

Unlocking WIPPS Products: Practical Aspects and Observed Benefits

Pre INFCOM-3 Information Session
(25 March - 5 April 2024)

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Indonesia (BMKG)

3 & 4 April 2024



WORLD
METEOROLOGICAL
ORGANIZATION

General Overview use of WIPPS Products in BMKG

Designated WIPPS Centres Web portal for the WMO Integrated Processing and Prediction System

Filter by Region: I II III IV V VI

Filter by WIPPS Activities: Search...

142 centres/networks 23 activities

WMO 2018 - Disclaimer: The designations employed in this map are in conformity with United Nations practice. The presentation of material therein does not imply the expression of any... Powered by Esri

Graphical display, ECMWF website

Product inventory. Open data from ECMWF are available for a wide range of products at 0.4 degrees resolution.

Information on key characteristics of the model and documentation

- Geopotential height, 850 hPa [Inventory] [WIS Metadata]
- Geopotential height, 500 hPa [Inventory] [WIS Metadata]
- Geopotential height, 250 hPa [Inventory] [WIS Metadata]
- Temperature, 850 hPa [Inventory] [WIS Metadata]
- Temperature, 500 hPa [Inventory] [WIS Metadata]
- Temperature, 250 hPa [Inventory] [WIS Metadata]
- Wind zonal velocity (u), 925 hPa [Inventory] [WIS Metadata]
- Wind zonal velocity (u), 850 hPa [Inventory] [WIS Metadata]
- Wind zonal velocity (u), 700 hPa [Inventory] [WIS Metadata]
- Wind zonal velocity (u), 500 hPa [Inventory] [WIS Metadata]
- Wind zonal velocity (u), 250 hPa [Inventory] [WIS Metadata]
- Wind meridional velocity (v), 925 hPa [Inventory] [WIS Metadata]
- Wind meridional velocity (v), 850 hPa [Inventory] [WIS Metadata]
- Wind meridional velocity (v), 700 hPa [Inventory] [WIS Metadata]
- Wind meridional velocity (v), 500 hPa [Inventory] [WIS Metadata]
- Wind meridional velocity (v), 250 hPa [Inventory] [WIS Metadata]

Information about RSMC ECMWF (Global deterministic numerical weather prediction)

Website: [Link](#)

Focal Point: [Mr David RICHARDSON](#)

Principal GIS: **Exeter**

This centre was designated in year **2017**.

This centre performs the following GDPFS activities:

- World Meteorological Centre
- Global deterministic numerical weather prediction
- Global ensemble numerical weather prediction
- Global numerical long-range prediction
- Coordination of deterministic numerical weather prediction verification
- Coordination of wave forecast verification

Useful links

- A full list of designated WIPPS (GDPFS) centres (Part III of Manual on the Global Data-processing and Forecasting System)
- WIPPS Community site

Notes to User

- Please address requests for updating information to the Earth System Prediction Division of the Secretariat at dpfsmail@wmo.int.
- Focal points of designated WIPPS centres are linked.

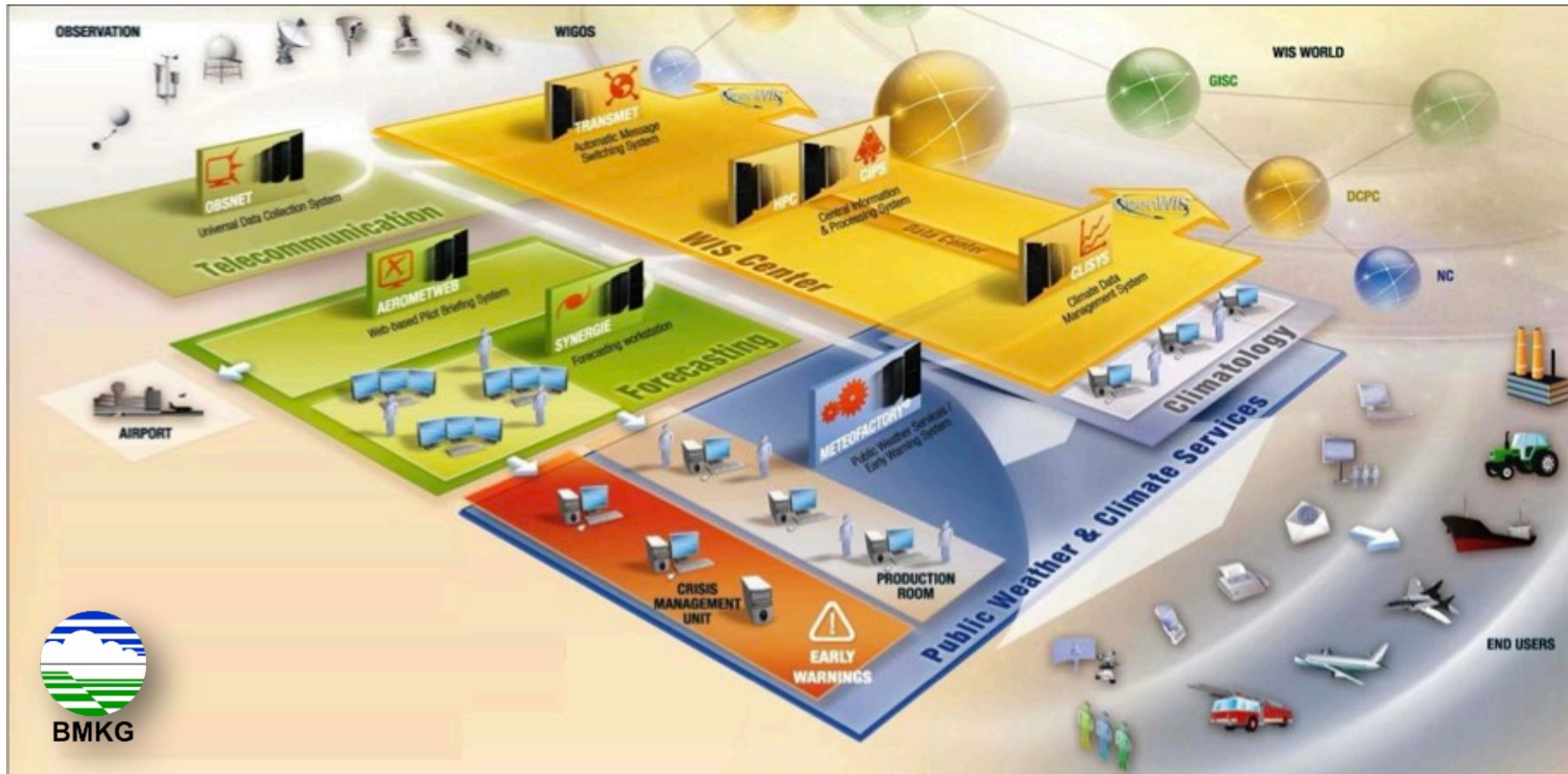
indicates mandatory products.

WIPPS Web Portal



- WIPPS is one of the main systems used by BMKG to support the generation of weather and climate information services.
- BMKG uses WIPPS to support its various services, such as:
 - Daily, weekly, and monthly weather forecasts
 - Impact-based Forecast (IBF)
 - Early warnings of extreme weather, such as floods, landslides, and strong winds
 - Climate information for various sectors, such as agriculture, aviation, and maritime
- BMKG is continuously developing and improving its use of WIPPS products to improve the quality and accuracy of the weather information it produces. BMKG main interest on WIPPS product are:
 - Nowcasting
 - Limited-area deterministic numerical weather prediction
 - Limited-area ensemble numerical weather prediction
 - Global deterministic numerical weather prediction
 - Global ensemble numerical weather prediction
 - Global numerical sub-seasonal forecasts
 - Global numerical long-range prediction
 - Annual to decadal Climate prediction
 - Numerical ocean wave prediction
 - Global numerical ocean prediction

BMKG's Integrated System on Weather Forecast



The BMKG has implemented a modern integration system that connects all observational data within Indonesia and global observations. This integration includes remote sensing data from weather satellites and radars, as well as numerical weather prediction data from the World Meteorological Centers Centers (WMC) and Regional Specialized Meteorological Centers (RSMC). This system operates in real-time and is dynamic, enabling the efficient feeding of data and information internally with BMKG and its stakeholders. The system greatly benefits from the existence of WIPPS.

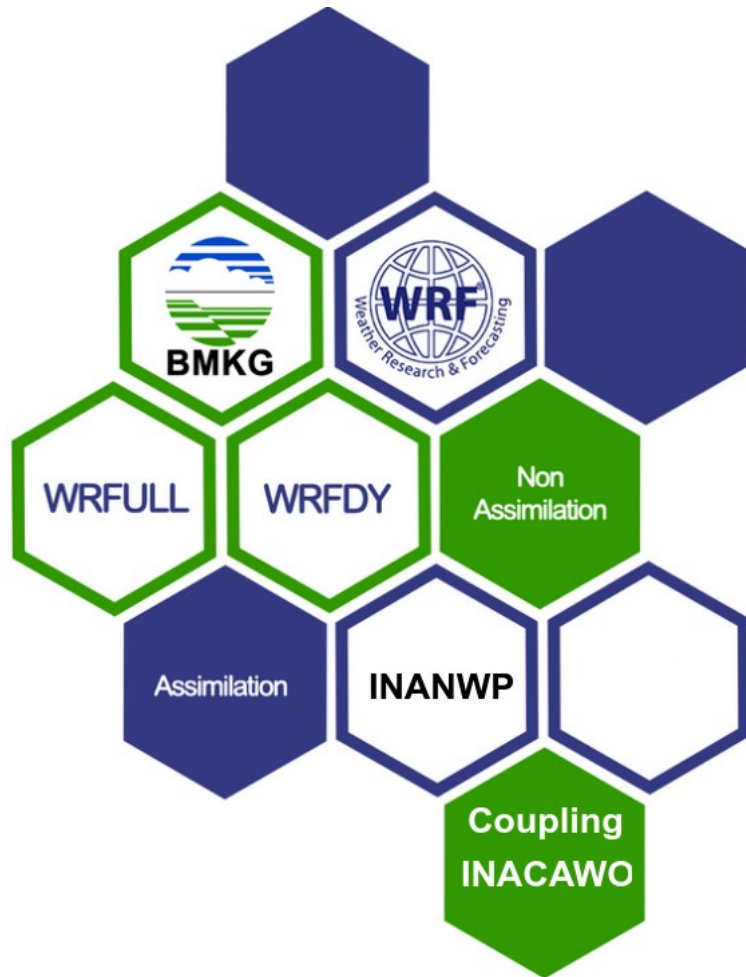
BMKG's Utilization of NWP Models



BMKG has utilized several numerical weather prediction (NWP) models to support its operational services, especially for National Digital Forecast (NDF) data initialization and analysis. The NWP models come from several WMCs such as:

1. IFS from ECMWF
2. GFS from NOAA/NCEP
3. ACCESSG from BoM
4. UM from UK Met Office
5. ARPEGE from Meteo France.

BMKG's Utilization of Global NWP Models to Mesoscale NWP Models



As BMKG has obtained several global NWP models data to our data center (CIPS Data Storage), BMKG initiates to improve its prediction accuracy through processing the global NWP models data to Limited-Area NWP models using WRF.

Several models have been developed as mesoscale prediction in BMKG such as:

1. WRF-DY (WRF without Assimilation)
2. INANWP (WRF with Data Assimilation of BMKG's surface, upper air and remote sensing observation)
3. INACAWO (Coupling Models between Atmospheric and Oceanic models)

BMKG's Utilization of Global NWP Models to National Digital Forecast in Indonesia

DATA FAMILY	DATA SET	UPDATE FREQUENCY	DATA TIME RANGE	DATA TEMPORAL RESOLUTION
Numerical Weather Prediction (NWP)	ECMWF – HRES	Every 12 h – 00Z, 12Z	0 to +240 h	1 to 6 h depending on the time range
	ECMWF – ENS	Every 12 h – 00Z, 12Z	0 to +360 h	1 to 6 h depending on the time range
	NCEP – GFS	Every 12 h – 00Z, 12Z	0 to +384 h	3 h
	NCEP – GEFS	Every 12 h – 00Z, 12Z	0 to +384 h	3 h
	Météo-France – ARPEGE	Every 12 h – 00Z, 12Z	0 to +96 h	1 to 6 h depending in the time range
	Météo-France – AROME	Every 12 h – 00Z, 12Z	0 to +36 h	1 h
	BMKG – WRF 0.3 SEA	Every 12 h – 00Z, 12Z	0 to +120h	3 h
	BMKG – WRF 0.1 IND	Every 12 h – 00Z, 12Z	0 to +120h	3 h
	BMKG – WRF 0.03 JAVA	Every 12 h – 00Z, 12Z	0 to +72h	1 h
	UKMO – UM	Every 12 h – 00Z, 12Z	0 to +168h	1 to 6h depending on the time range
	UKMO - MOGREP	<i>Still under investigation. Currently probabilities not available on UKMO Weather data hub.</i>		
	BOM – Access G3	Every 12h – 00Z, 12Z	0 to +240h	1 h
	BMKG – MMS1 – CAWO	Every 6h – 00Z, 06Z, 12Z, 18Z	0 to +240h	1 h

BMKG's Access to WIPPS

No	Heading	Channel	Subscriber	Received date	Size	Trt	Nnn	Format	Priority	Error	Oprt	Wmo filename	Mss
1	SMID52WIII100000	SFTPA	BMKSFTY	2023-11-10 03:19:05	135	-	0	-	84	0	0	-	1
No	Channel	Subscriber	Sending date	Nnn	Format	Delay	Size	Resend	Rtg	Rqprt	Mss		
1	CEDSUJ01A	-	2023-11-10 03:19:16	37526	-	00:00:11	135	0	0	0	1		
2	COMPIL_S	-	2023-11-10 03:19:05	0	-	00:00:00	135	0	0	0	1		
3	CSISUJ01A	-	2023-11-10 03:19:16	37618	-	00:00:11	135	0	0	0	1		
4	SYDSUJ01A	-	2023-11-10 03:19:16	37575	-	00:00:11	135	0	0	0	1		
5	TRSSIA01A	-	2023-11-10 03:19:20	42408	-	00:00:15	135	0	0	0	1		
6	TRSSUPA	-	2023-11-10 03:19:16	37526	-	00:00:11	135	0	0	0	1		

To access WMC and RSMC products as listed on the WIPPS Portal, BMKG employs various methods of access and download, tailored to the specific product needed. The majority of these products are acquired through direct connections with WMCs and RSMCs.

For specialized data, such as Numerical Weather Prediction (NWP) data, BMKG integrates RSMC products into its own data streams, utilizing a transfer system known as INA-Switching.

Name	Status	Agent	Count	Date
ads_cams_grib	On	cams	2	13 February 202...
api_meteofrance_arpege_run00	On	meteofrance	1	7 December 202...
api_meteofrance_arpege_run12	On	meteofrance	1	7 December 202...
api_meteofrance_arpege_wave_run00	On	meteofrance	1	7 December 202...
api_meteofrance_arpege_wave_run12	On	meteofrance	1	7 December 202...

WELCOME TO THE INDOONESIAN DATA CENTER

NATIONAL OBSERVATION MESSAGE

SURFACE OBSERVATION

UPPER LEVEL OBSERVATION

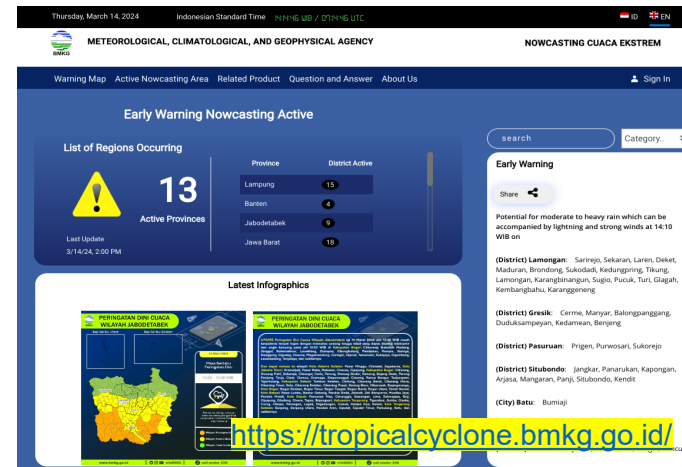
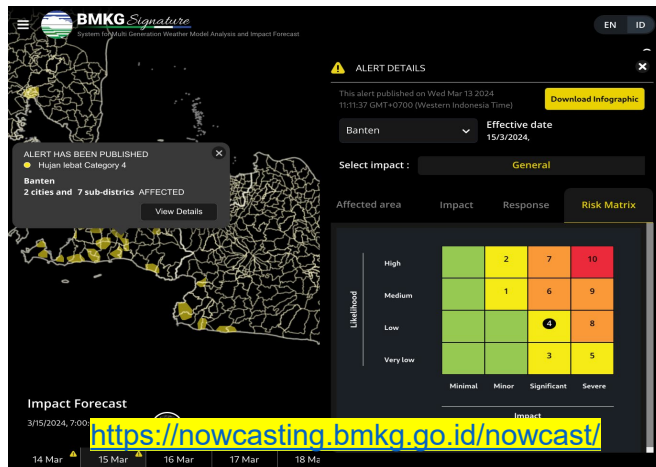
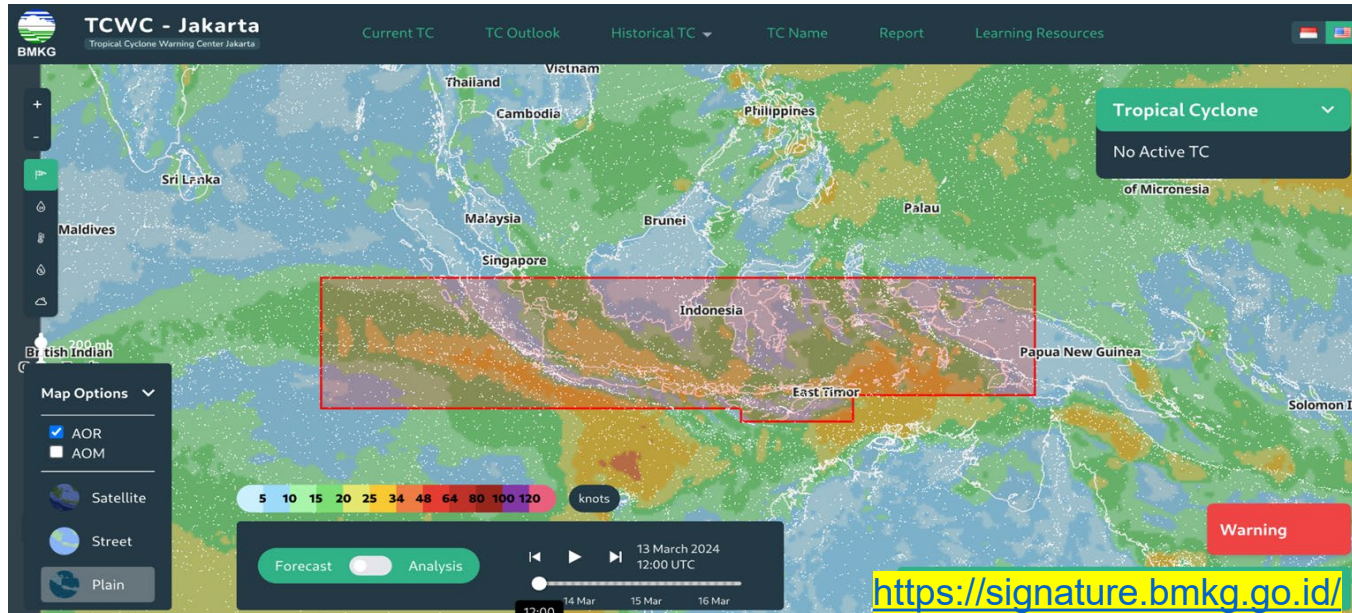
SATELLITE

Hazardous Weather

Additionally, for World Meteorological Organization Information System (WIS) metadata services, BMKG actively offers access services through its website, available at <http://wis.bmkg.go.id>.



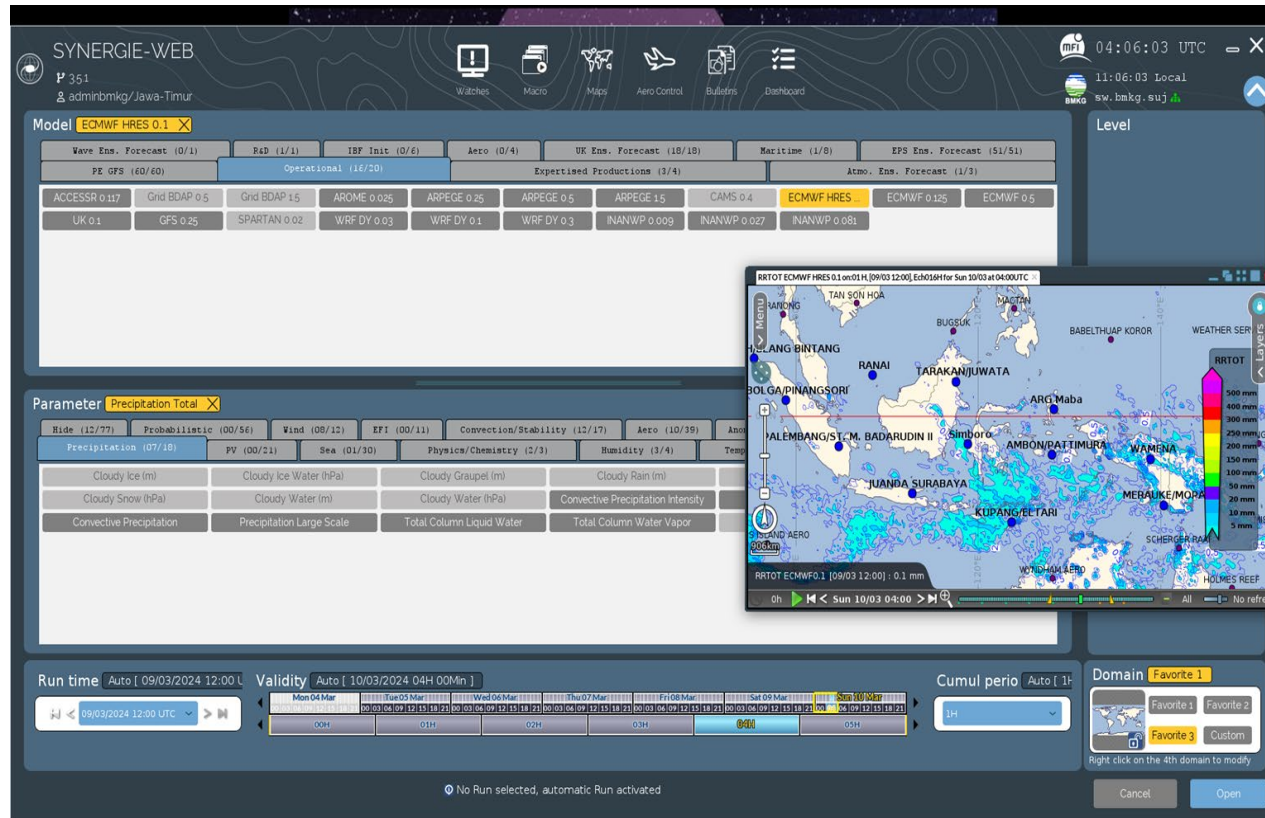
BMKG's Utilization NWP Models data



The NWP Models data has been utilized by BMKG in its operational activities, such as:

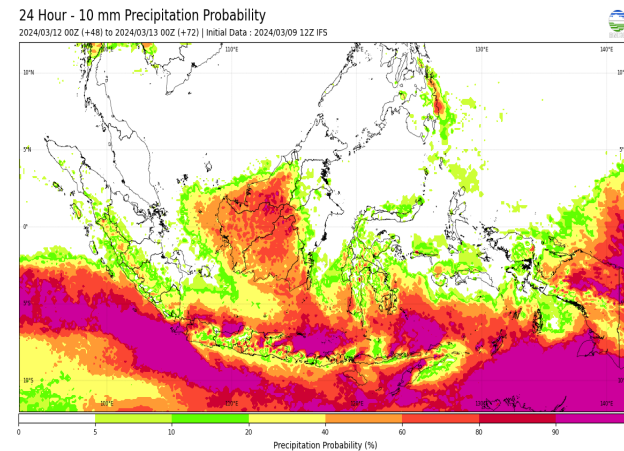
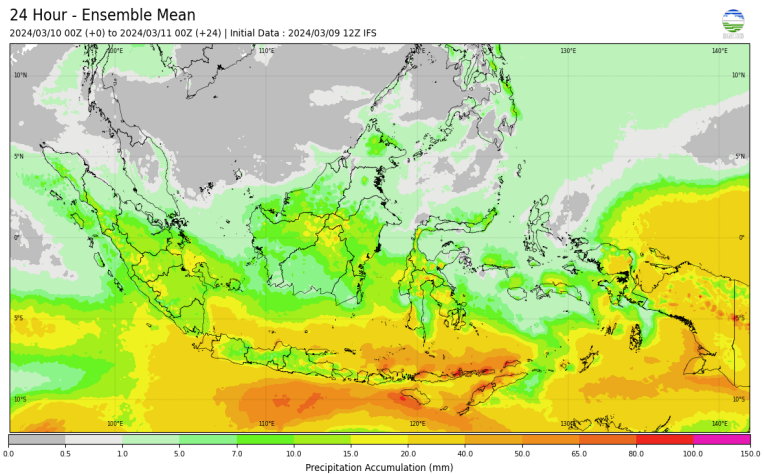
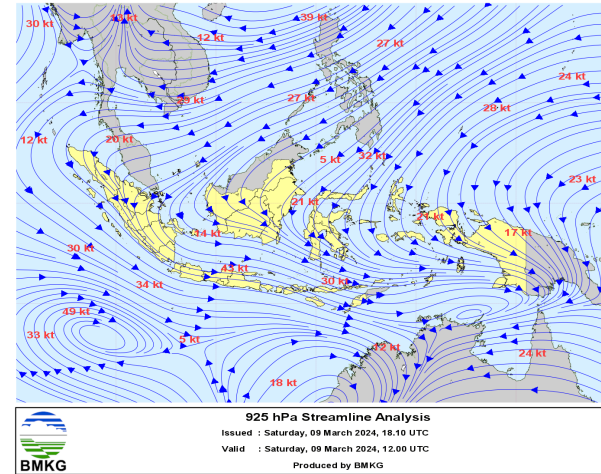
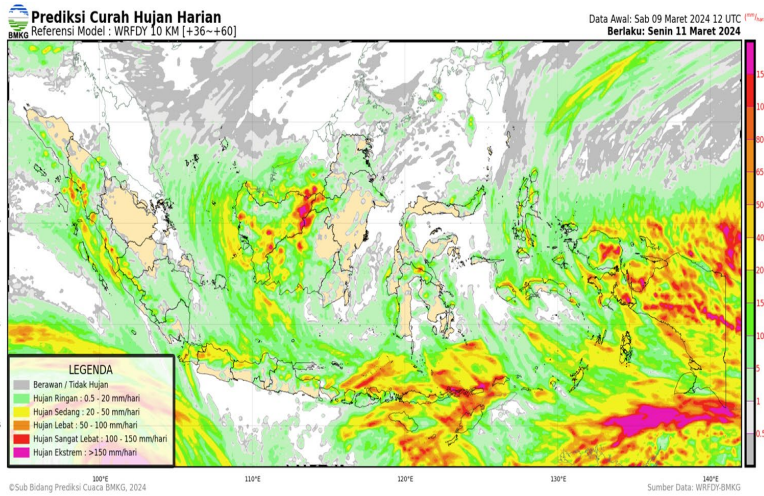
1. Initialization and boundary condition for the mesoscale NWP Model
2. Nowcasting up to the next 6 hours (AROME, INACAWO)
3. Model reference for Impact-Based Weather Forecasts (IBF) up to 1 week (IFS, GFS)
4. Analysis and Prediction of Tropical Cyclones (TCWC),
5. Post-processing products processed through the BMKG Task Center System (CIPS-TC)

The important WIPPS Product for BMKG's Integrated System for Analysis and Visualization



BMKG has implemented Synergie as a comprehensive system for analysis, forecasting, and visualization, integrating both observational data and NWP (Numerical Weather Prediction) models. Currently utilized across 34 provinces, plans are underway to extend its reach to all 38 provinces. The system's ability to present weather models, remote sensing, and observational data in a complete and real-time manner serves as a crucial foundation for issuing local-level weather early warnings.

BMKG's NWP Post Processing and Visualization of NWP Models data



To order to support all BMKG's Forecaster, BMKG has done several post-processing and visualization of the NWP models data. There are some added value products, such as deterministic map prediction, ensemble and probabilistic prediction developed using the time-lag method.

<https://web.meteo.bmkg.go.id/id/>

The Benefit to Use Products from WIPPS Designated Centres

As BMKG has used WIPPS Products, here are several key benefits, such as:

- **Enhanced Accuracy and Specificity:**

Global NWP data can significantly improve the accuracy of our local forecasts compared to relying solely on global models by use it as input for BMKG's Mesoscale Model.

- **Improved Forecast Timeliness:**

Some WIPPS products, like NWP data, are updated frequently, allowing us to integrate the latest atmospheric information into our forecasts.

- **Streamlined Workflows:**

International standard data formats and protocols, making it easier to integrate their products into our existing forecasting workflows.

- **Additional Benefits:**

RSMC seasonal climate outlooks can inform long-term planning decisions in various sectors like agriculture and water management alongside other data sources for a comprehensive weather information picture. This combined approach can lead to more accurate, timely, and effective forecasts for our needs.

BMKG's Future Contribution



As a dedicated member of the World Meteorological Organization (WMO) within Regional Association V, BMKG recognizes the importance of leveraging our current resources to actively contribute to the development and enhancement of WIPPS products. With this goal in mind, BMKG is committed to playing a pivotal role within the operational center tasked with managing key areas such as:

- Nowcasting
- Limited-area deterministic numerical weather prediction
- Limited-area ensemble numerical weather prediction
- Numerical ocean wave prediction

This will involves processing data, developing numerical models, and providing services to region and neighboring countries

Thank you.



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