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The 11th Session of East Asia Winter Climate Outlook Forum (EASCOF-11)
7 November 2023 (Day 2), Tokyo, Japan

Introduction of "Objective Seasonal Forecast" Session

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Leader, WMO RAII WG-S Expert Team on Climate Service (ET-CS)

Key objectives

- It is expected that this session will:
  - Be a kick-off discussion about seeking a possibility of implementing objective seasonal forecast (OSF) into EASCOF processes.
  - Provide an opportunity for getting a better understanding of OSF (background, benefit, good practices, etc.).
  - Seek the optimal style of OSF for EASCOF, taking into account the circumstances specific to EASCOF, more specifically the inherent nature of the climate in East Asia and existing climate services operations by participating members in EASCOF, as well as the benefit of OSF.

Outline

- Some background information (me)
- The implementation of objective seasonal forecasts with country level delivery: Needs and Gaps in Africa, Caribbean and Pacific (Dr. Wilfran MOUFOUMA OKIA from WMO HQ)
- Preliminary investigation for Objective Seasonal Forecast in RAII (Mr. TAKAHASHI Kiyotoshi)
- Discussion (all)

Objective Seasonal Forecast

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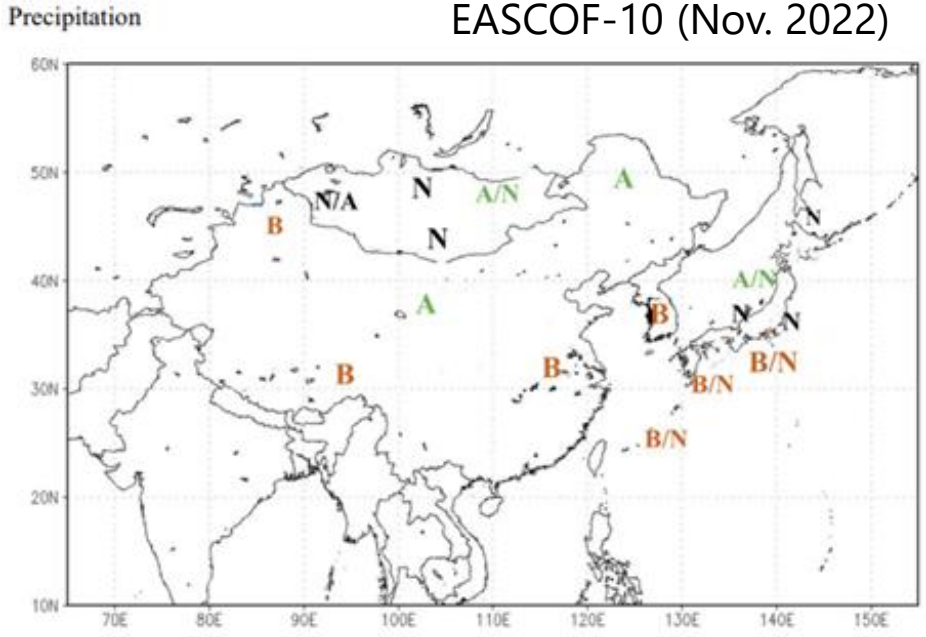
Subjective seasonal forecast

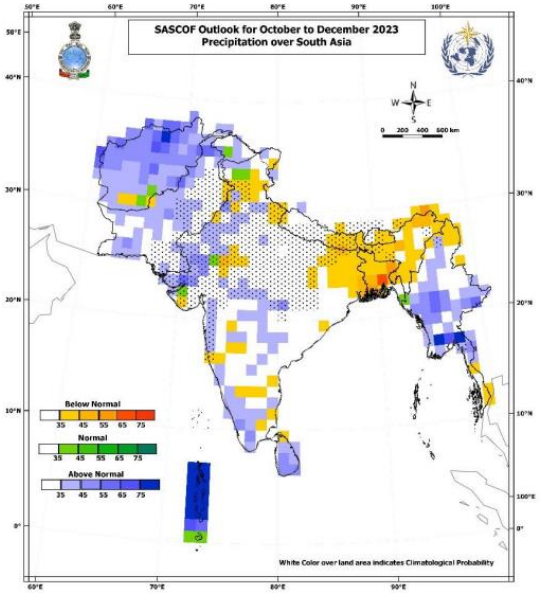
EASCOF-10 (Nov. 2022)



Consensus-based

Objective seasonal forecast

SASCOF-26 (Sep. 2023)



More traceable, reproducible and verifiable

➔Enhancing accountability

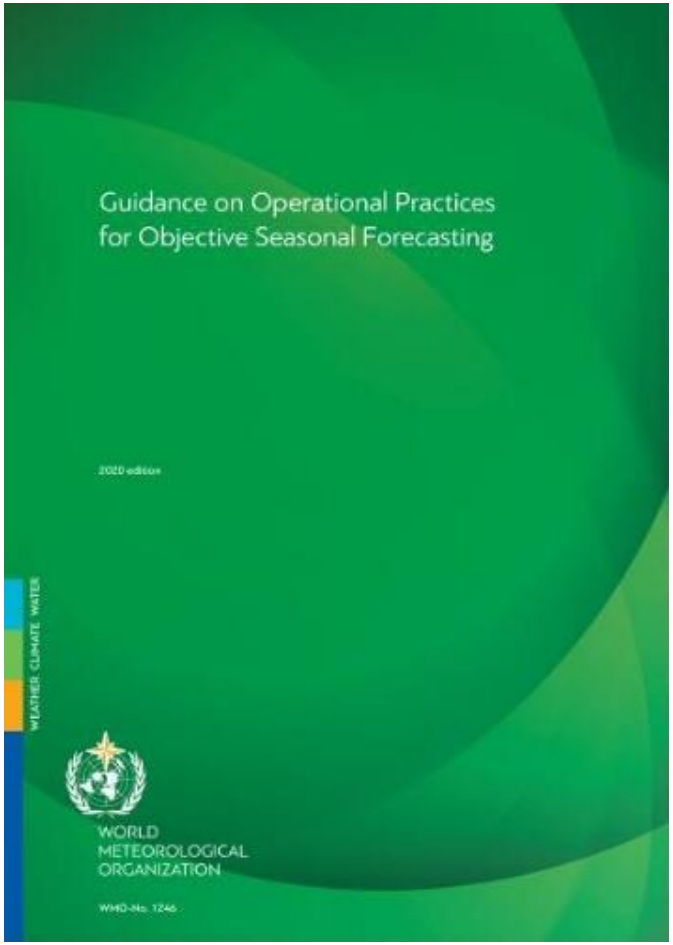
Background

Global-level

- Global Review of Regional Climate Outlook Forums (2017)
- Decision 9 (WMO EC-72, 2018)
- Guidance on Operational Practices for Objective Seasonal Forecasting (2020)

Regional-level (in RA II)

- Pioneering work at SASCOF
- Decision 5 (RA II-17, 2021)
- RA II Operating Plan (2021-2024)



https://library.wmo.int/records/item/57090-guidance-on-operational-practices-for-objective-seasonal-forecasting

WMO RAII Operating Plan (2021-2024)

- RA II Operating Plan gives **the principle for WMO RAII activities**.
- A living document, be updated from time to time.

World Meteorological Organization
REGIONAL ASSOICATION II (ASIA)

Version 3

RA II OPERATING PLAN 2021–2024

- This RA II Operating Plan has considered the WMO Strategic Plan and regional priorities, and identifies the tasks requested by the Eighteenth World Meteorological Congress (Cg-18), the seventy-second (EC-72), seventy-third (EC-73) and seventy-fourth (EC-74) sessions of the Executive Council to the regional associations.
- It will be a living document, be updated from time to time by RA II WG/CP and approved by RA II Management Group.
- It will seek synergy with the WMO Operating Plan, with the interaction with INFCOM, SERCOM and the Research Board.
- It forms the principle basis for establishing the relevant Expert Teams under WGs.
- Terminologies used will be further discussed and improved.

https://wmoomm.sharepoint.com/sites/wmocpdb/eve_group/Forms/AllItems.aspx?id=%2Fsites%2Fwmocpdb%2Feve%5Fgroup%2FRA%20II%20Management%20Group%2FPublic%2FGovernance%20Documents%2FRA%20II%20OP%20v3%5Fapproved%2Epdf&parent=%2Fsites%2Fwmocpdb%2Feve%5Fgroup%2FRA%20II%20Management%20Group%2FPublic%2FGovernance%20Documents&p=true&ga=1

WMO RAII Operating Plan (2021-2024)

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"Promote Climate Services Implementation"

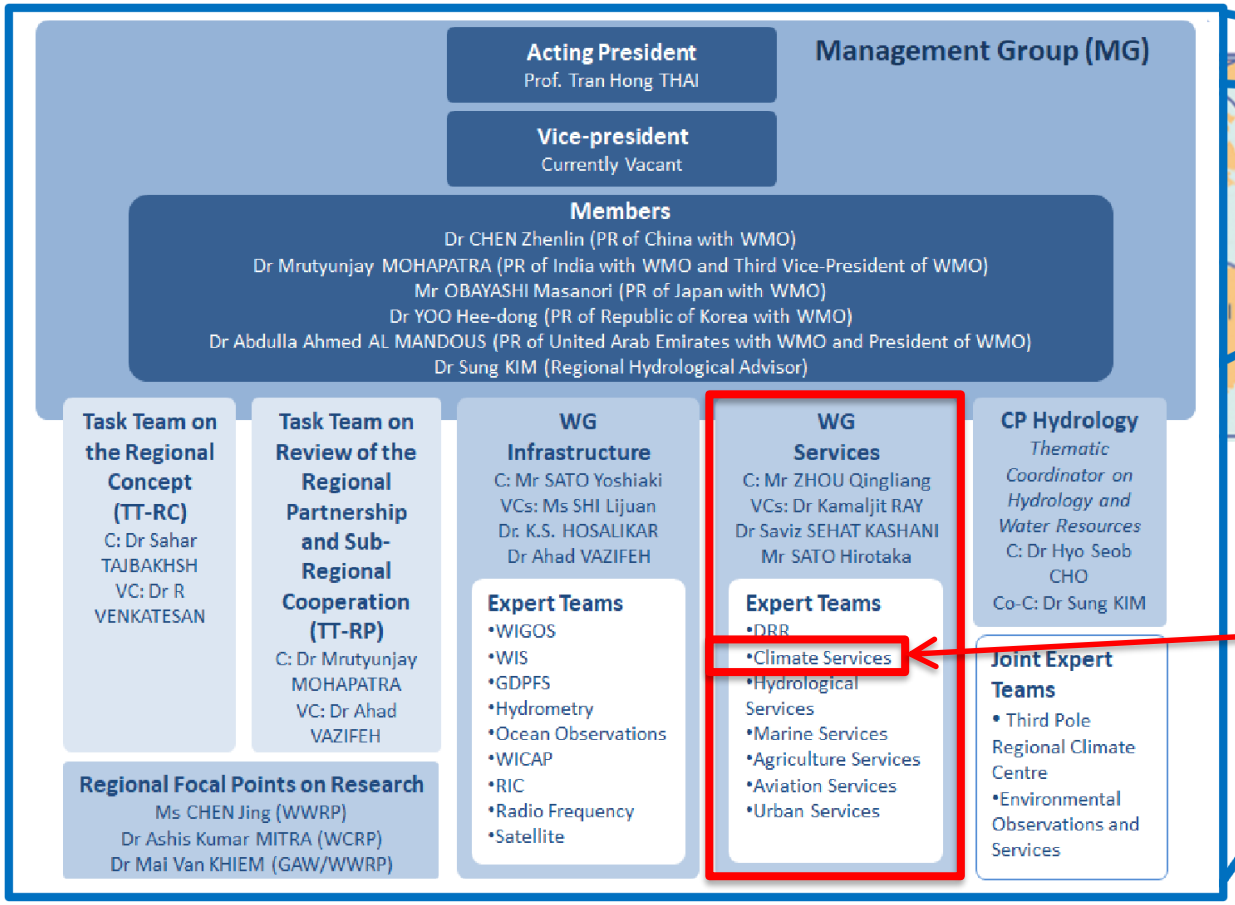
Deliverables

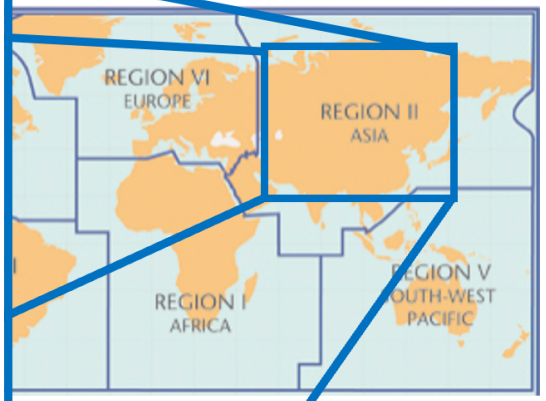
4. Regional Climate Forum (RCF) organized and Services of Regional Climate Centers (RCCs) improved.

Related Activities and Timeline

5. **To evaluate the forecast skill of objective seasonal forecast, based on multi-model ensembles** from dynamical climate models, at sub-regional scale and users' need for the forecasts and capability of NHMSs and/or RCFs to operationalize it. **(2021-2023)**
6. Adoption of objective seasonal predictions into RCOF processes as trial basis. **(2024)**

Working Structure of WMO RA II





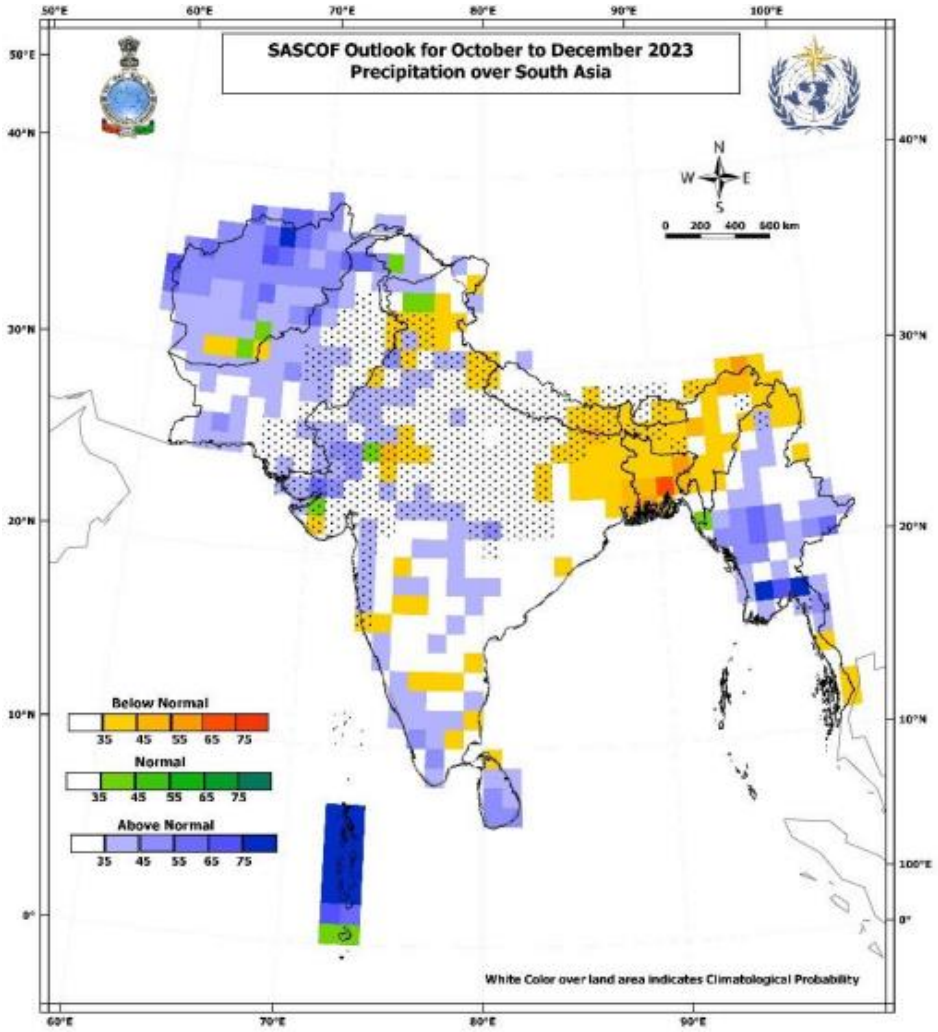
Expert Team on Climate Services (ET-CS)

* Please click the image for a bigger size

WMO Regional Association II:
https://community.wmo.int/en/governance/Regional-Association/RA-II

ET-CS under WG Services contributes promoting climate services implementation in RA II.

SASCOF



SASCOF-26
(26-27 September 2023)

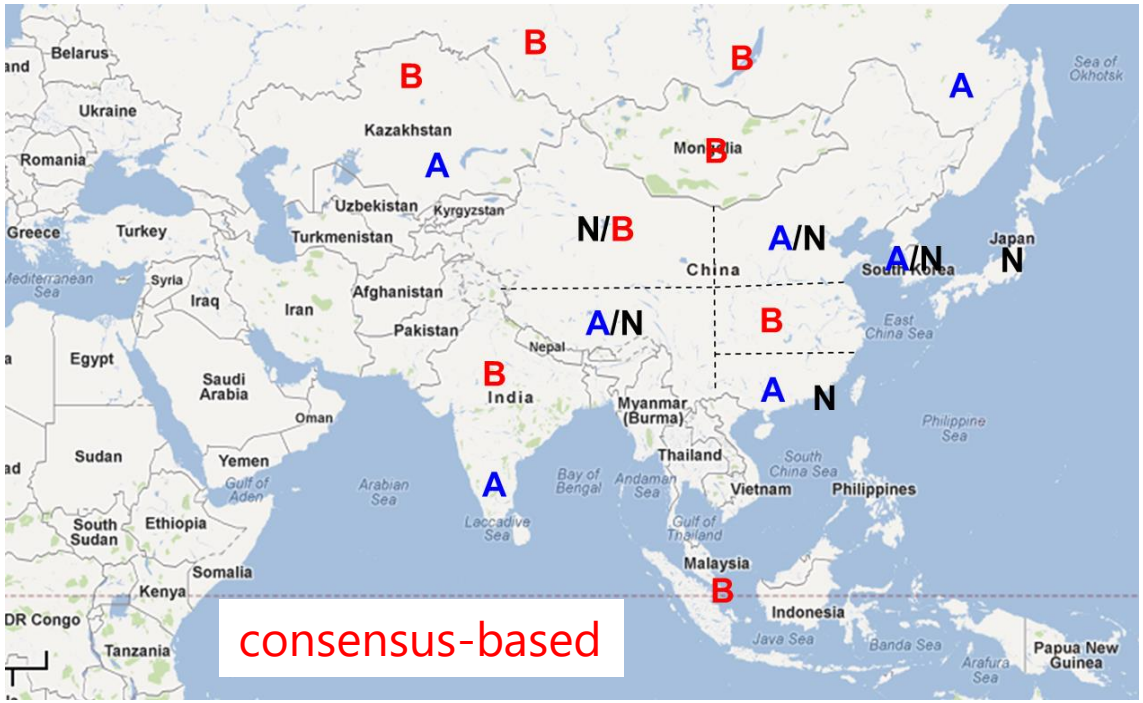
Precipitation forecast for Oct.-Nov.-Dec. 2023

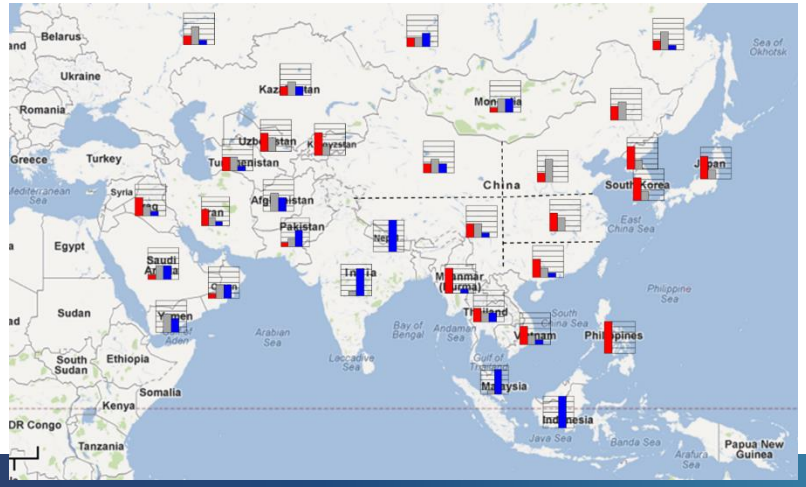
*Multi-model ensemble from dynamical climate models

FOCRAII

FOCRAII-19
(8-10 May 2023)

Precipitation forecast for Jun.-Jul.-Aug. 2023





←Probability forecast for sub-region averages based on multi-model ensemble

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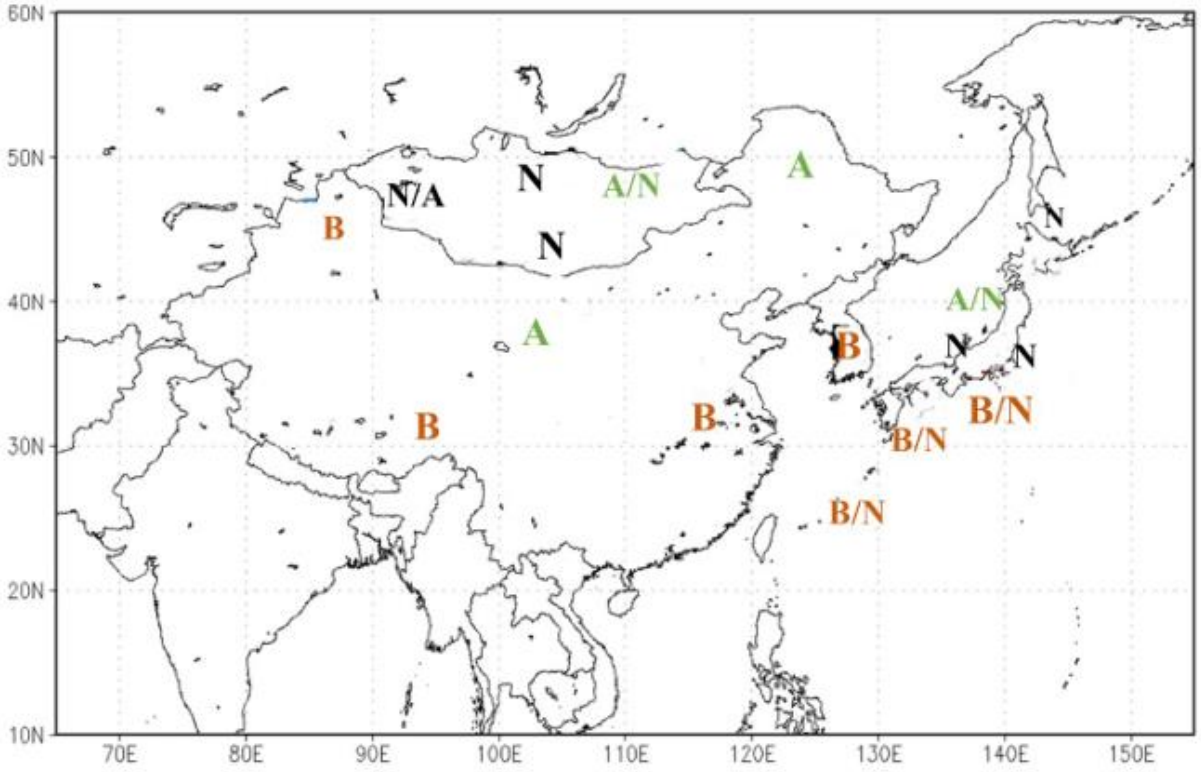
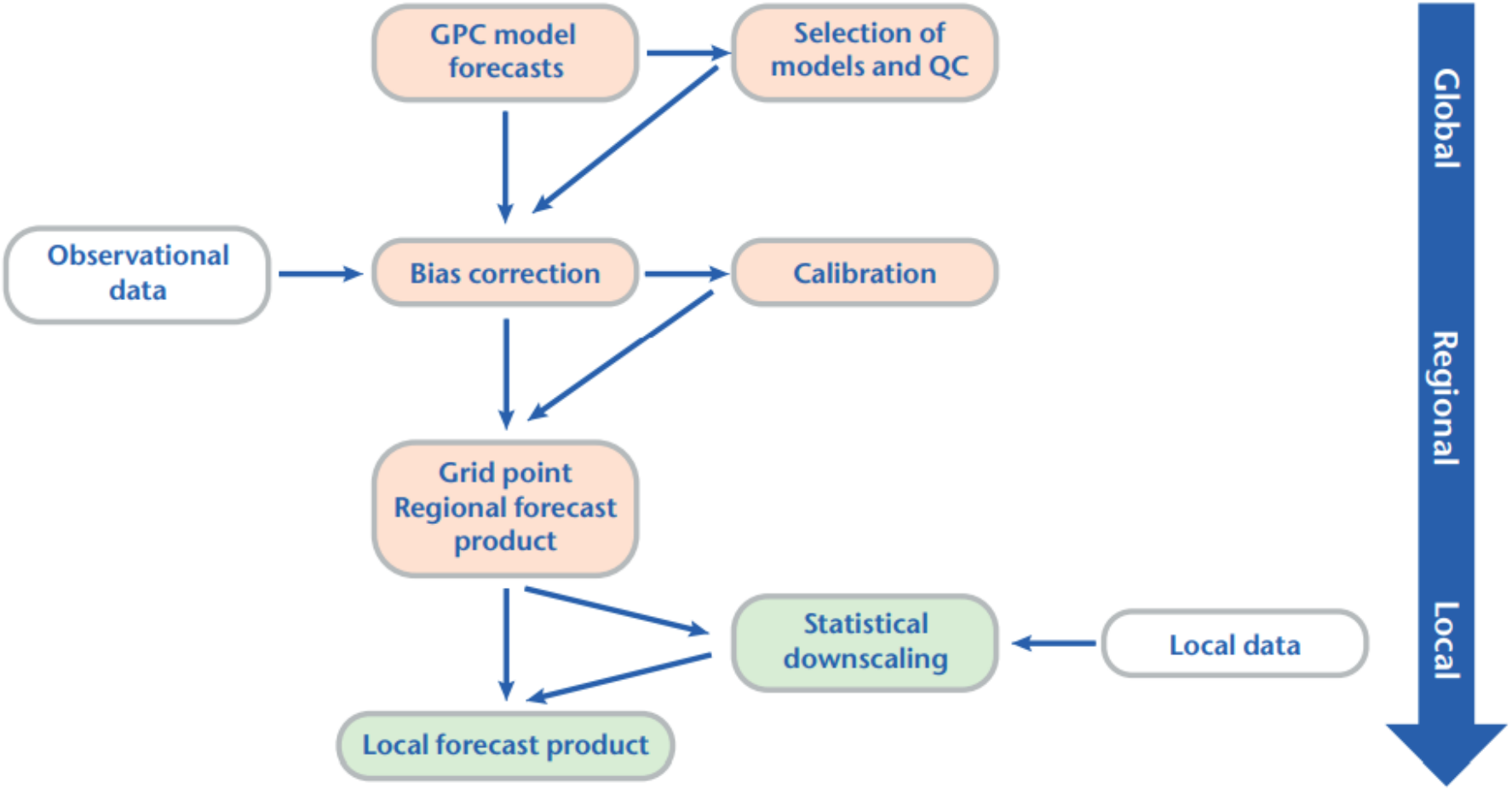
EASCOF-10
(10 November 2022)
last year



Precipitation forecast for Dec.-Jan.-Feb. 2023
*consensus-based only

Recommendation by WMO

Recommended procedure for developing seasonal forecasts



Source: Guidance on Operational Practices for Objective Seasonal Forecasting (WMO, 2020)

Characteristics of East Asia

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- Existing climate services operations
  - CMA, KMA, NAMEM and JMA: (To my understanding)
    - Operate dynamical climate models on each own and get model output from GPCs-LRF or LC-LRFMME
    - Produce seasonal forecasts based on each seasonal prediction system (i.e., based on different CGCMs)
    - Share knowledge and experiences of climate services at EASCOF meetings as well as seasonal forecasts
- The inherent nature of the climate in East Asia
  - Mr. Takahashi will give a presentation about prediction skills of multi-model ensembles for Asia.

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DISCUSSION

Discussion

1. Current situations and practices on seasonal forecast operations (10 min)
2. Views on objective seasonal forecast (20 min)
3. Way Forward (10 min)

Current Situations and Practices

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1. Current situations and practices on seasonal forecast operations (10 min)

(To my understanding)

Each participating member to EASCOF operates climate models or takes forecast model outputs from GPCs-LRF or LC-LRFMME by each own to produce domestic seasonal forecasts, with modifying such model outputs manually as necessary.

Q1. How do you produce your seasonal forecast? Do you modify the model outputs *manually* (i.e., Is there any human intervention to produce seasonal forecasts)? If yes, how?

(Although some of you have already answered in previous sessions, but for confirming and sharing)

Current Situations and Practices

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1. Current situations and practices on seasonal forecast operations (10 min)

Q2. When you explain your seasonal forecasts to the users of specific sectors, what particular aspects of the forecasts do you emphasize? (e.g., reasons of forecasts, climate drivers, uncertainty, implication, etc.)

Q3. How consistent are your domestic seasonal forecasts with consensus-based forecasts at EASCOF?

Views on objective seasonal forecast

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2. Views on objective seasonal forecast (20 min)

Q4. What is your view on implementing objective seasonal forecast into EASCOF? What do you think is the optimal style of OSF for EASCOF?

Note: We should take into account the circumstances specific to EASCOF, like the inherent nature of the climate in East Asia and existing climate services operations by participating members in EASCOF, as well as the benefit of OSF.

- Uncertainty
- Enhancing accountability
- Possibility of including MME results into the final report
- Retaining consensus-based forecast with careful explanation (e.g., differences between issued forecasts and numerical predictions)?

Views on objective seasonal forecast

2. Views on objective seasonal forecast (20 min)

Raising verifiability is one of major motivations for implementing objective seasonal forecast.

Q5. Do you think EASCOF should routinely review the outlook for previous year? (e.g., reviewing the DJF 2022/23 consensus outlook at EASCOF in 2023)

Views on objective seasonal forecast

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Examples of reviewing the outlook for previous year:

From SASCOF-26 (Sep. 2023)

Verification of consensus outlook for 2022 October to December season

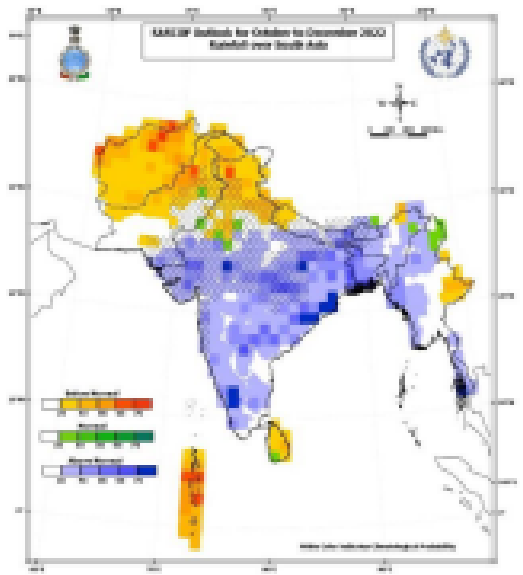

Fig 2. Consensus outlook map of SASCOF-23 for 2022 October to December Rainfall over South Asia

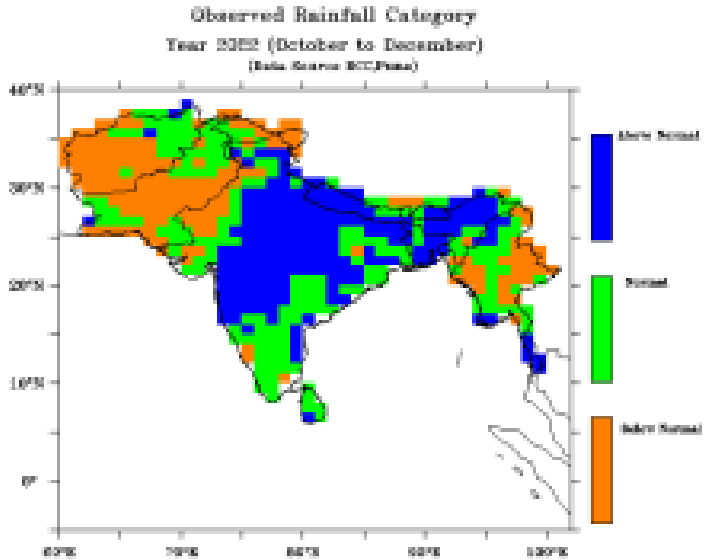

Fig 3. Observed rainfall distribution during 2022 Oct-Dec Season over South Asia expressed as grid point rainfall tercile categories.
Data Source: RCC,IMD, Pune

Views on objective seasonal forecast

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Examples of reviewing the outlook for previous year:

From ASEANCOF-20
(May 2023)

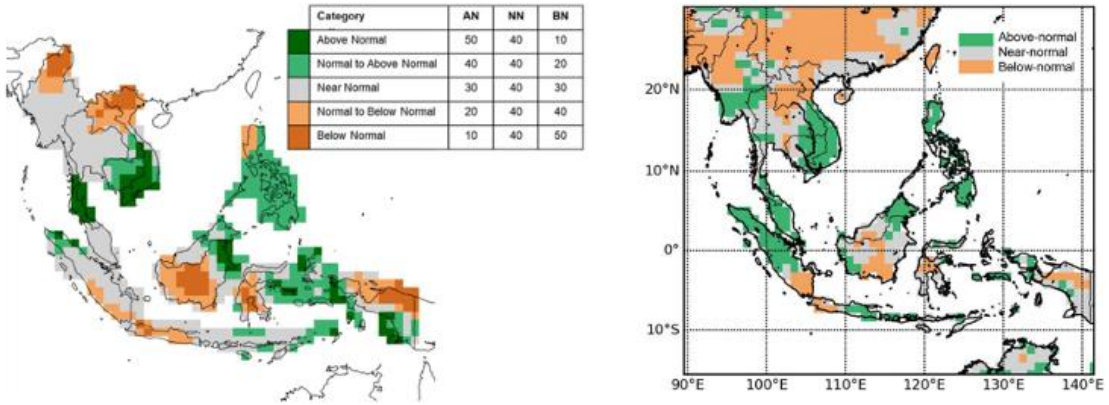

Figure C1: DJF 2022 ASEANCOF outlook (left) observed DJF rainfall in terciles (right, climatology 1991-2020). The rainfall dataset is CHIPRS (Funk et al 2014).

Country	Location (- indicates the entire country)	Outlook (MLC*)	NMHS obs. tercile
Brunei Darussalam	-	NN – AN	NN
Cambodia	-	NN – AN	AN
Lao PDR	Northern half	BN – NN	BN
	Southern half	**NN – AN**	**BN**
…	…	…	…

Way forward

3. Way forward (10 min)

We need to confirm what we can agree and set some action items for the next meeting.

Q6. What do we need to move the discussion forward?

(To my understanding)

TCC is the RCC which has served as the secretariat for EASCOF. It would be reasonable if TCC and the next hosting organization could continue the discussion in detail.