PACIFIC METEOROLOGICAL COUNCIL

Operationalization of objective seasonal forecasts and tailored products on sub-regional scales

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Context: WMO strategic plan 2020-2030

VISION 2030

By 2030, a world where **all nations**, especially the **most vulnerable**, are **more resilient** to the **socioeconomic impact** of **extreme weather, climate, water** and other **environmental events**, and **empowered** to boost their **sustainable development** through the **best possible services**, whether over land, at sea or in the air

OVERARCHING PRIORITIES

- Enhancing preparedness for, and reducing losses of life and property from hydrometeorological extremes
- Supporting climate-smart decision-making to build resilience and adaptation to climate risk
- Enhancing socioeconomic value of weather, climate, hydrological and related environmental services

CORE VALUES

- Accountability for Results and Transparency
- Collaboration and Partnership
- Inclusiveness and Diversity

LONG-TERM GOALS / STRATEGIC OBJECTIVES 2020-2030 FOCUS

Better serve societal needs
Delivering authoritative, accessible, user-oriented and fit-for-purpose information and services

- **Strengthen national multi-hazard early warning/alert systems and extend reach to better enable effective response to the associated risks**
- **Broaden the provision of policy- and decision-supporting climate information and services**
- **Further develop services in support of sustainable water management**
- **Enhance the value and innovate the provision of decision-supporting weather information and services**

Enhance Earth system observations and predictions
Strengthening the technical foundation for the future

- **Optimize the acquisition of observation data through the WMO Integrated Global Observing System**
- **Improve and increase access to, exchange and management of current and past Earth system observation data and derived products through the WMO Information System**
- **Enable access and use of numerical analysis and prediction products at all temporal and spatial scales from the WMO seamless Global Data Processing and Forecast System**

Advance targeted research
Leveraging leadership in science to improve understanding of the Earth system for enhanced services

- **Advance scientific knowledge of the Earth system**
- **Enhance the science-for-service value chain ensuring scientific and technological advances improve predictive capabilities**
- **Advance policy-relevant science**

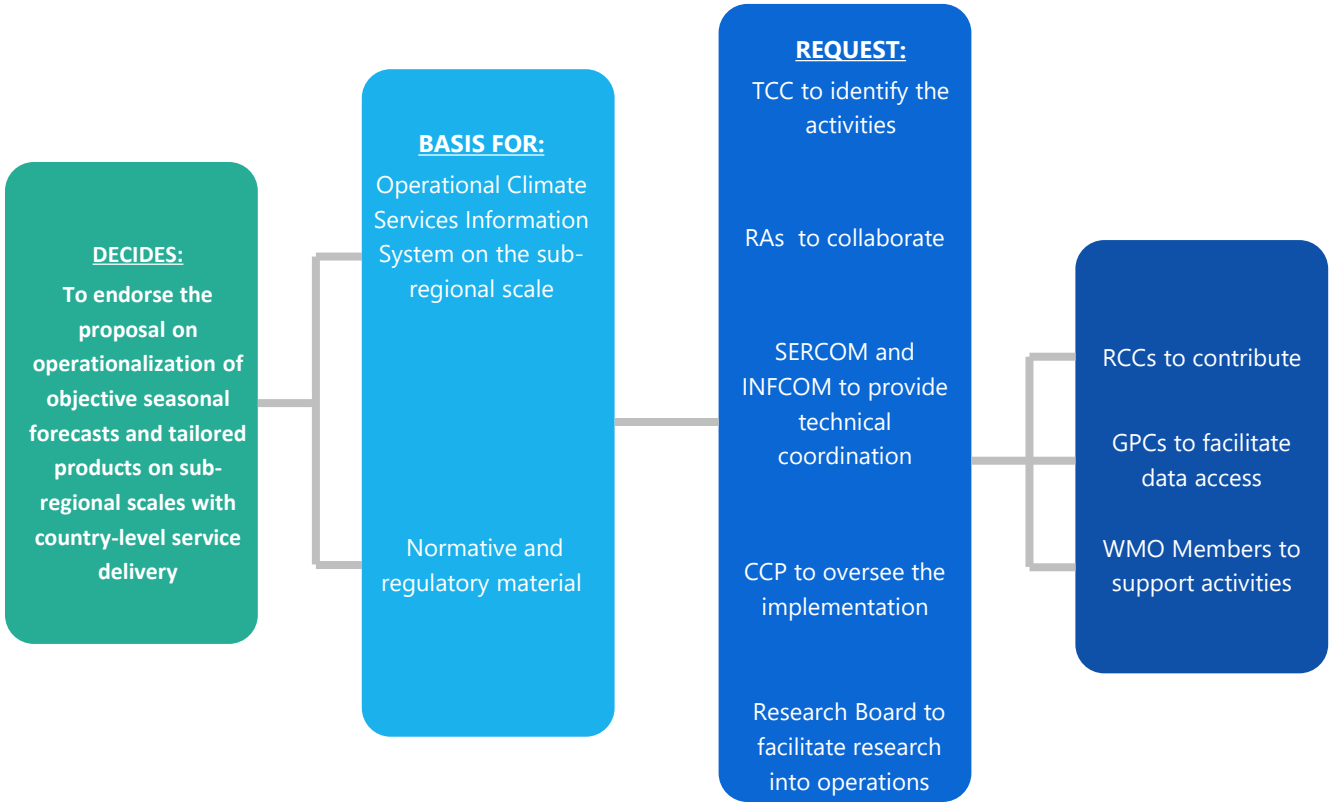
Close the capacity gap
Enhancing service delivery capacity of developing countries to ensure availability of essential information and services

- **Address the needs of developing countries to enable them to provide and utilize essential weather, climate, hydrological and related environmental services**
- **Develop and sustain core competencies and expertise**
- **Scale-up effective partnerships for investment in sustainable and cost-efficient infrastructure and service delivery**

Strategic realignment of WMO structure and programmes
Effective policy- and decision-making and implementation

- **Optimize WMO constituent body structure** for more effective decision-making
- **Streamline WMO programmes**
- **Advance equal, effective and inclusive participation** in governance, scientific cooperation and decision-making

WMO Executive Council Decision - 4.1(2)/1



JUSTIFICATION:

Decision 16 (EC-68) - Country-focused Results-based Framework and Mechanism for WMO Contributions to GFCS

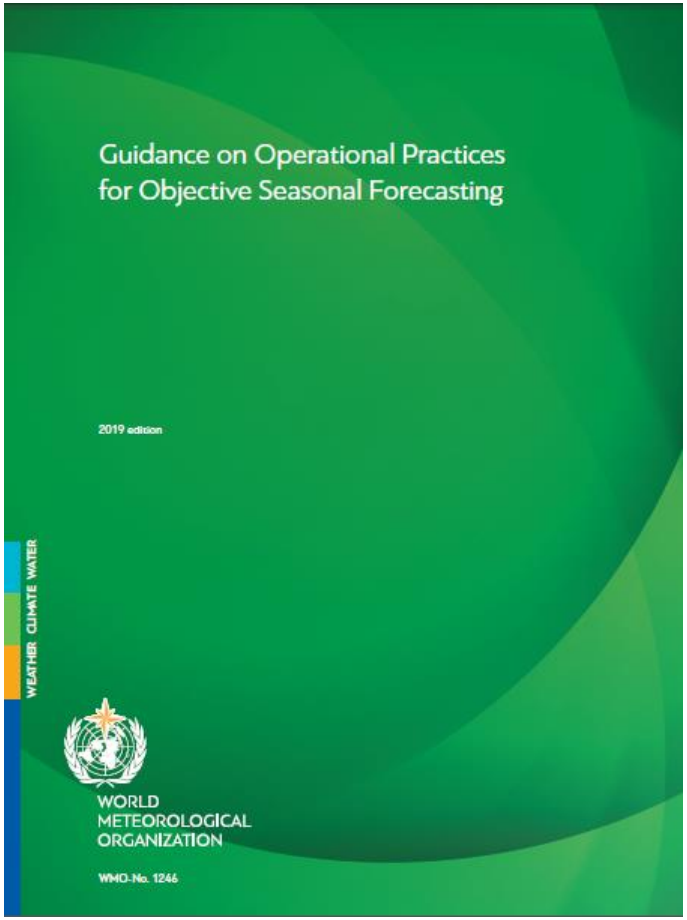
Decision 18 (EC-69) - Sub-Seasonal and Seasonal Forecasting Systems

Guidance on Operational Practices for Objective Seasonal Forecasting **(WMO-No. 1246)**

Resolution 7 (Cg-18) – Establishment of WMO Technical Commissions

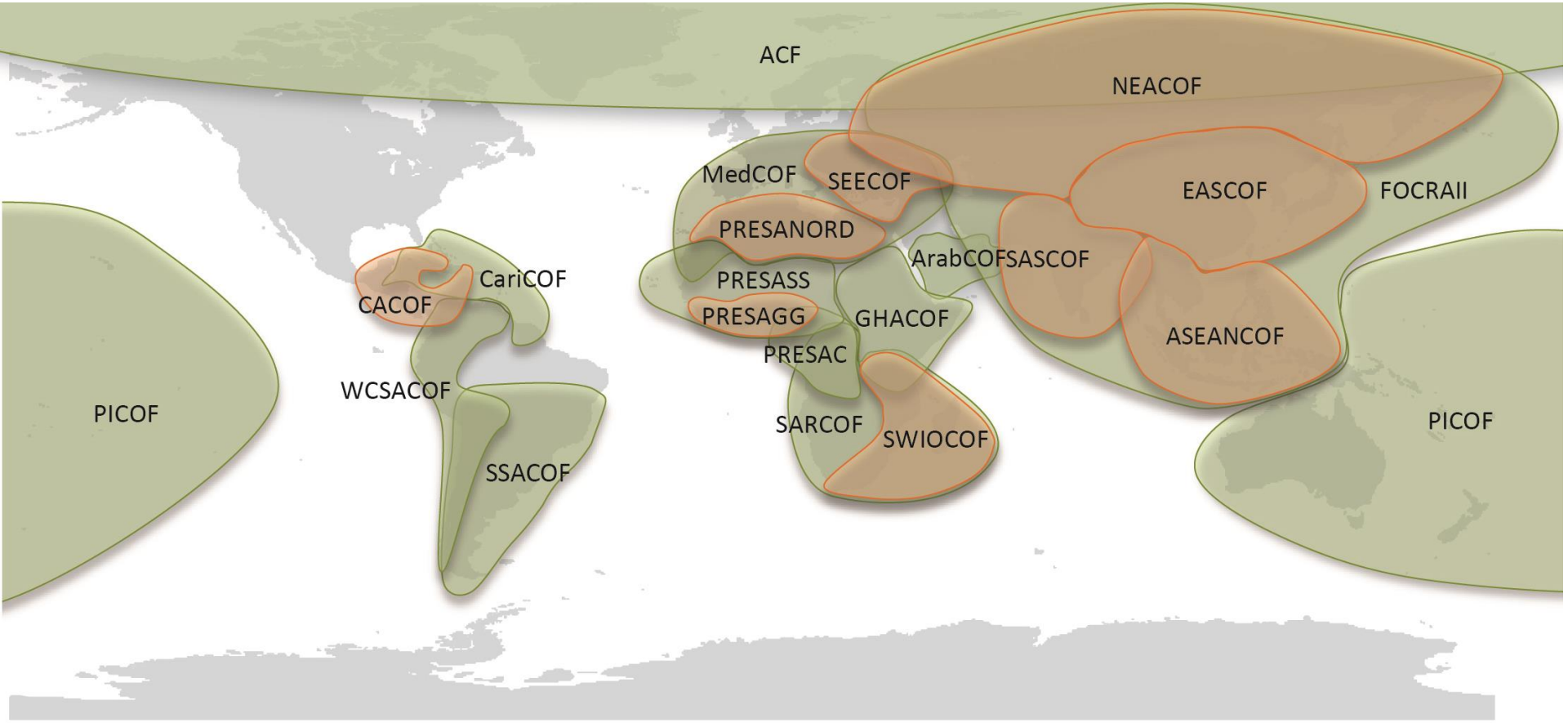
Resolution 58 (Cg-18) - Future Integrated Seamless Global Data-processing and Forecasting System Collaborative Framework

Principles for objective seasonal prediction



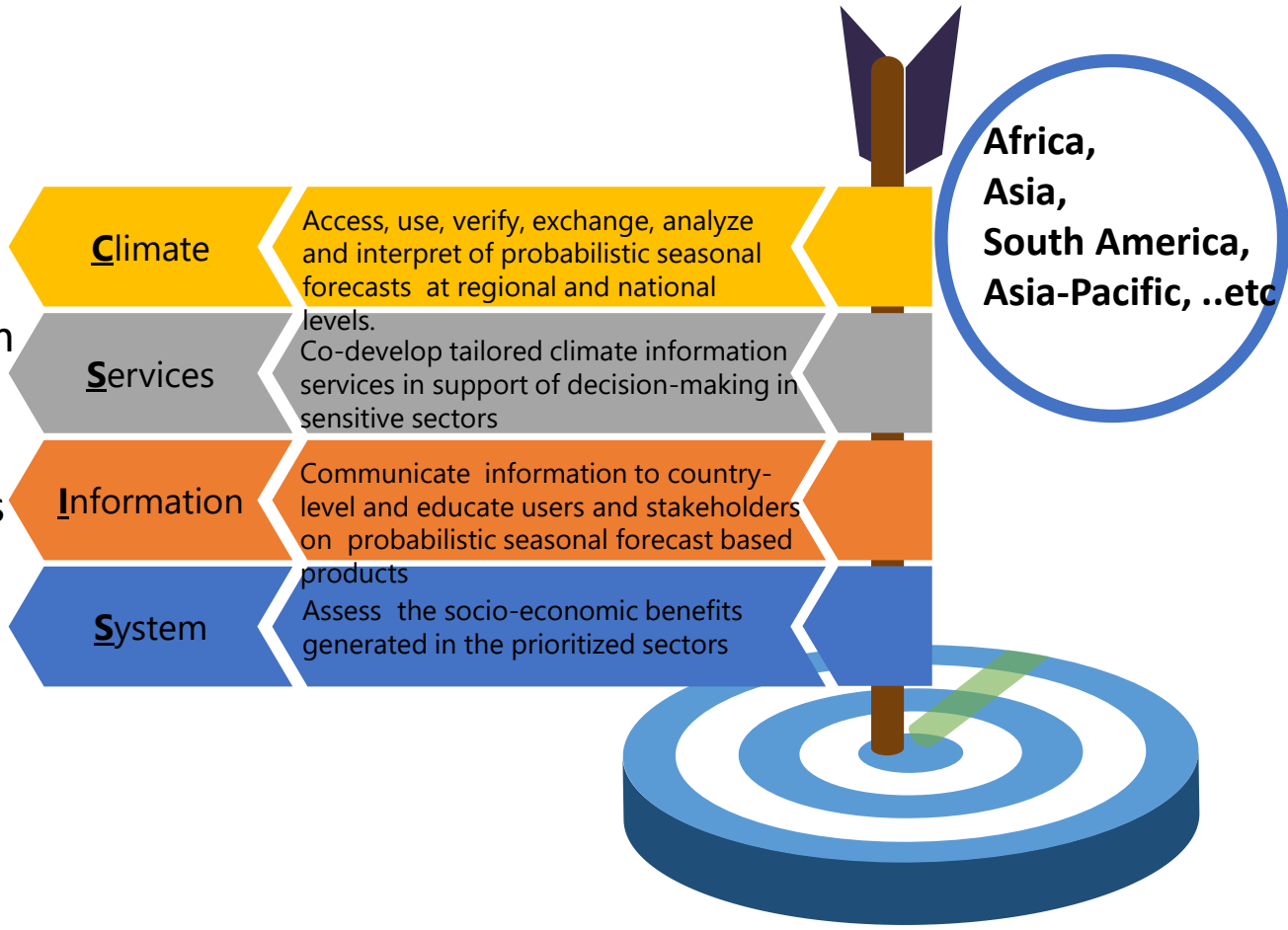
- Follow a **traceable, reproducible**, and well-documented procedure, amenable to verification.
- Use dynamical climate models, including **multi-model ensembles**
- Establish quality controlled **observational databases** for forecast verification
- Identify, assess and monitor **drivers of predictable climate variability**
- Follow forecast **verification standards**
- Provide forecast information together with historical performance
- Use non-technical language to **communicate uncertainty**
- Provide seasonal forecasts as well as **regular updates** on a fixed operational schedule
- Establish **user feedback** and product upgrade mechanisms

RCOF - operationalizing objective seasonal forecasts



Strengthening capacity of RCCs and NMHSs

Enhance the country-level capacity to deliver tailored products and services through the operationalization of the Climate Services Information System on sub-regional scales (CSIS-R)



Project design and work packages

- **WP1:** Regional standard observational and quasi-observational databases established for routine climate model calibration, verification and climate monitoring
- **WP2:** Enhanced RCCs and NMHSs capacity on objective LRF (Long Range Forecasting)
- **WP3**: Subset of models established for use in ensemble seasonal predictions at regional and national levels
- **WP4:** Calibration and downscaling approached identified for use in regional seasonal predictions
- **WP5:** Regional climate outlook statement standardized
- **WP6:** High priority tailored products routinely delivered at country level
- **WP7:** Climate outlook updated monthly at regional and national levels
- **WP8:** Verification and upgrading mechanism established

Work package 1: Observational databases for verification

Outputs	[illegible]	technical units	partners
Outcome 1: Regional standard observational and quasi-observational databases established for routine climate model calibration, verification and climate monitoring			
Historical data and products derived from current and past observations rescued and digitized, and discoverable and accessible and exchangeable through WIS	• Standing Committee Information Management and Technology; • Standing Committee for Climate Services; • Regional Associations; • Standing Committee on Earth Observing Systems and Monitoring Networks; Standing Committee on Measurements, Traceability and Instrumentation	SERVICES/CMP/RCP, INFRASTRUCTURE/WIS, SCIENCE&INNOVATION, MEMBER SERVICES	COPERNICUS, NOAA-NCEI, ECMWF, ACRE, METEO FRANCE, UK MET OFFICE, CRU, KNMI, BOM, IEDRO,
All observations taken at national level incorporated into national and regional datasets, and incorporated in a climate data management system (CDMS)		SERVICES/CMP, SERVICES/RCP, INFRASTRUCTURE, MEMBER SERVICES & DEVELOPMENT DEPARTMENT	COPERNICUS, ECMWF, NOAA-NCEI, ACRE, METEO FRANCE, MET OFFICE, BOM, IEDRO
Customized regional reference observational databases implemented: RCCs and NMHSs staff members trained to use, access, exchange, and quality control standard regional observational datasets (including reanalysis and blended analysis products) to support the delivery of objective seasonal forecast at regional and national levels	Standing Committee for Climate Services; Standing Committee Information Management and Technology; Research Board, JCB	SERVICES/CMP/RCP, INFRASTRUCTURE, SCIENCE&INNOVATION	KNMI, DWD NOAA-NCEI Copernicus University of Rovira i virgili, Spain University of Reading, UK
Road map for establishing regional reference Databases: assessment of observational datasets used to catalogue regional climate variability and its drivers , including reanalysis and blended analysis products . document shall identify products required and area to be operationalized by RCCs and NMHSs for the provision of	Research Board; Standing Committee for Climate Services; Standing Committee Information Management and Technology; Regional association	SCIENCE&INNOVATION, SERVICES/RCP/CMP, MEMBER SERVICES	WCRP, COPERNICUS, IRI, METEO FRANCE, MET OFFICE, BOM, NOAA

Work package 2: RCCs and NMHSs capacity needs for timely access, use and interpretation of Long Range Forecasts

WMO to closely collaborate on this component with the WMO Global Producing Centres for Long Range Forecasting (GPCLRFs), WCRP and other partners

Outcome 2: Enhanced RCCs and NMHSs capacity on objective LRF (Long Range Forecasting)			
Access to Long Range Forecasts: NMHSs staff trained to access and use LRF from WMO lead centre (LC-LRFMME) and other dynamical LRF products, including those products	Standing Committee on Data Processing for Applied Earth System Modelling and Prediction; Research Board;	INFRASTRUCTURE S/RCP, SCIENCE&INNOVATION, MEMBER SERVICES & DEVELOPMENT DEPARTMENT	WCRP, MET OFFICE, NOAA, METEO FRANCE, IRI
from RCCs	Standing Committee for Climate Services; Standing Committee Information Management and Technology; Regional association		
Understanding drivers of climate variability and predictability: NMHSs staff trained on the analysis of regional climate drivers and physical basis of seasonal prediction	Research Board; Standing Committee for Climate Services;	SCIENCE&INNOVATION, SERVICES/RCP/CMP	WCRP, WISER, MET OFFICE, NOAA, METEO FRANCE, IRI, RIMES BOM, Met-Office
Assessment of model performance, reliability, and sources of predictability over the region: RCCs and NMHSs staff trained on selection of best suited models for the region, given the range of forecasts options from multi-models ensemble. This requires support from expert in the analysis of models ability to capture relevant climate processes	Research Board; Standing Committee for Climate Services;	SCIENCE&INNOVATION, SERVICES/RCP	WCRP, MET OFFICE, RIMES, NOAA, METEO FRANCE, IRI
Calibration: RCCs and NMHSs staff trained on selection in all post-processing steps require by the multi-model ensemble (MME) seasonal prediction approach including bias correction and calibration	Research Board; Standing Committee for Climate Services; Standing Committee on Data Processing for Applied Earth System Modelling and Prediction;	SCIENCE&INNOVATION, INFRASTRUCTURE, SERVICES/RCP	WCRP, MET OFFICE, NOAA, METEO FRANCE, IRI
Probabilistic seasonal forecast: RCCs and NMHSs staff trained on interpreting and emphasizing the probabilistic nature of seasonal forecasts		SCIENCE&INNOVATION, INFRASTRUCTURE, S/RCP	WCRP, MET OFFICE, NOAA, METEO FRANCE, IRI, KMA
Real-time forecasts verification: RCCs and NMHSs staff trained on verification of real-time forecasts in addition to establishing the model average predictive skill of the seasonal forecasting system		SCIENCE&INNOVATION, INFRASTRUCTURE, S/RCP	WCRP, MET OFFICE, NOAA, METEO FRANCE, IRI
Downscaling and generation of national products from regionally optimized inputs: RCCs and NMHSs staff trained on better understanding the regional and local climate, and statistical downscaling	Research Board; Standing Committee for Climate Services;	SCIENCE&INNOVATION, S/RCP SERVICES/CMP	WCRP, MET OFFICE, RIMES, METEO FRANCE, IRI

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Thank you