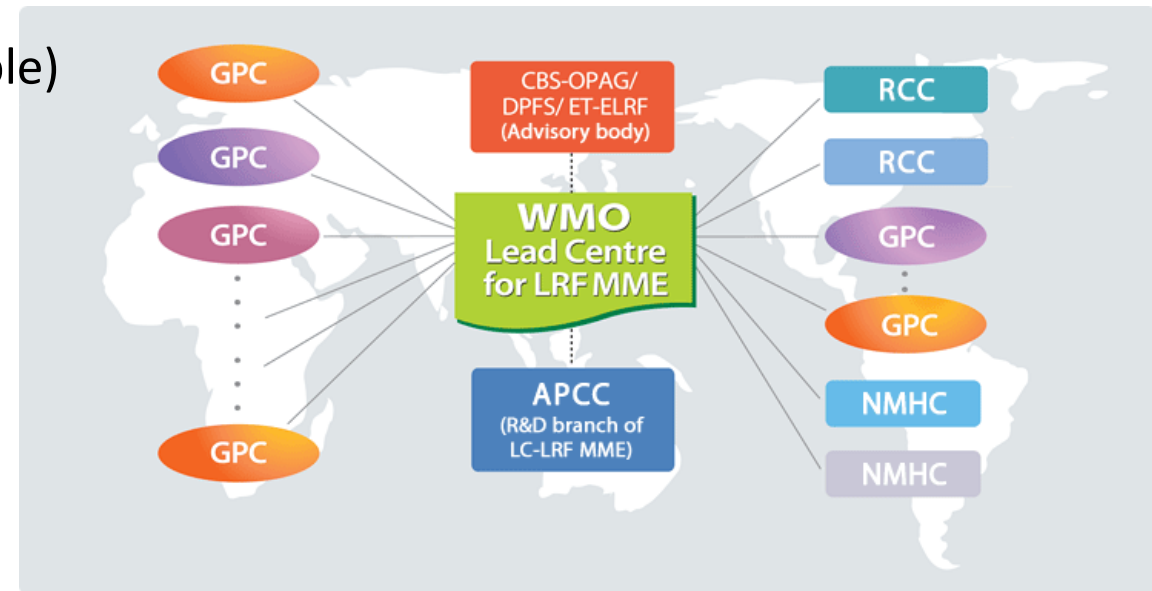
Summary

**WMO Lead Centre for
Long-Range Forecast Multi-Model Ensemble
(WMO LC-LRFMME)**



What is WMO LC-LRFMME?

- WMO LC LRFMME
- (Lead Center for Long Range Forecast Multi-Model Ensemble)
- Data collection from the GPC's in the world
- Standardization
- Producing seasonal forecast & verification data by MME
- Dissemination



- ➔ If many GPCs' products are combined by ensemble skill, MME forecast data
 1. significant improvement
 2. contribute to prevent and mitigate the climate disaster
 3. contribute to build socio-economic plan taking into account variable climatic conditions

WMO Global Producing Centres (13 GPCs)



- Beijing: China Meteorological Administration (CMA)/ Beijing Climate Center (BCC)
- CPTEC: Center for Weather Forecasting and Climate Research/ National Institute for Space Research (INPE)
- ECMWF: European Centre for Medium-Range Weather Forecasts
- Exeter: Met Office, United Kingdom
- Melbourne: Bureau of Meteorology (BoM), Australia
- Montreal: Meteorological Service of Canada (MSC)
- Offenbach: Deutscher Wetterdienst

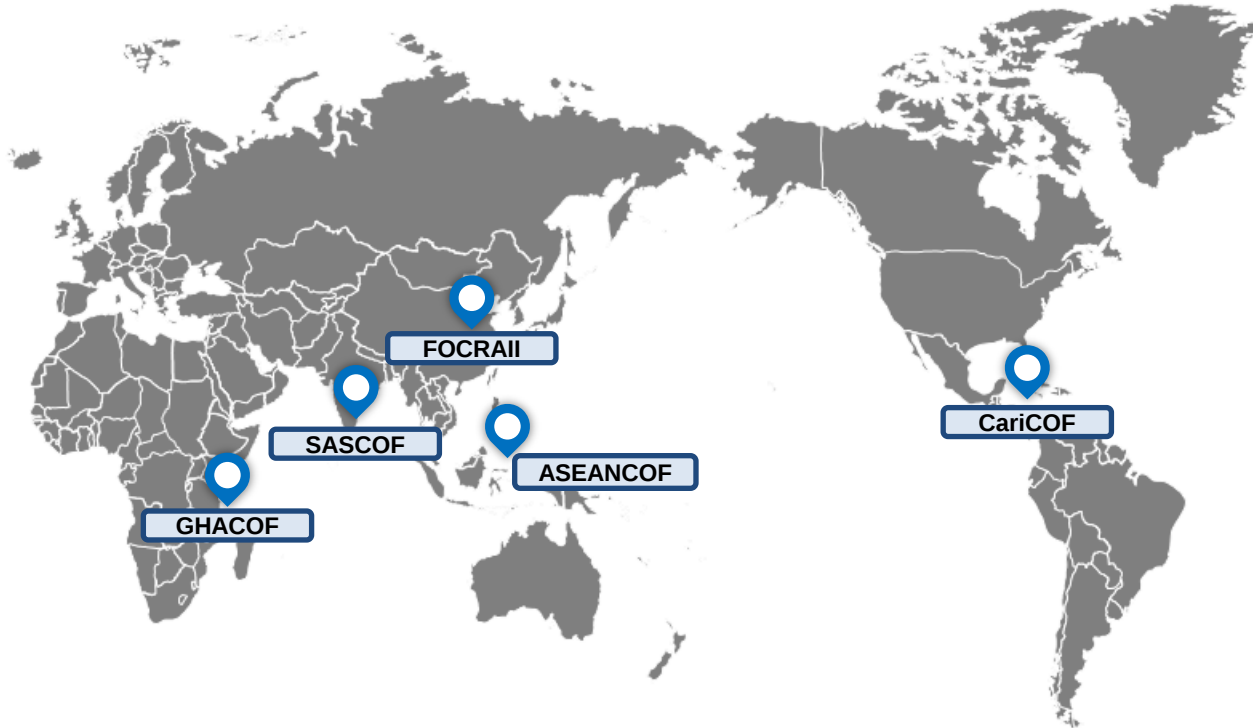
- Moscow: Hydrometeorological Centre of Russia
- Pretoria: South African Weather Services (SAWS)
- Seoul: Korea Meteorological Administration (KMA)
- Tokyo: Japan Meteorological Agency (JMA)/ Tokyo Climate Center (TCC)
- Toulouse: Météo-France
- Washington: Climate Prediction Center (CPC), National Oceanic and Atmospheric Administration, United States of America

➤ A benefit: diversity of model set, an important condition to improve the MME's forecast skill



Activities of WMO LC-LRFMME

❖ Support for Regional Climate Outlook Forums



In 2016,

SASCOF-8	4/25-26 (Colombo, Sri Lanka)
GHACOF43	5/30-31 (Naivasha, Kenya)
SASCOF-9	9/27-28 (Nay Pyi Taw, Myanmar)
ASEANCOF-7	11/14-18 (Manila, Philippines)
CariCOF	12/1-3 (St. George's, Grenada)

❖ Support for Global Seasonal Climate Update (GSCU)

- A new Initiative for [Consensus-Based Real Time Monitoring and Prediction](#) of Seasonal Climate of the World
- To provide the world community with [an expert consensus on the state of the global climate with an outlook](#) for the upcoming season along with information on robustness of the available forecast signals.
- To strengthen [international collaboration and information flow](#) between global, regional and national level operational climate monitoring and prediction centres
- For use by RCCs, RCOFs and NMHSs for [assistance in preparation of regional and national climate Updates](#)

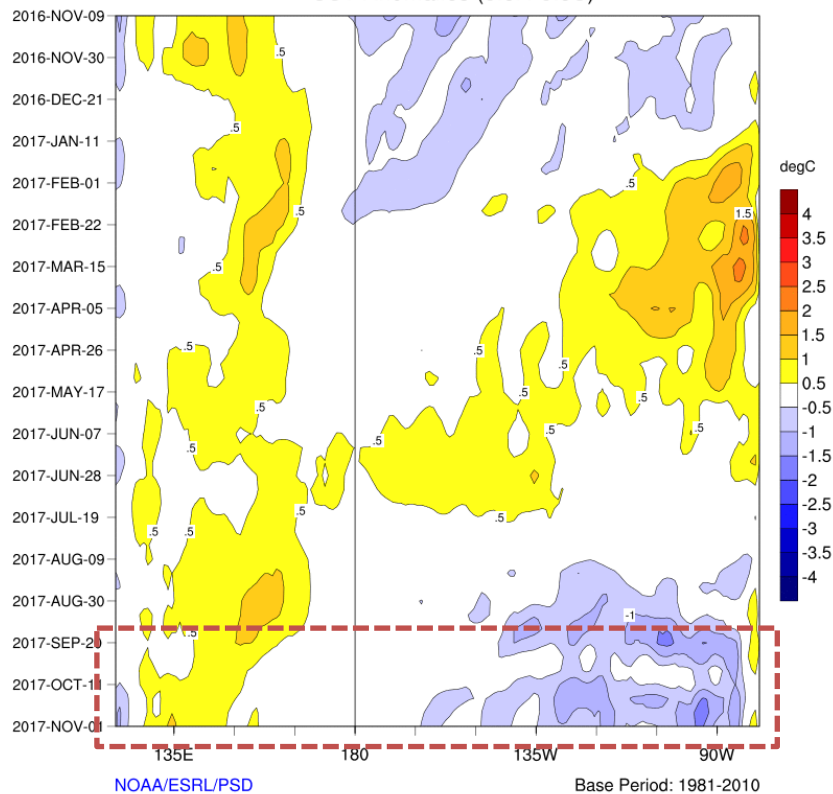
Current Oceanic Condition (Tropical Pacific Ocean & Indian Ocean)



Recent Equatorial Pacific Ocean SST

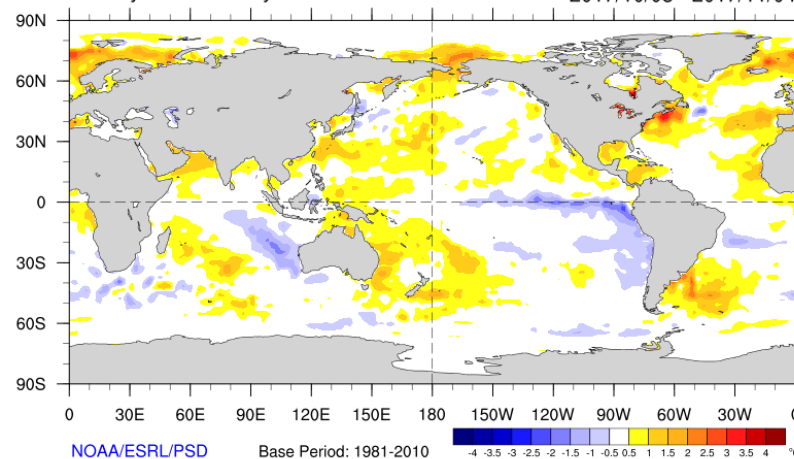
- Cold SST anomalies have been expanded in the East tropical Pacific since late summer, warm SST anomalies are prolonged in the western tropical Pacific.
- A La Nina-like SST pattern is observed in the tropical Pacific (but not strong)
- The stronger convective atmospheric activity is developed in the western tropical Pacific and Maritime Continent.

SST Anomalies (3.5N-3.5S)



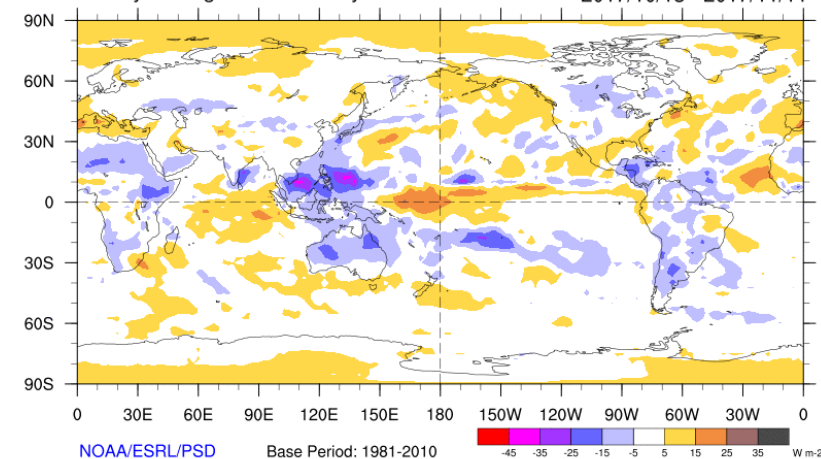
Monthly SST Anomaly

2017/10/08 - 2017/11/04



30-Day Average OLR Anomaly

2017/10/13 - 2017/11/11

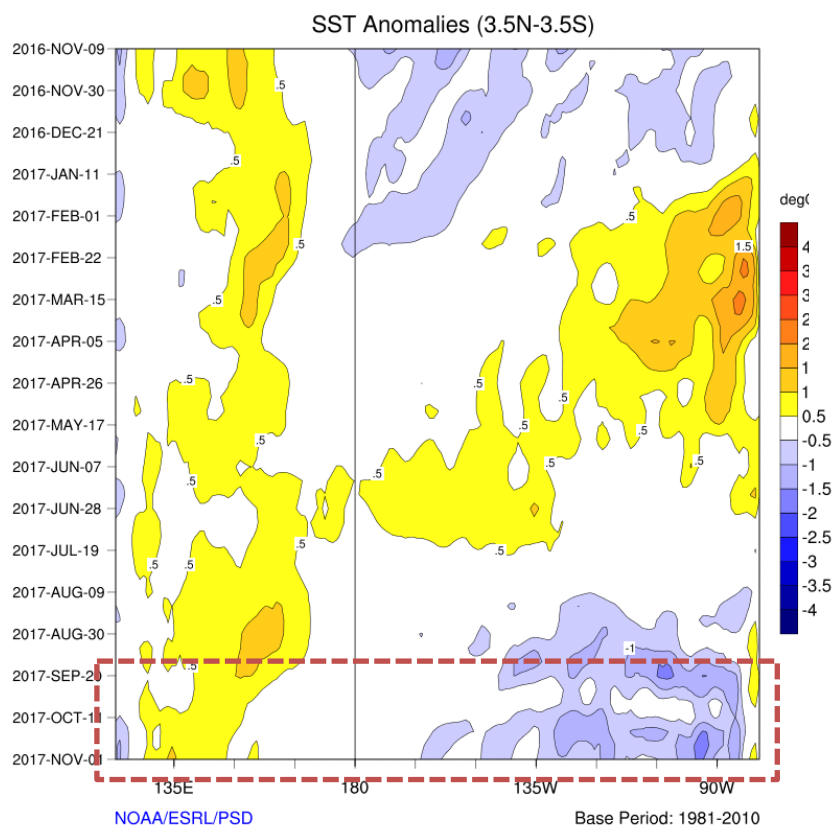


OLR Outgoing Longwave Radiation

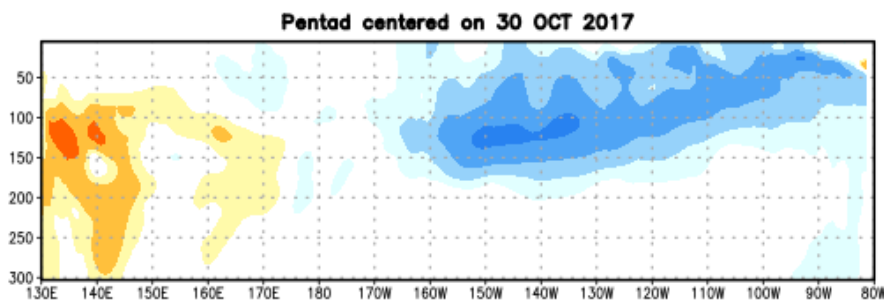


Recent Equatorial Pacific Ocean subsurface temperature

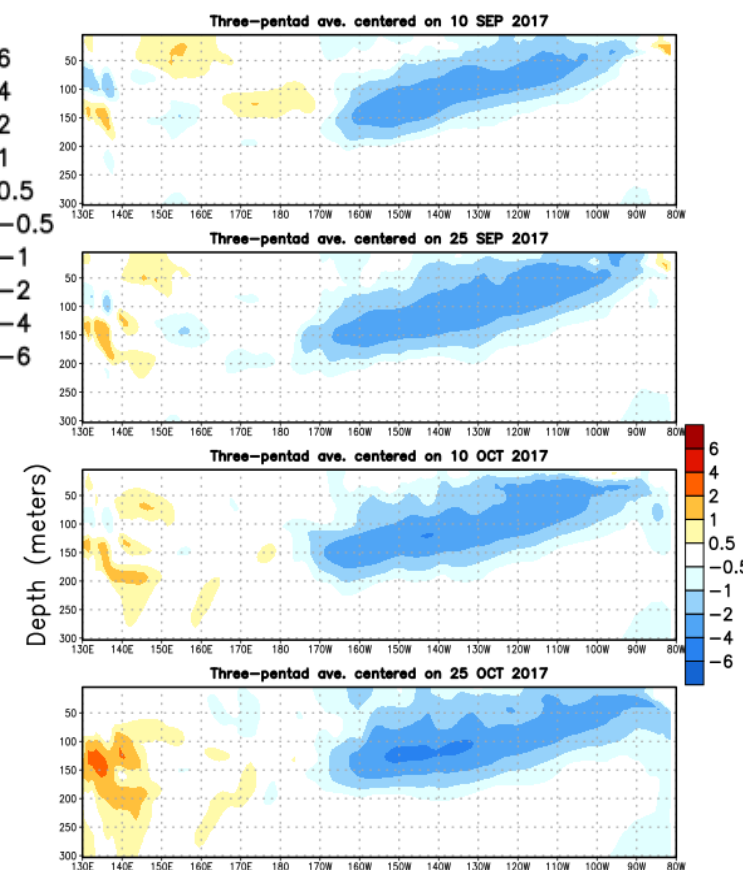
- Pacific Equatorial subsurface temperature anomalies show cold anomalies in the eastern part in the recent week.
- The cold subsurface temperature anomalies have been strengthened in the last two months.
- The warm subsurface temperature anomalies also have been strengthened in the western Pacific.
- Developing La Nina-like pattern



EQ. Subsurface Temperature Anomalies (deg C)



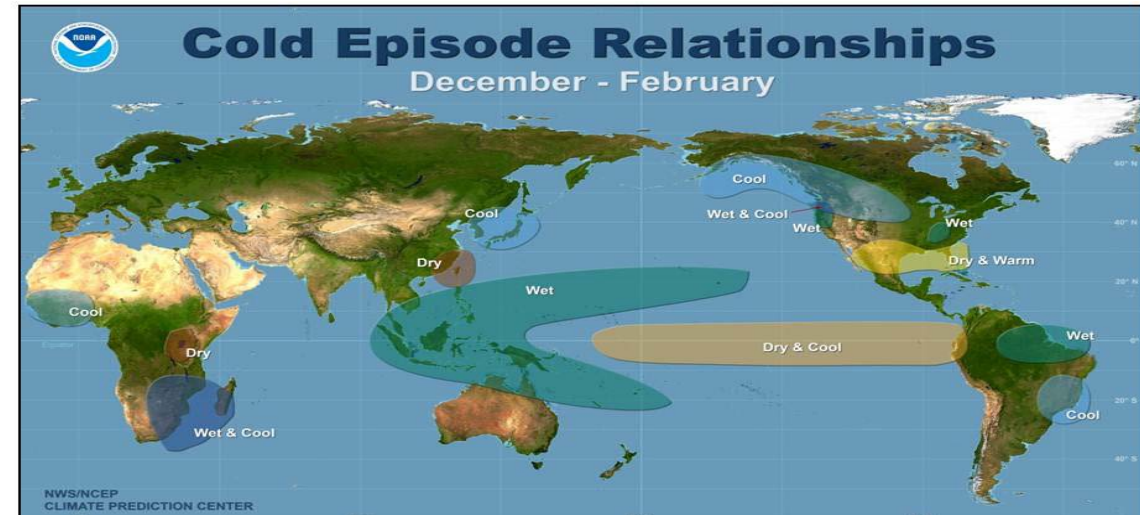
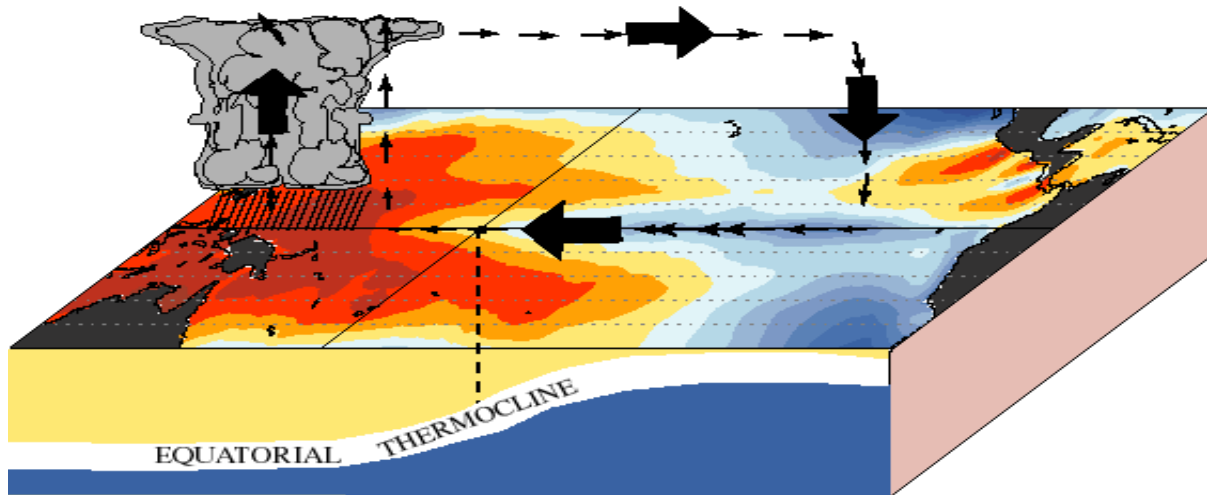
EQ. Subsurface Temperature Anomalies (deg C)



La Niña & Southeast Asian Winter Monsoon

DJF Ocean & precipitation in the La Niña episode

December - February La Niña Conditions

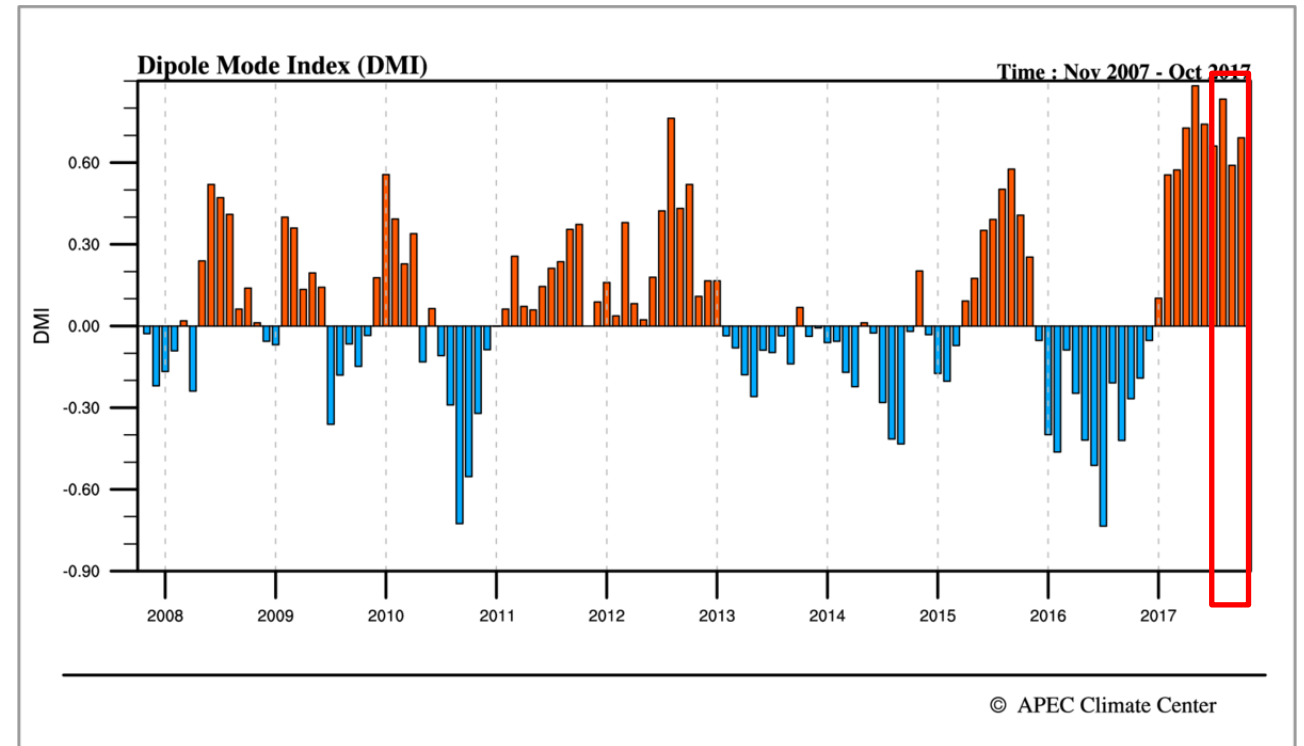
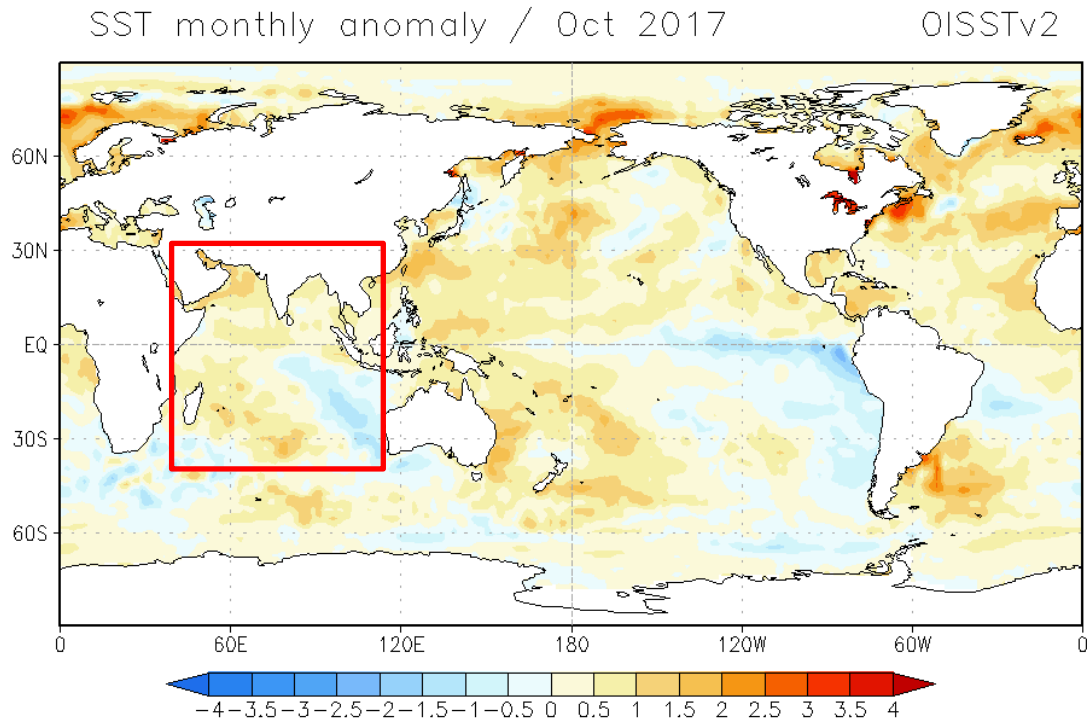


- DJF : Mature season of ENSO
- Tropical western Pacific SST warming, strong convection in the warm pool region
- Negative anomaly OLR
- The wet tropical western Pacific is expected.



Recent Indian Ocean SST

- In the western Indian Ocean, SST anomalies were warm, while in the eastern part, the SST anomalies were cold during October.
- The Indian Ocean Dipole (IOD) index is positive recently.



courtesy of APEC Climate Center

Seasonal Outlook: Winter 2017/18



Participating GPCs for Winter 2017/18 Prediction

GPC	CPTEC	ECMWF	Exeter	Melbourne	Montreal	Offenbach	Tokyo	Washington
Institute	CPTEC	ECMWF	UKMO	BoM	MSC	DWD	TCC	NCEP
Hindcast period	1979-2010	1981-2010	1993-2015	1980-2011	1981-2010	1981-2010	1979-2010	1981-2010

	2017			2018				
Initial Month	10	11	12	1	2	3	4	5
Nov								

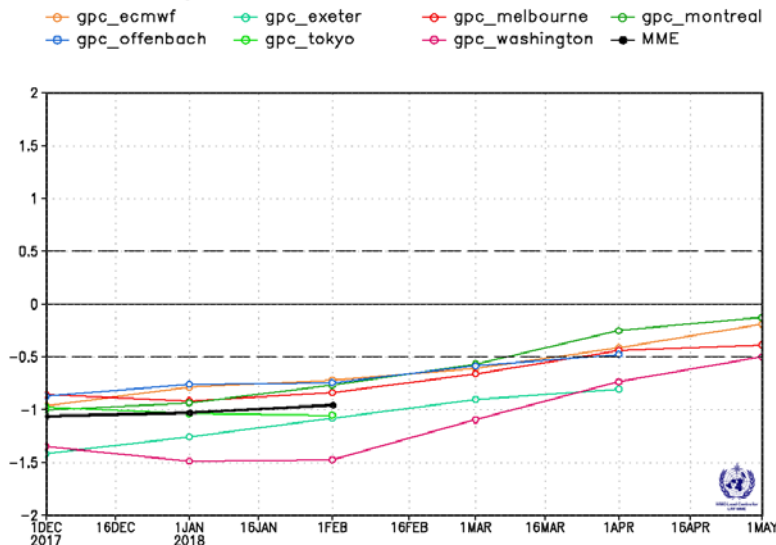
- 8 models are included.
- Variable : 2m temperature, precipitation, mean sea level pressure, 850hPa temperature, 500hPa GPH, sea surface temperature (if available)
- New GPC, GPC-Offenbach, is included (since August 2017).



ENSO and IOD Prediction

ENSO

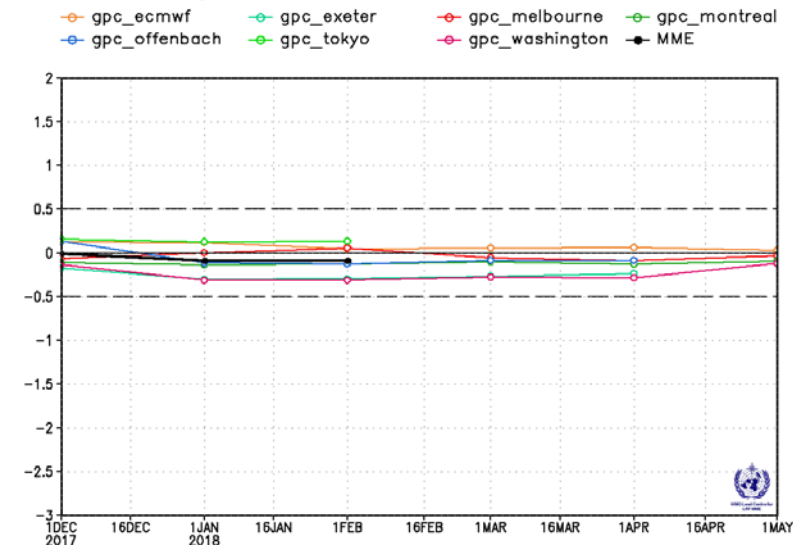
Forecast of Nino3.4 SST Anomalies
Dec2017 to Aug2018



- Cold SST anomalies are predicted in the eastern tropical Pacific during DJF.
- Warm SST anomalies are predicted in the tropical western Pacific.
- Na Nina is predicted in DJF and then it will be recovered in spring.
- But!! Most part of SSTs in ASEAN region are neutral.

IOD

Forecast of IOD Anomalies
Dec2017 to Aug2018



- The week zonal gradient of SST in the Indian Ocean is predicted during DJF.
- Neutral IOD is predicted.

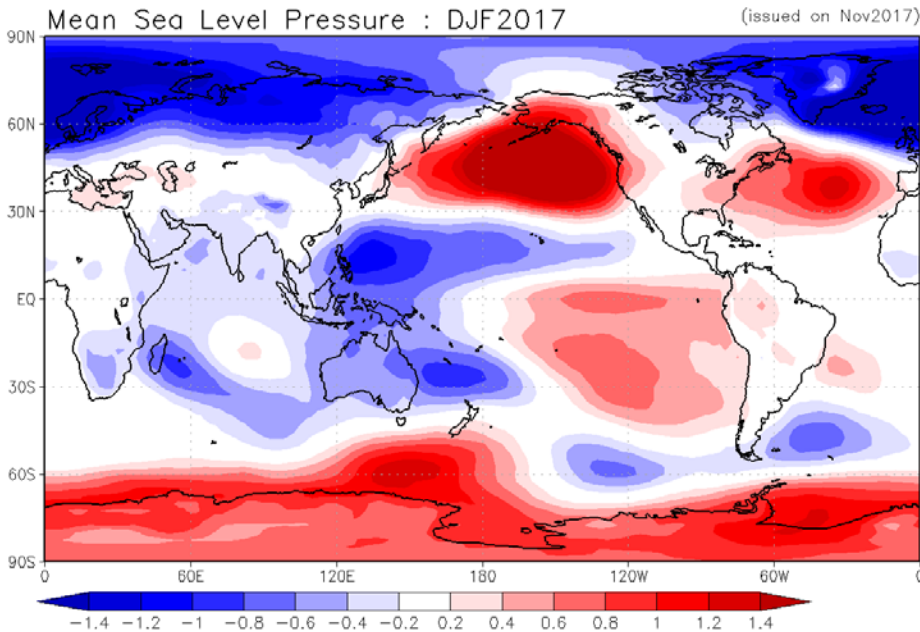


MME: Sea level pressure for DJF 2017/18

Deterministic MME

Simple Composite Map

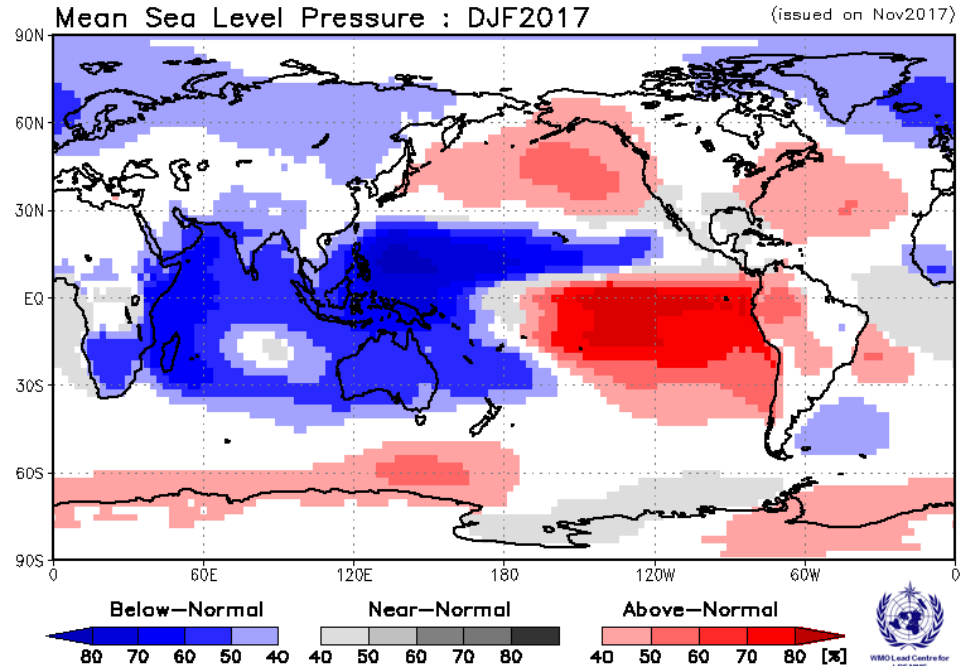
cptec/ecmwf/exeter/melbourne/montreal/offenbach/tokyo/washington



Probabilistic MME

Probabilistic Multi-Model Ensemble Forecast

/GPC_washington/GPC_tokyo/GPC_exeter/GPC_melbourne/GPC_cptec/GPC_montreal
/GPC_ecmwf/GPC_offenbach

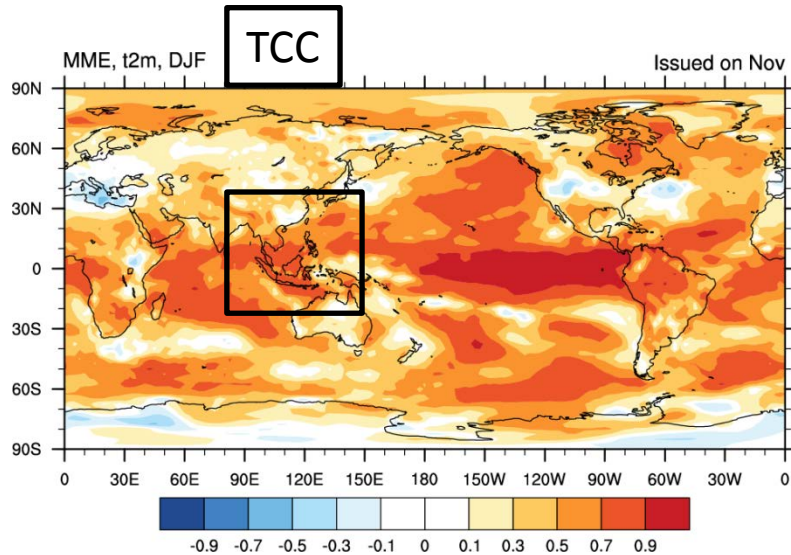


- Negative SLP anomalies are predicted in tropical western Pacific -> convection activity.
- Strong negative SLP anomalies are limited to the western Pacific.
- More than 50% models predict below normal SLP in western Pacific and Indian Ocean
- But the negative SLP anomalies strength are not strong in the Indian Ocean, relatively.
- Positive SLP anomalies are located in tropical eastern Pacific – La Nina related pattern



MME: 2m temperature for DJF 2017/18

ROC



- The TCC (Temporal Correlation Coefficient) skills in the ASEAN region are quite good in DJF season.
- The ROC (Relative Operating Characteristics) skills are quite good for above/below normal during DJF season. But for Normal condition, the ROC skills are not reliable.
- The MME predicts cold temperature in southern part of main land. Warm temperatures are predicted in the northern part of mainland, and western Pacific. Most other parts are near normal.

Deterministic MME

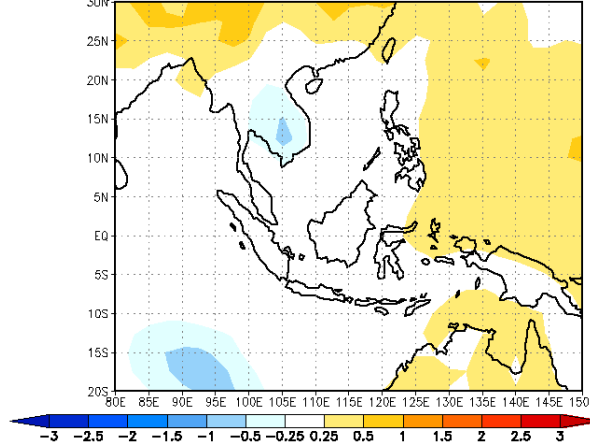
Simple Composite Map

GPC_Washington/GPC_Tokyo/GPC_Montreal/GPC_Melbourne/GPC_Exeter/GPC_EDMWF/GPC_CPTec/GPC_Offenbach

[Unit: K]

(issued on Nov2017)

2m Temperature : DJF2017



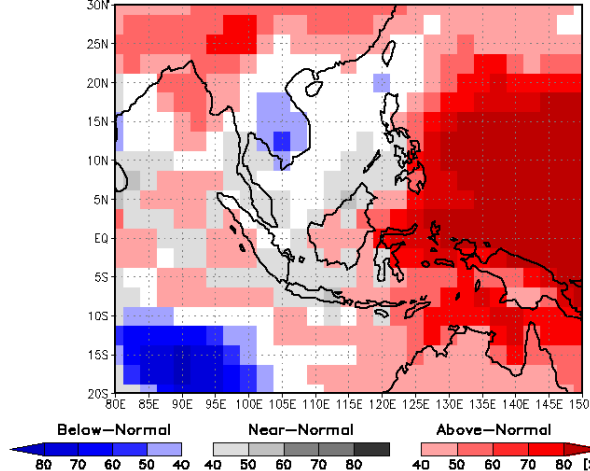
Probabilistic MME

Probabilistic Multi-Model Ensemble Forecast

/GPC_washington/GPC_tokyo/GPC_exeter/GPC_melbourne/GPC_cptec/GPC_montreal
/GPC_edmwf/GPC_offenbach

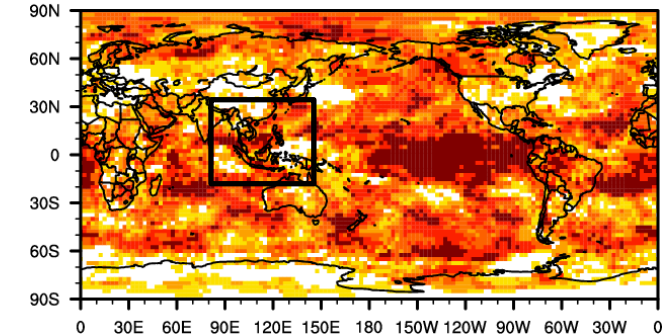
2m Temperature : DJF2017

(issued on Nov2017)

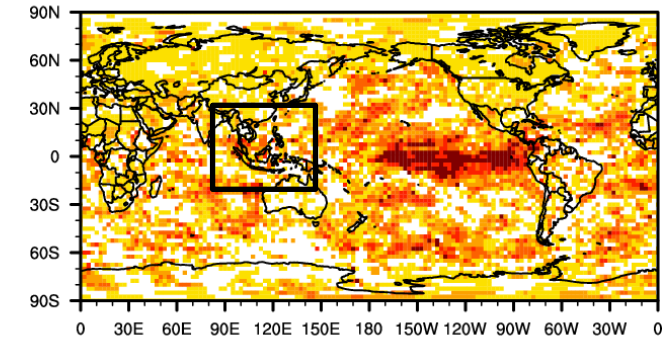


pmme, TMP2m, DJF (issued on Nov)

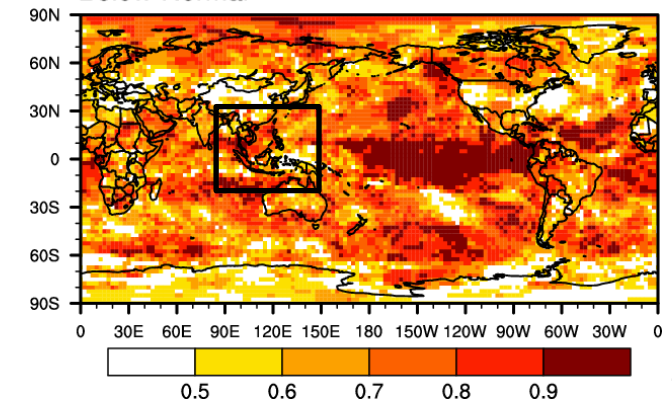
Above-Normal



Near-Normal



Below-Normal





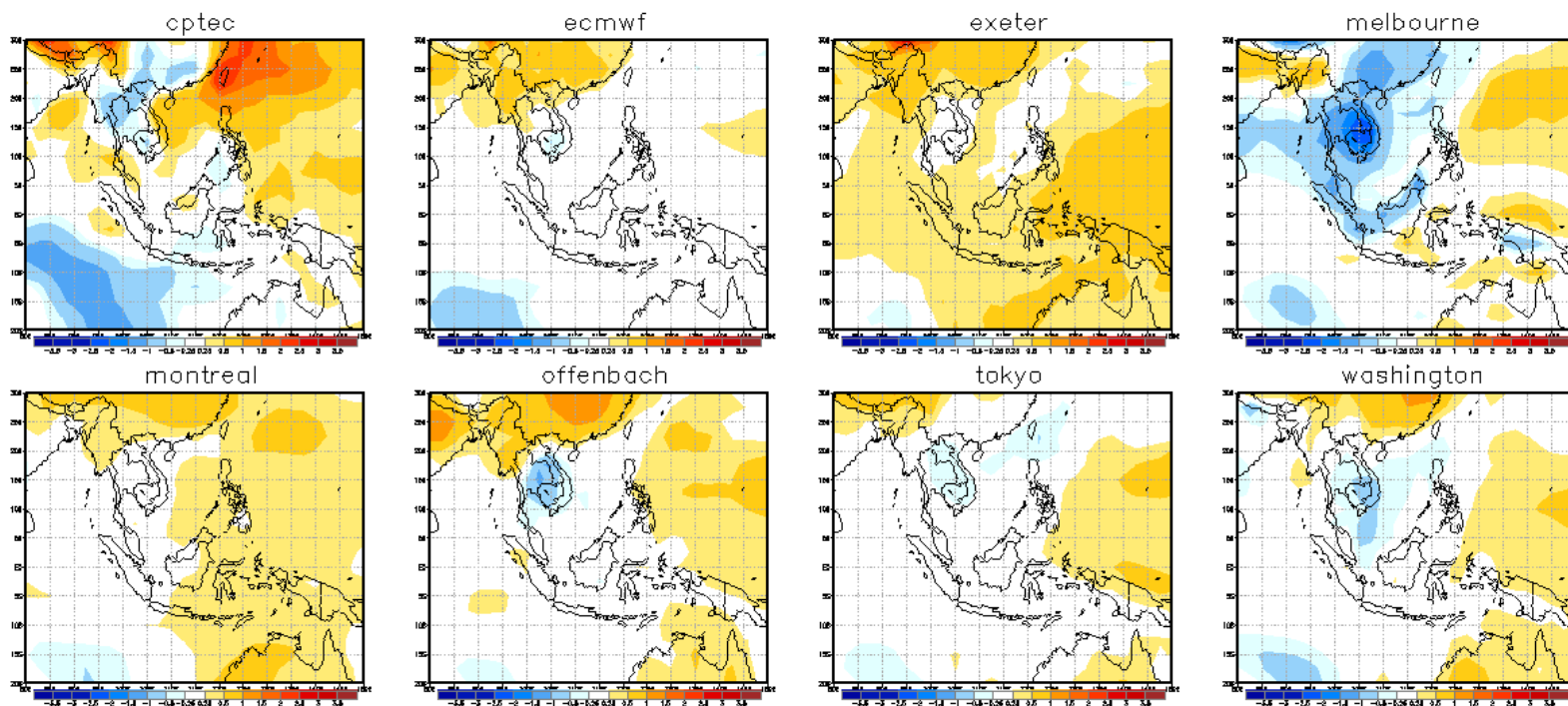
Individual forecast: 2m temperature for DJF 2017/18

lat=-20 30
lon=80 150

2m Temperature : DJF2017

(issued on Nov2017)

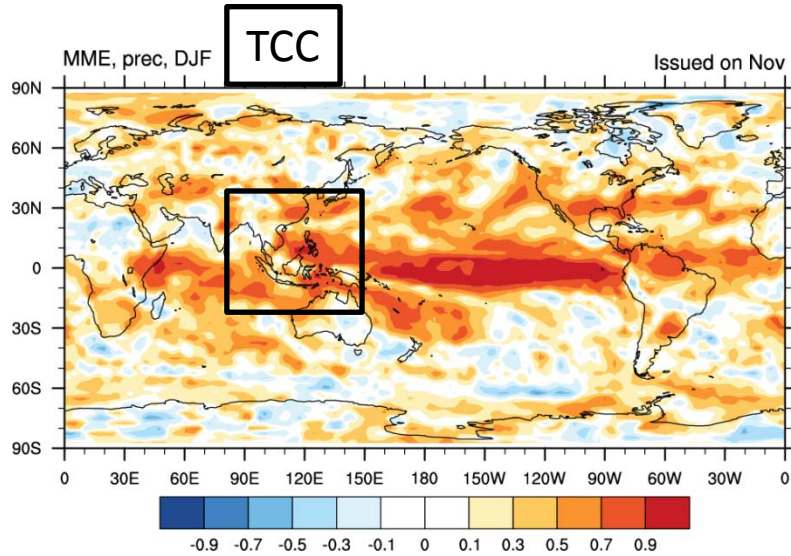
[Unit: K]





MME: Precipitation for DJF 2017/18

ROC

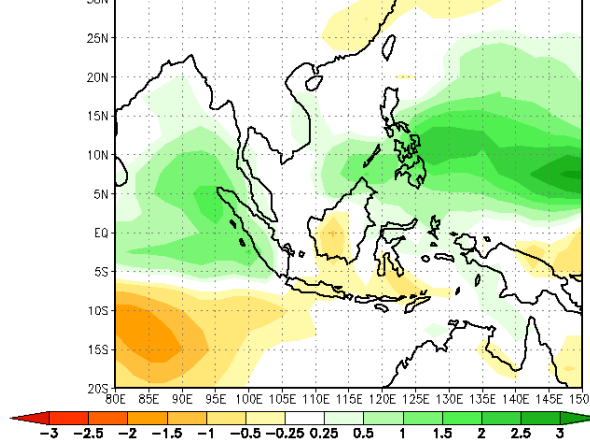


- TCC skills in the ASEAN region are relatively high compared to other regions but are low compared to those of temperature.
- Wet anomalies are predicted in some part of Philippines, Malaysia, Indonesia, and Vietnam, while dry anomalies are predicted in southern Kalimantan, Java, Sulawesi. (West Pacific)

Deterministic MME

Simple Composite Map
GPC_Washington/GPC_Tokyo/GPC_Montreal/GPC_Melbourne/GPC_Exeter/GPC_EDMWF/GPC_CPTec/GPC_Offenbach
[Unit: mm/day]
(issued on Nov2017)

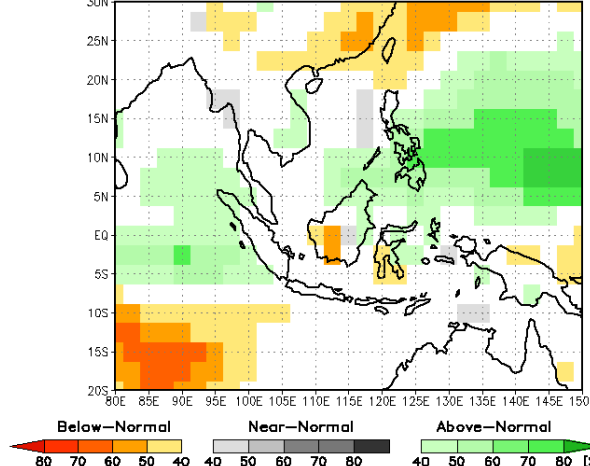
Precipitation : DJF2017



Probabilistic MME

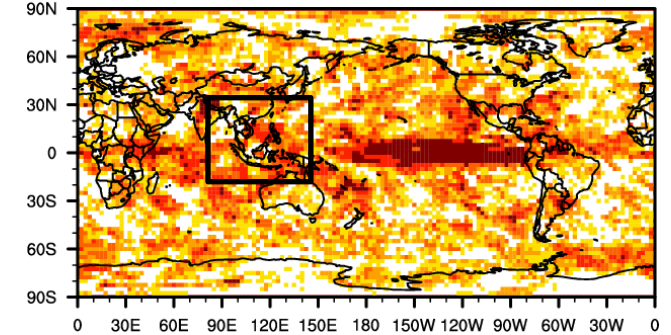
Probabilistic Multi-Model Ensemble Forecast
/GPC_washington/GPC_tokyo/GPC_exeter/GPC_melbourne/GPC_cptec/GPC_montreal
/GPC_edmwf/GPC_offenbach
(issued on Nov2017)

Precipitation : DJF2017

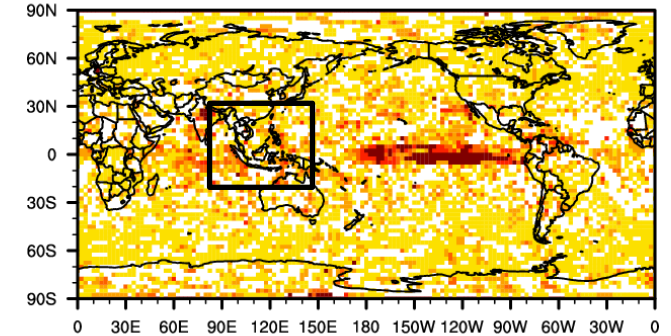


pmme, APCP0m, DJF (issued on Nov)

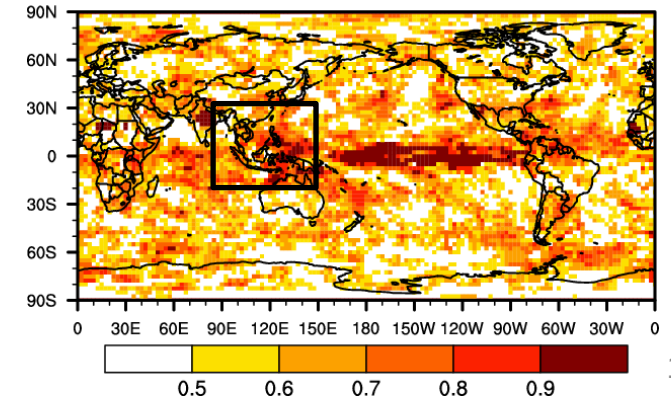
Above-Normal



Near-Normal



Below-Normal



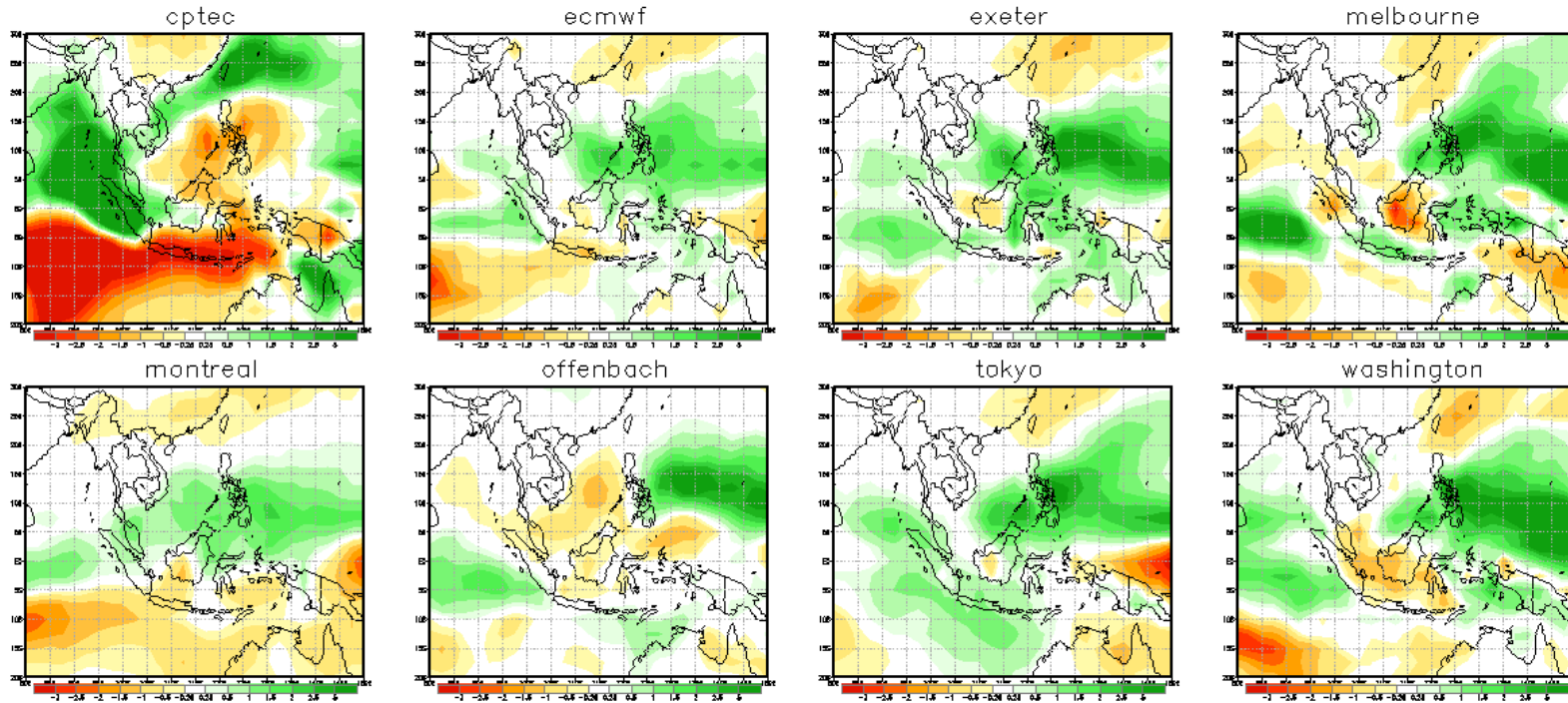


Individual forecast: Precipitation for DJF 2017/18

lat=-20 30
lon=80 150

Precipitation : DJF2017

(issued on Nov2017) [Unit: mm/day]





Summary for DJF 2017/18

- **Ocean**
 - **ENSO prediction**
 - Negative ENSO (<-0.5) is predicted during DJF.
 - **IOD prediction**
 - Neutral IOD is predicted.
- **Atmosphere :**
 - **2m Temperature**
 - Cool in the southern part of mainland
 - Warm in the northern part of mainland and western Pacific
 - **Precipitation**
 - Wet in the western Pacific, southern part of mainland
 - Dry in some part of Kalimantan, Java, Sulawesi





For more Information, Please contact

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Website : <http://www.wmolc.org>



Survey for Satisfaction Measurement via Website

WMO LRF MME x

안전함 | https://www.wmolc.org/_popup/survey.php

2017 Survey for satisfaction measurement (during 01 Sept.-30 Nov. 2017)

Thank you for using our WMO LC-LRFMME website.
The LC-LRFMME is jointly organized and operated by the Korea Meteorological Administration (KMA) and NOAA/NCEP. It provides high-quality climate prediction products and develops advanced climate prediction technology, which is contributing to the reduction of the adverse impacts of abnormal climate.

* is a required input.

1. Which organisation do you belong to/which organisation are you involved in? (select all that match) *

The maximum number of choices is 4.

☐ WMO Global Producing Centres (GPCs) for Long Range Forecasts (LRF)

☐ National Hydrological and Meteorological Services (NHMS)

☐ WMO Regional Climate Centre (RCC)

☐ Regional Climate Outlook Forum (RCOF)

☐ Other :

2. How often do you visit the WMO LC-LRFMME homepage? *

☐ more than 12 times a year (at least once a month)

☐ 4~12 times (at least once a season)

- **Why?**
To diagnose the current status of WMO LC-LRFMME and provide better services to the website user
- **When?**
1st September – 30th November 2017
- **To whom?**
All website registered members



Goals of WMO LC-LRFMME



Providing a **conduit** for sharing the model data

Developing a **well-calibrated MME system** for

- Mitigating the adverse impact of unfavorable climate conditions
- Maximizing the benefit from favorable conditions

Providing **high-quality climate prediction products**

Developing **advanced climate prediction technology**



❖ URL: <https://www.wmolc.org>

The screenshot shows the WMO Lead Centre for Long-Range Forecast Multi-Model Ensemble website. The header includes the WMO logo, the site title, and navigation links (Login, Sign Up, Sitemap, Contact Us). Below the header is a main navigation bar with links to Home, About us, News, Data & Plot, and Related Sites. A secondary navigation bar lists Introduction, Deterministic MME, Probabilistic MME, and References. The main content area features a 'Latest Forecast data' section with a world map showing various forecast centers and their data upload dates (e.g., ECMWF 2016 AMJ, Moscow 2016 AMJ, Exeter 2016 MAM, Beijing 2016 AMJ, Seoul 2016 AMJ, Tokyo 2016 AMJ, Montreal 2016 AMJ, Washington 2016 AMJ, CPTEC 2016 AMJ, Toulouse 2016 MAM, Pretoria 2016 AMJ, Melbourne 2016 AMJ). Below the map are sections for 'Latest PMME plot' and 'Latest Individual Forecast plot'. A 'Notice / News' section on the left lists updates for GPCs(12) for FMA 2016, JFM 2016, DJF 2015, NDJ 2015, and OND 2015. A 'WMO Global Producing Centres' section on the right displays logos for various centers including Canada, Montreal, BCC, Beijing, ECMWF, Meteorological Centre of Russia, Moscow, Seoul, Tokyo, Toulouse, Washington, Exeter, PCMA, Melbourne, Pretoria, and CPTEC. The footer contains contact information for KMA (Korea Meteorological Administration), a copyright notice, a privacy handling policy, and a visitor count (today: 82, total: 148407).

Membership Levels & Accessibility

- **Level A** (GPCs)
 - Upload & download digital data (limited)
 - Download image plots
- **Level B** (NMHSs, RCCs)
 - Download digital data (limited) & image plots
- **Level C** (Others)
 - Image plots

As of 1st October 2014, access to **the site is limited** to Global Producing Centres (GPCs), Regional Climate Centres (RCCs), National Meteorological and Hydrological Services (NMHSs) and bodies coordinating Regional Climate Outlook Forums (RCOFs)



Products of WMO LC-LRFMME

WMO Lead Centre for Long-Range Forecast Multi-Model Ensemble

Home About us News Data & Plot Related Sites

WMO Lead Centre for SVSLRF

Data & Plot

- Data Exchange Policy
- Data Exchange
 - How to Upload
 - Upload
 - Search/Download
 - Direct Download
- Plot
 - Probabilistic Multi-Model Ensemble
 - Deterministic Multi-Model Ensemble
 - Individual Forecast
 - Energetics
 - Indices
 - Verification : Hindcast
 - Verification : Forecast
 - 6 month MME
- System Configuration Information

Individual Forecast

Display

Map Type

Rectangular Time series Stereographic All Map Consistency Map SST Plume

Deterministic Multi-Model Ensemble

Simple Ensemble Mean Regular Multiple Regression Singular Value Decomposition (SVD)

Genetic Algorithm (GA)

Probabilistic Multi-Model Ensemble

Definition

Display

Map Type

Combined Below Normal Near Normal Above Normal

Select Period

Forecast 2016 AMJ Mean ex) 2008 SON

Select Model

All moscow melbourne seoul montreal beijing cptec pretoria washington tokyo

Select Parameters

Precipitation 500hPa GPH Mean Sea Level Pressure 2m Temperature 850hPa Temperature

Select Region

Global Longitude 0 ~ 360 Latitude -90 ~ 90

Check! System Requirement

All GPCs(12) for FMA 2015 are uploaded

All GPCs(12) for JFM 2015 are uploaded

All GPCs(12) for DJF 2015 are uploaded

All GPCs(12) for NDJ 2015 are uploaded

All GPCs(12) for OND 2015 are uploaded

61 16-GIL YEOUIDAEBANG-RO DONGJAK-GU SEOUL 156-720 Republic of Korea
Email: lc_lrfmme@korea.kr Tel. 82-2-2181-0474 Fax. 82-2-2181-0489
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KMA Korea Meteorological Administration

today : 82 total : 148407

- Select...
- Map Type
- Period
- Model
- Parameters

NINTH ASEAN CLIMATE OUTLOOK FORUM (ASEANCOF-9) CONSENSUS FOR DJF 2017-2018

15 - 17 November 2017, Hanoi
National Hydro-Meteorological Service of Viet Nam
(NHMS)



WORLD
METEOROLOGICAL
ORGANIZATION



This project was undertaken with the financial support of:
Ce projet a été réalisé avec l'appui financier de :



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada

Previously...

GPCs /NMHSs
Presentations

Applications
talks

Consensus
Discussion &
Formulation

Release of
Consensus
Outlook
Report

GPCs /NMHSs
Presentations

Consensus
Discussion &
Formulation

Applications
talks

Release of
Consensus
Outlook
Report

Going forward

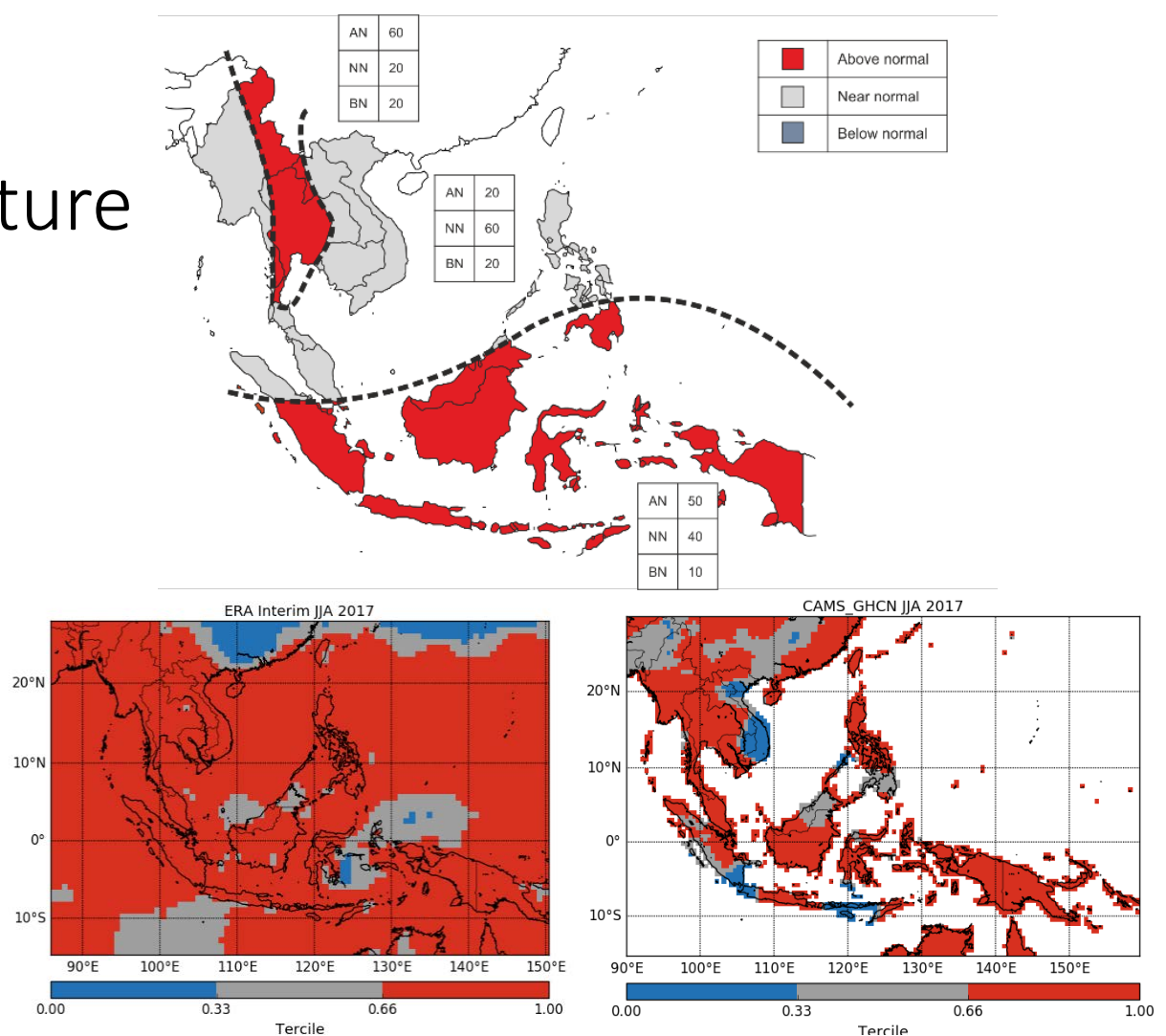
Review of OUTLOOK for JJA 2017

ASEANCOF-8, May 2017

Reviewing previous outlook (caveats)

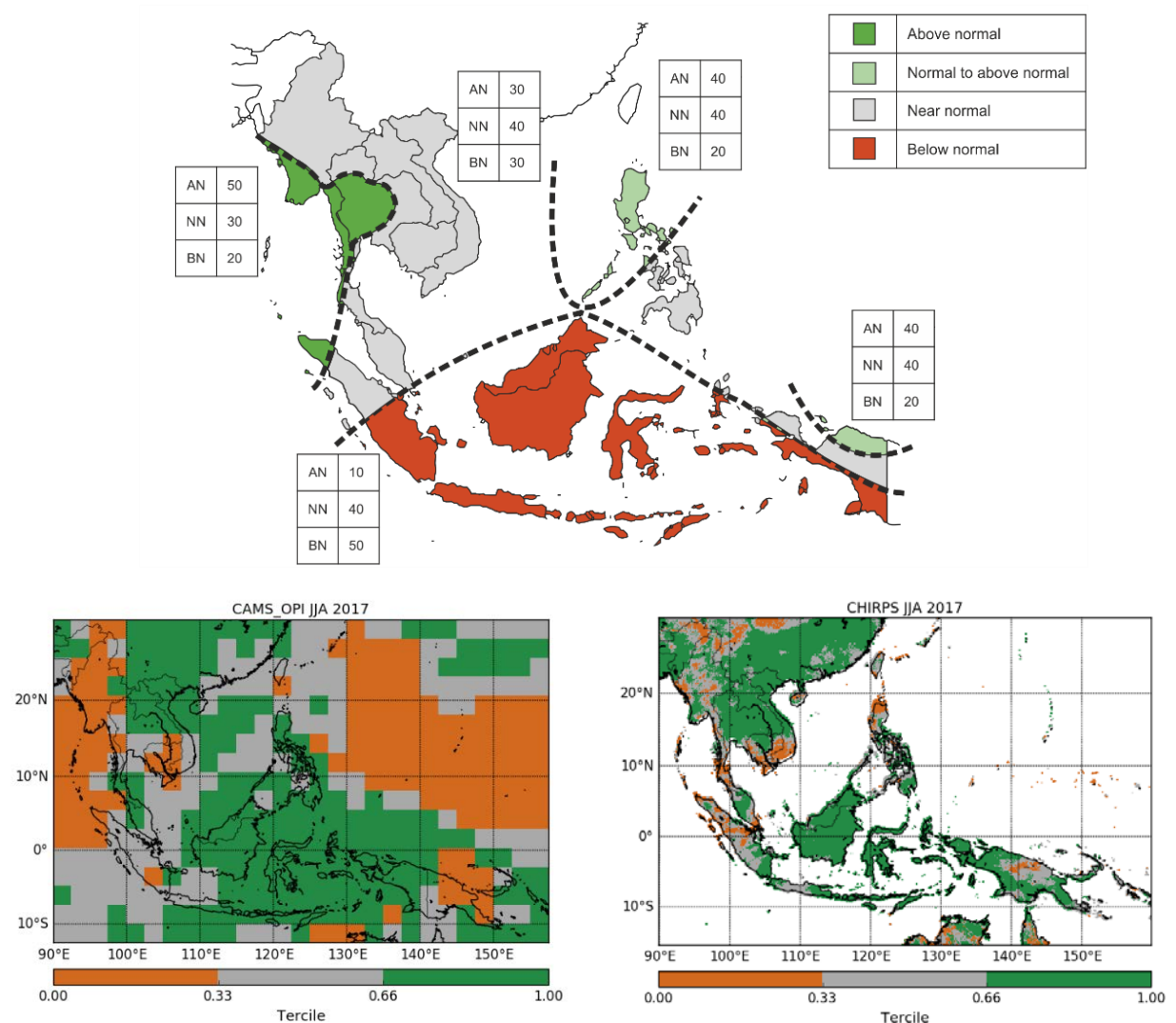
- Not so much to *quantitatively verify* the outlook for but a *qualitative, broad-scale* assessment or review. **General sense** of outlook's representativeness of the “obs”.
- Some considerations:
 - Different **resolutions**
 - Outlook have been ‘upscaled’ for *regional* reporting purposes
 - Different observations have been regridded differently and algorithms may differ across
 - Different **versions of realities**: can we depend on just one set of observations as the ‘truth’?
 - **Climatological reference period** for observations and outlook may be different (region needs work)
 - Measure of true skill requires longer verification period.

JJA Temperature



- Most of Southeast Asia observed normal to above normal temperature.
- Below normal temperature was observed in Vietnam based on the CAMS_GHCN data, but ERA Interim data and Vietnam's national assessment recorded above normal temperature.
- More stations in Peninsular Malaysia as well as central and southern Myanmar recorded near normal temperatures rather than above normal

JJA Rainfall



- Large parts of the region received higher rainfall amounts than predicted.
- Based on both gridded products and reviews by NMHSs, most of Borneo and Indonesia experienced above normal rainfall, in contrast to the low forecasted probability of 10%.
- This may be tied to the smaller than anticipated impact of the possible El Niño and the positive IOD. However, JJA is the dry season for these regions, which makes anomalous wet conditions difficult to forecast.

ENSO & Large-scale Drivers

ENSO

1. Sea surface temperature (SST) over the tropical Pacific Ocean is currently cool (negative anomaly) with **La Niña like or borderline conditions**.
2. However, models suggest the tropical Pacific Ocean will continue to cool. Chance of a **weak La Niña forming in late 2017** of at least 60%, around double the normal likelihood for La Niña. If it forms, the event is **not expected to last beyond March 2018**.
3. Atmospheric indicators of **ENSO conditions** (e.g. the Southern Oscillation Index, SOI) are broadly **within neutral at the moment**.

IOD

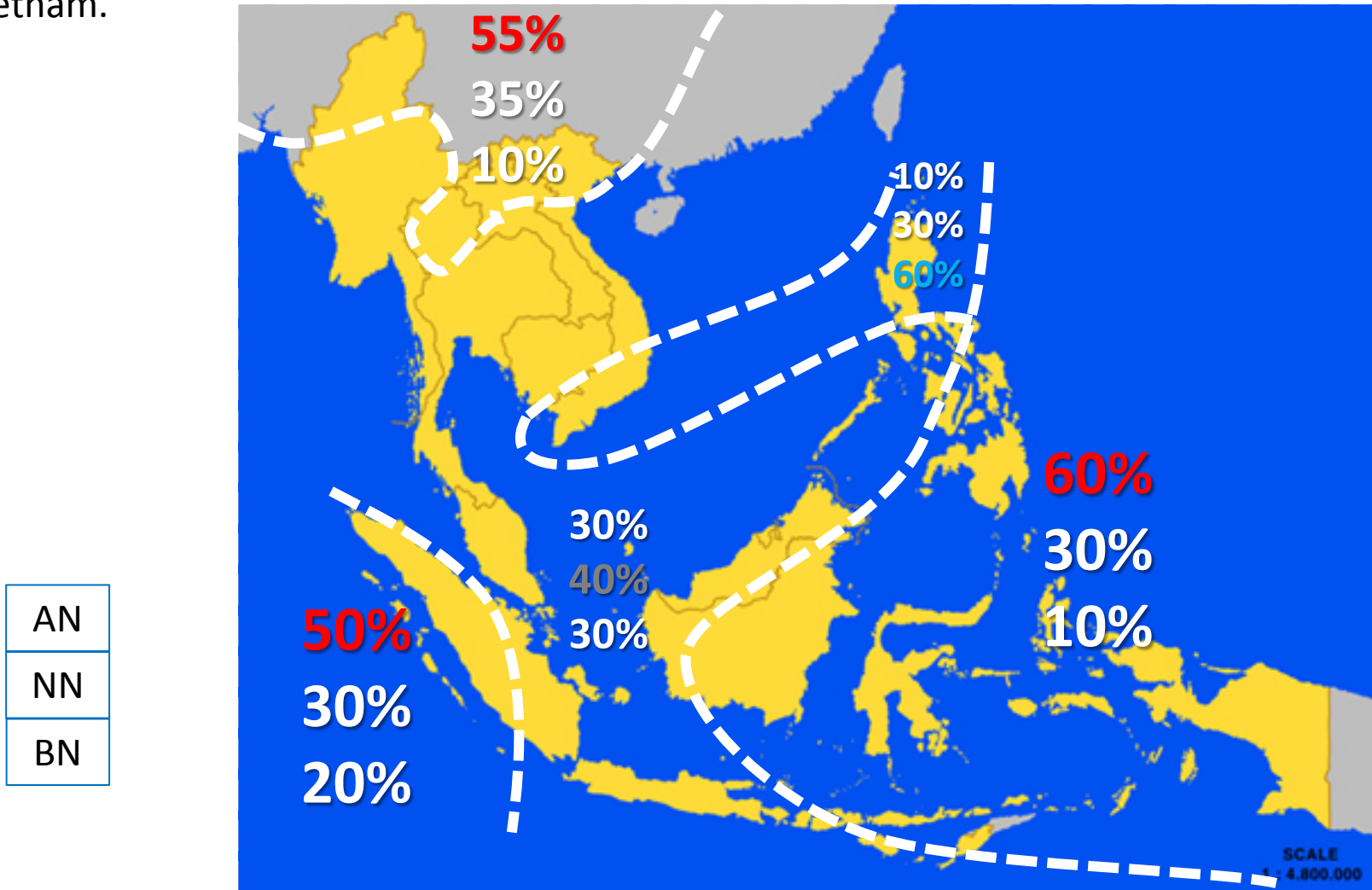
1. The IOD index is recently slightly positive (warmer western Indian Ocean SST, and cooler eastern Indian Ocean SST). **IOD predicted to be neutral** in DJF 2017-2018.

Monsoon Activity

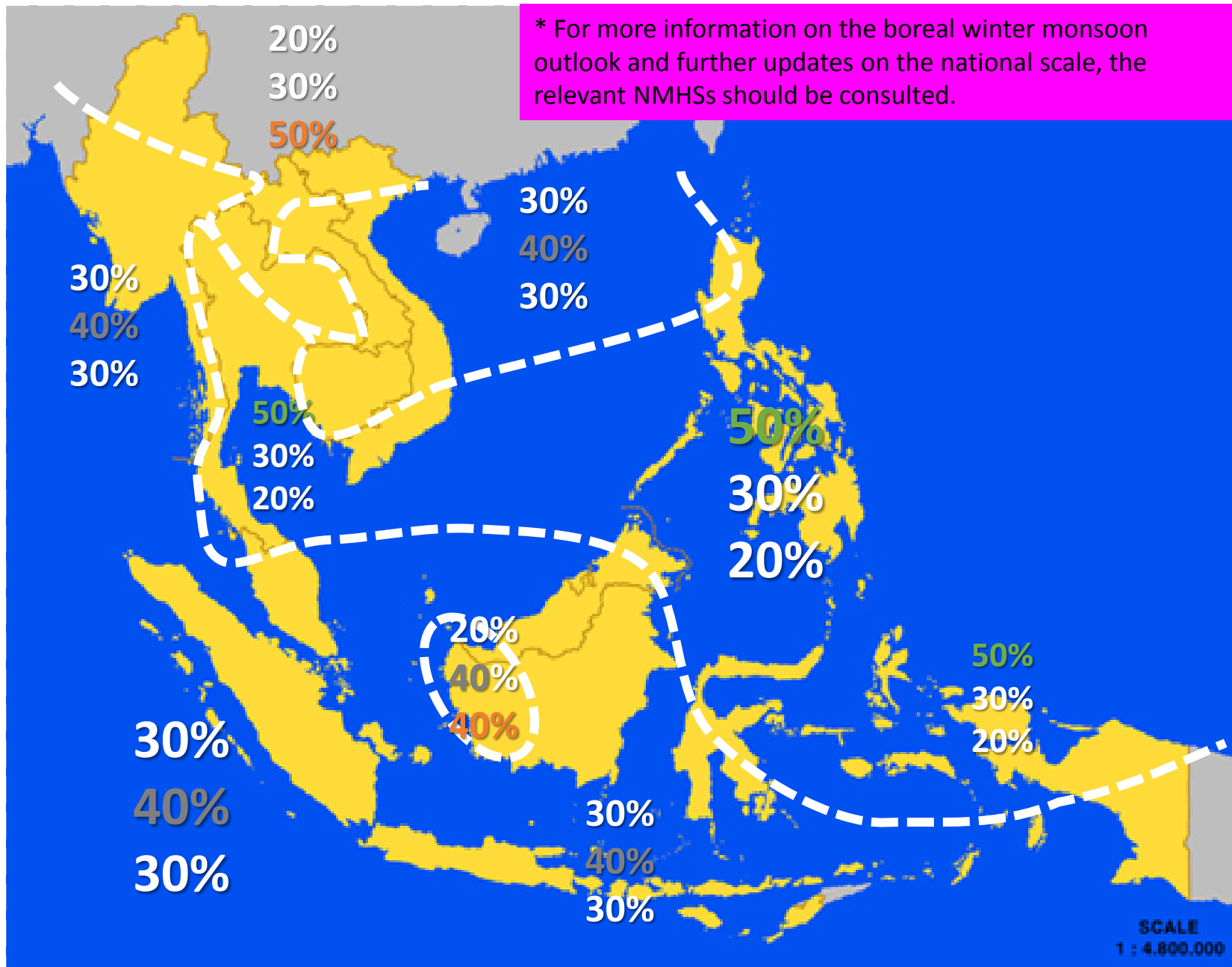
1. **Monsoon trough will be active** in the south of Vietnam and over the Philippines for DJF 2017-2018. **More convective rainfall and tropical storms** activities expected.

Consensus DJF Temperature Forecast

“Above normal temperatures are favoured over much of the Southeast Asia region for the upcoming boreal winter monsoon season (Dec-Jan-Feb 2017-2018), with the highest probabilities over the eastern Maritime Continent, northern Mainland Southeast Asia, and Sumatra. Below normal temperatures are favoured over northern Philippines and southern Vietnam.”



Consensus DJF Rainfall Forecast



Consensus DJF Rainfall Forecast

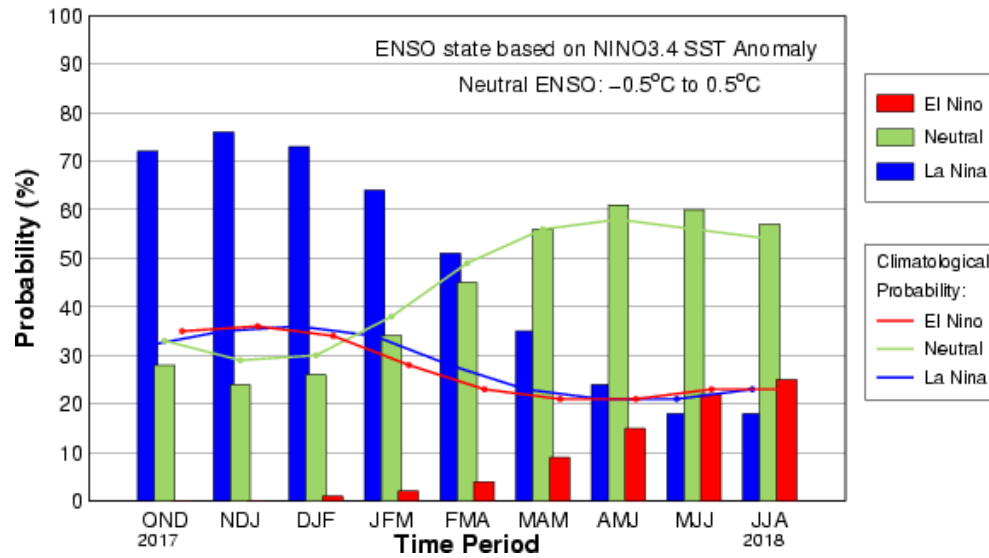
“For the upcoming boreal winter monsoon season (Dec-Jan-Feb 2017-2018), above normal rainfall are favoured over the eastern Maritime Continent, southern Vietnam, and central and southern Thailand. Below normal rainfall is slightly favoured over western Borneo and northern Mainland Southeast Asia. Elsewhere near normal rainfall are favoured.

** For detailed information on the boreal winter monsoon outlook and further updates on the national scale, the relevant NMSs should be consulted.*

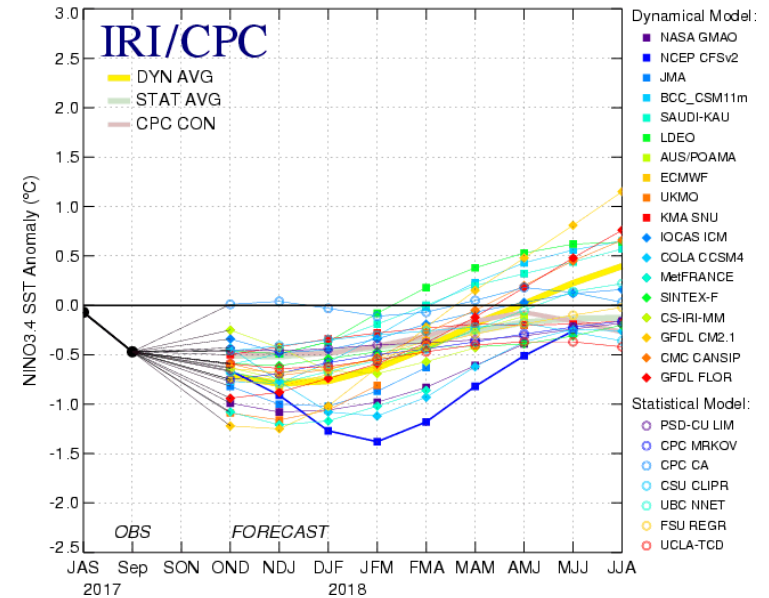
Thank You

ENSO Forecast

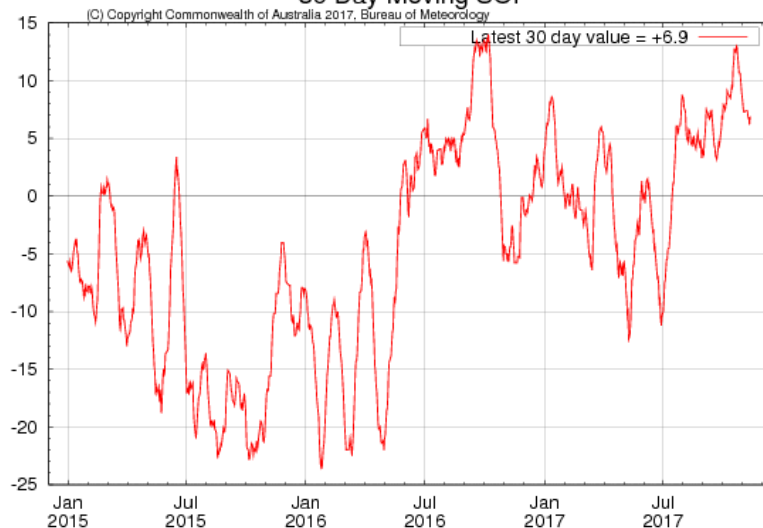
Early–Nov CPC/IRI Official Probabilistic ENSO Forecast



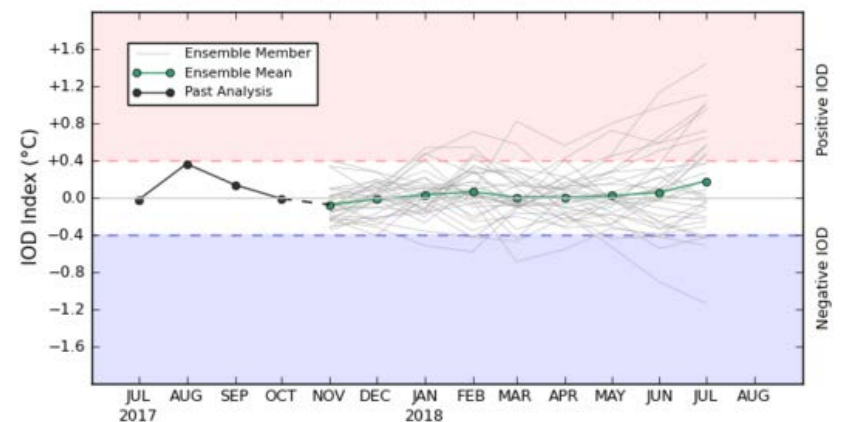
Mid-Oct 2017 Plume of Model ENSO Predictions



30 Day Moving SOI

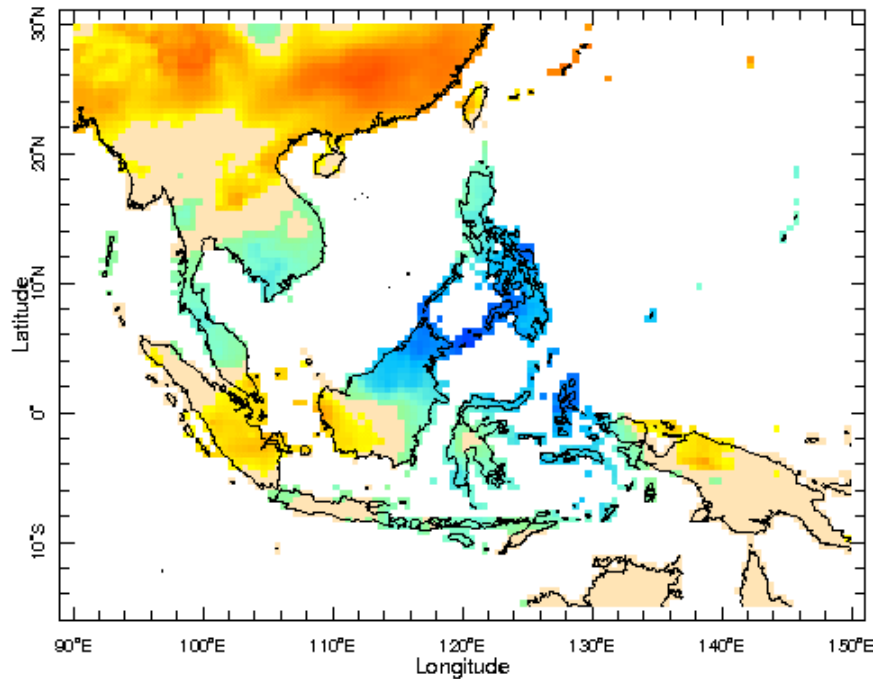


POAMA monthly mean IOD - Forecast Start: 5 NOV 2017

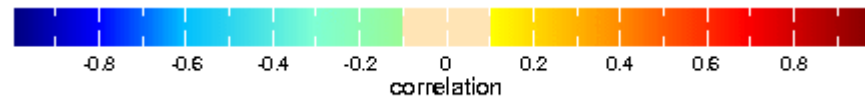
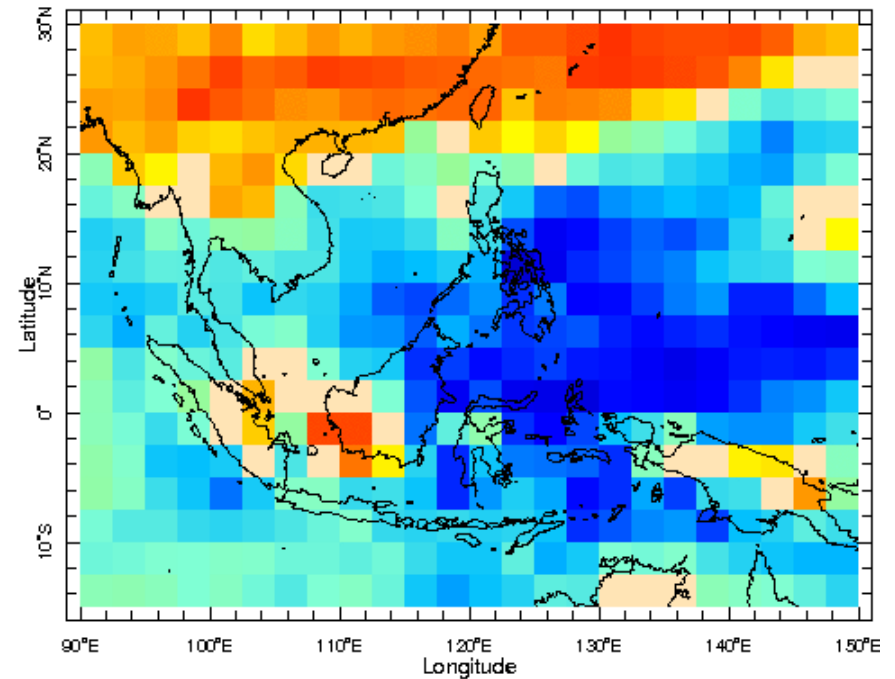


Correlation between Nino3.4 and Rainfall (IRIDL)

1951-2007 APHRODITE vs Nino3.4



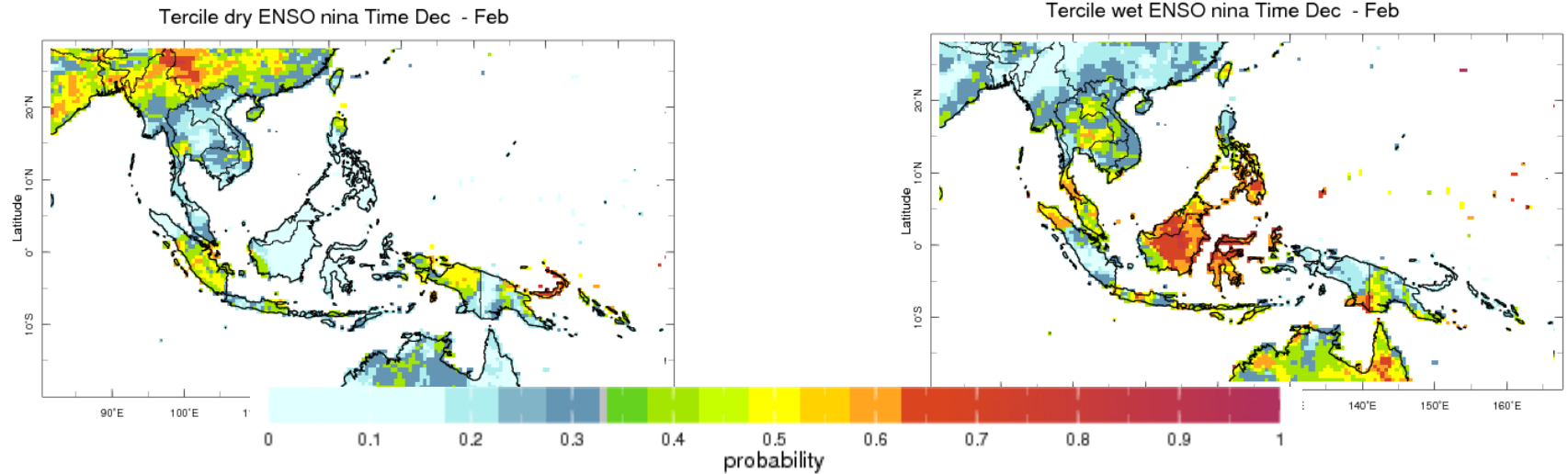
1979-2015 GPCP vs Nino3.4



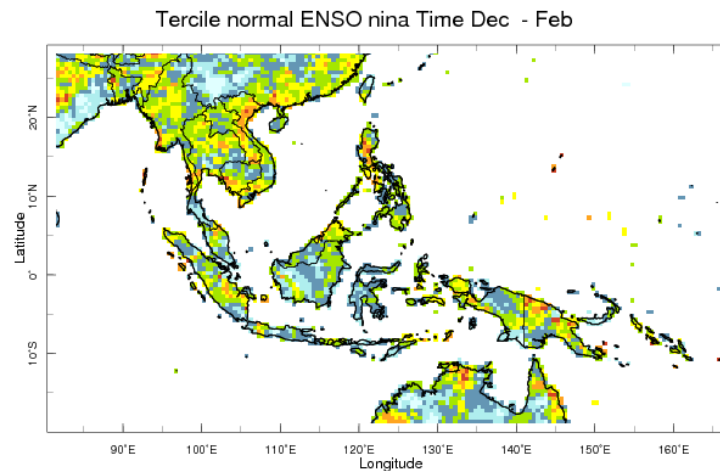
Tercile Probability of the Seasonal Characteristics of Daily Precipitation Conditioned on La Nina (IRIDL)

“Below Normal”

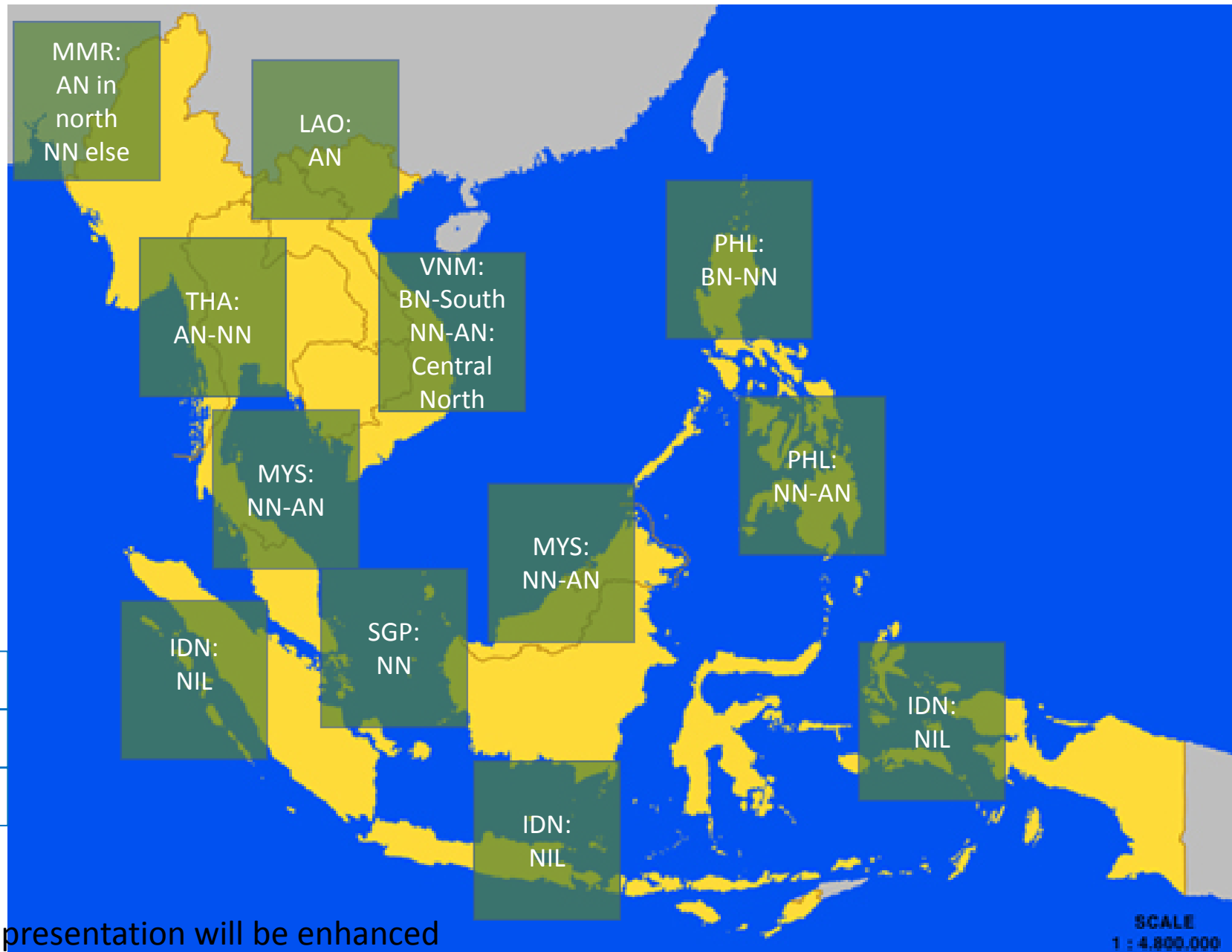
“Above Normal”



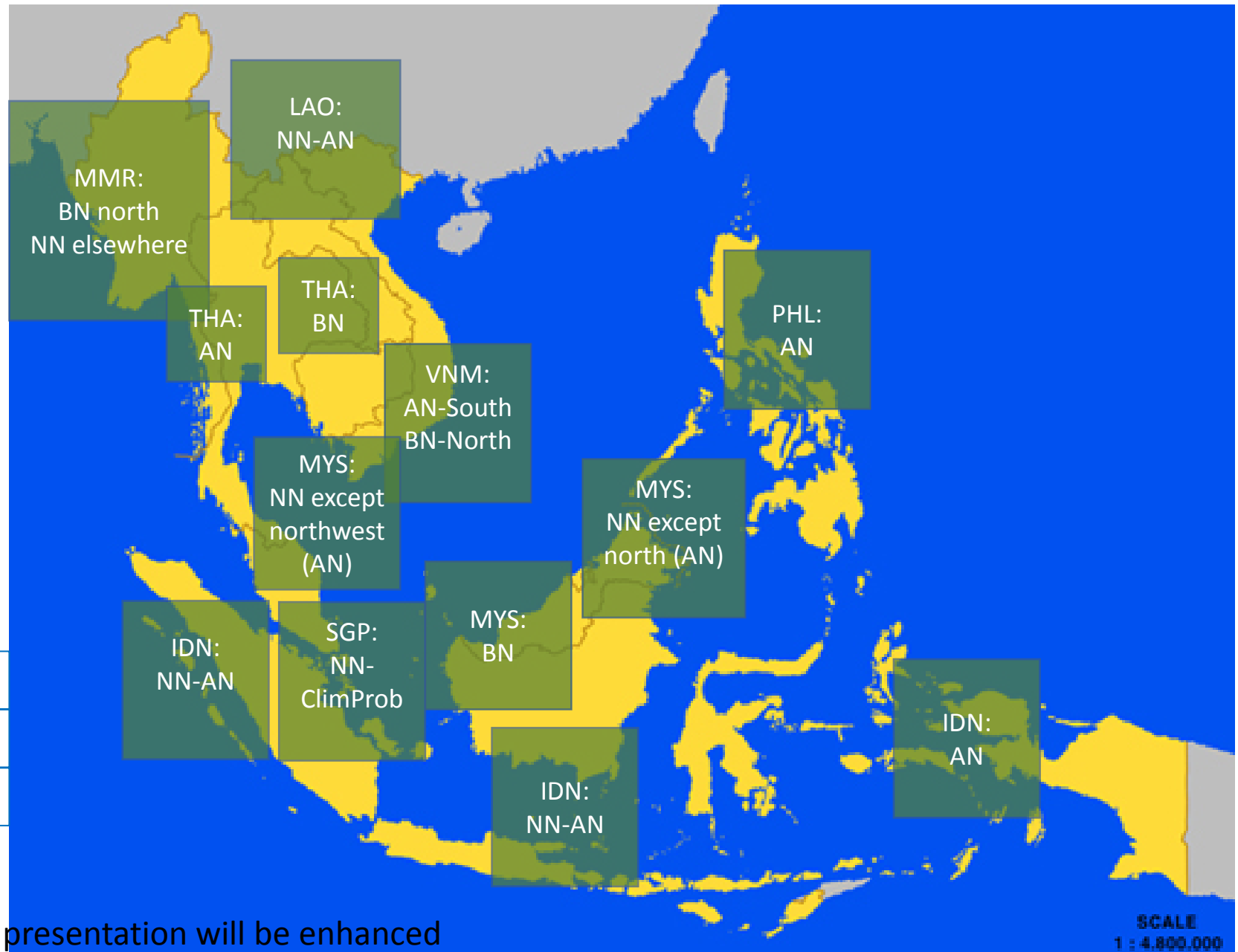
“Near Normal”



NMSs DJF **Temperature** Forecast (draft)



NMSs DJF Rainfall Forecast (draft)



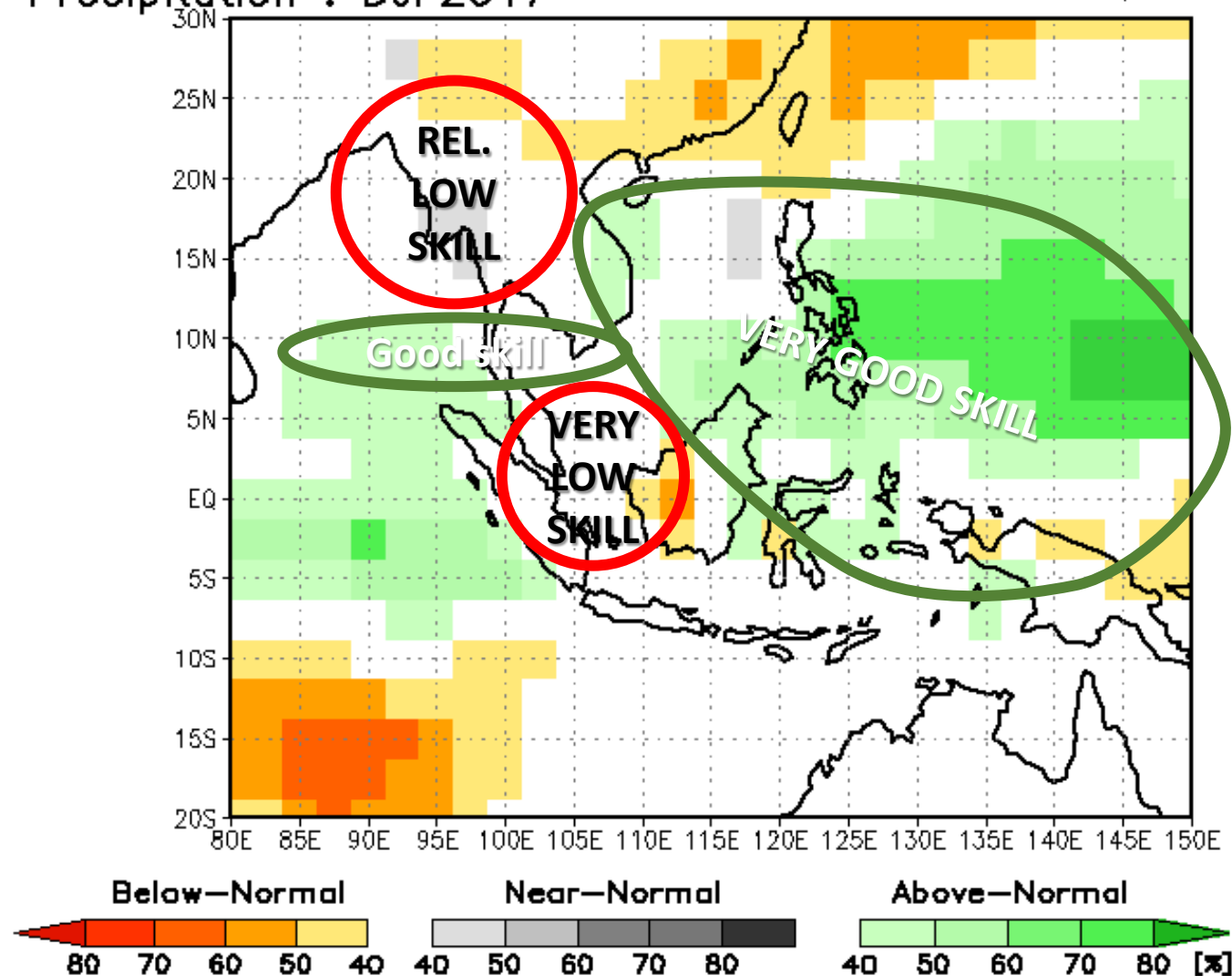
Skill superimposed on Forecast

Probabilistic Multi-Model Ensemble Forecast

/GPC_seoul/GPC_washington/GPC_tokyo/GPC_exeter/GPC_beijing/GPC_melbourne
/GPC_cpptec/GPC_montreal/GPC_ecmwf/GPC_offenbach

Precipitation : DJF2017

(issued on Nov2017)



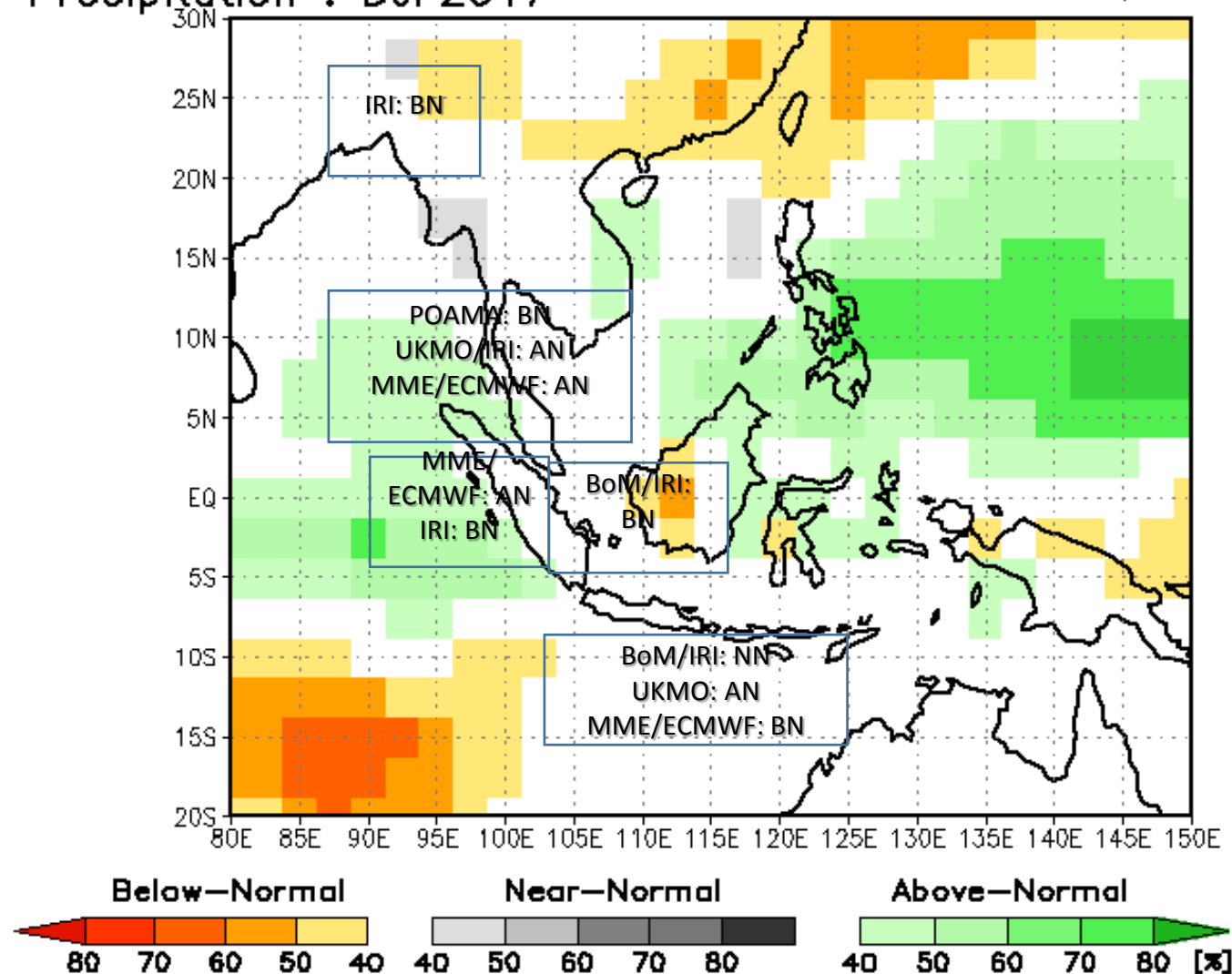
Forecast Variations

Probabilistic Multi-Model Ensemble Forecast

/GPC_seoul/GPC_washington/GPC_tokyo/GPC_exeter/GPC_beijing/GPC_melbourne
/GPC_cptec/GPC_montreal/GPC_ecmwf/GPC_offenbach

Precipitation : DJF2017

(issued on Nov2017)



Consensus DJF Rainfall Forecast (spare)

* For more information on the boreal winter monsoon outlook and further updates on the national scale, the relevant NMHSs should be consulted.

AN
NN
BN

