



The Bureau  
of Meteorology



# **Australian VLab Centre of Excellence Regional Focus Group meeting 22<sup>nd</sup> January 2026**

Resources from the presentation "A summary of the use of Artificial Intelligence (AI) in Satellite Meteorology as presented at Australian VLab CoE Regional Focus Group meetings during 2025".

Bodo Zeschke,  
Bureau of Meteorology Training Centre  
Australian VLab Centre of Excellence

# Contents

1. AI presentations and information during AOMSUC-14 and 15
2. Using AI to predict convective hazards: the ProbSevere products
3. Familiarisation with near real time LightningCast data over the southern Pacific Ocean, from the SSEC Real Earth web page.
4. Examining the AIFS ECMWF forecasts on the ECMWF web page. Also, the MIMIC TPW and JAXA GSMaP forecasts.
5. Instructions for rendering the AIFS ECMWF forecasts, with "future forecasts" that can be verified.



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# AOMSUC-15 Conference Presentations: AI in Satellite Meteorology

## Including useful web links

### Direct observation prediction: AI-DOP

- Can we learn ML forecasts directly from observations?

**AI-DOP. Utilising AI and Machine Learning to produce weather forecasts directly from observations**

<https://www.ecmwf.int/en/newsletter/182/earth-system-science/update-ai-dop-skilful-weather-forecasts-produced-directly>

### AOMSUC-15 FYSUC-2025

### 5. Opportunities in AI & Other Emerging Technology

"AI-STORMVIS"  
using

**AI-STORMVIS, which uses AI to automatically analyse Tropical Cyclone position and intensity**

[https://www.typhooncommittee.org/19IWS/docs/Technical%20Presentations/4.%20IWS19\\_2024\\_TechnicalPresentation\\_Hong\\_Kong\\_China\\_v1.pdf](https://www.typhooncommittee.org/19IWS/docs/Technical%20Presentations/4.%20IWS19_2024_TechnicalPresentation_Hong_Kong_China_v1.pdf)

### Applications of Data-driven AI models

- At CMA, several **data-driven weather forecasting models including Fengqing** have been implemented. These models are now real-timely providing forecasts and directly integrated into operational platform for use by forecasters.
- **High-resolution Monitoring:** Utilizes satellite, surface station, and gridded analysis data to support global weather monitoring.

**CMA's Feng Series AI Model Matrix**

[http://www.nsmc.org.cn/conference/fysuc/assets/ppt/session6\\_03\\_GONG\\_Yu.pdf](http://www.nsmc.org.cn/conference/fysuc/assets/ppt/session6_03_GONG_Yu.pdf)

### Satellite Image Sequence Prediction

- Motivation 1: The blurry issue

**CMA's Multiscale Time Conditioning Generative Adversarial Network for long-term satellite image sequence prediction (MSTCGAN).**

<https://ieeexplore.ieee.org/abstract/document/9791392>





# AOMSUC-15 Conference Presentations: AI in Satellite Meteorology

Including a useful web link

**AOMSUC-15 FYSUC-2025**  
FIFTEENTH ASIA-OCEANIA METEOROLOGICAL SATELLITE USERS' CONFERENCE  
THE JOINT 2025 FENGYUN SATELLITE USER CONFERENCE

## Study to retrieve the 3D-winds by AI/ML-based retrieval algorithm

- JMA is also developing a method to retrieve 3D-winds and other geophysical quantities from satellite data using AI and machine learning (ML).

**JMA's study to retrieve 3D winds using Optical Flow and AI/ML based retrieval algorithms**

Time-sequential imager data at t=1(hour) and t=2(hour) are used to generate a Time-sequential imager data at t=1(hour) and t=2(hour). The process involves merging the first guess and sounding information and then merging the first guess and sounding information.

This presentation introduces the imager data processing part.

**AOMSUC-15 FYSUC-2025**  
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## II. Data and Method

### Step3. AI-based Precipitation Estimation

#### FY-4B AI Precipitation Algorithm

- Ground stations record hourly accumulated rainfall, but rapid changes cause fluctuations

**AI-based Precipitation Estimation**

Input: Ground stations record hourly accumulated rainfall, but rapid changes cause fluctuations. The input is used to train a model.

data: Applies Light Gradient Boosting Machine (LGBM) for accurate rainfall estimation.

Train\_model → Predict → Output

**Lightning Detection**

**AI Satellite-based lightning forecasting**

2024-08-17 (12:00-13:30) KST

IR image: 12:00 12:10 12:20 12:30 12:40 12:50 13:00 13:10 13:20 13:30

**KMA's AI Satellite-based lightning forecasting and ground lightning observations**

Ground observation: NWCSAF Radar-based lightning potential area

First Lightning Observation Time: 13:00  
AI Satellite-Based Lightning Prediction: 12:14 (46 min. earlier)  
Ground Radar-Based Lightning Potential Area: 12:25

**AINPP Asia Nowcasting Intercomparison- Lightning Nowcasting**

Participating: NOAA/C... Him...

10-min/ Ground truth data: Global lightning occurrence

**AINPP Asia Nowcasting Comparing AI driven Lightning Prediction algorithms**

<https://www.wmc-bj.net/ainpp/>





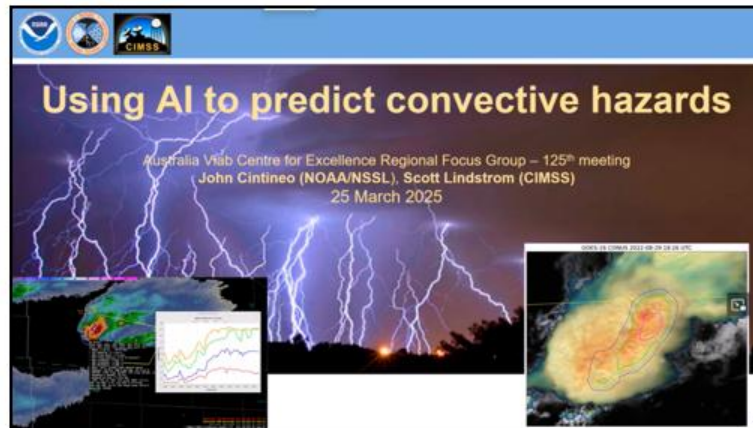
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# Using AI to predict convective hazards: the ProbSevere products

March 2025 RFG meeting.



### Summary

- ProbSevere v3** (gradient-boosted decision trees)
  - Uses multi-sensor storm tracking
  - Fuses radar, satellite, lightning, NWP data
  - Guidance used throughout U.S. NWS
- IntenseStormNet** (convolutional neural network)
  - Stand-alone satellite-only convective nowcasting tool
  - Used within PSv3
  - Exploring utility for "convection reanalysis"
- LightningCast** (convolutional neural network)
  - Satellite-only lightning prediction
  - Excels at lightning-initiation forecasts
  - GLM serves as the truth/target data
  - Available through CSPP-Geo

Contact:

- [john.cintineo@noaa.gov](mailto:john.cintineo@noaa.gov)
- [scottl@ssec.wisc.edu](mailto:scottl@ssec.wisc.edu)

Links at <http://www.virtuallab.bom.gov.au/archive/regional-focus-group-recordings/>

### History of ProbSevere LightningCast Machine Learning Tool promotion and collaboration within our VLab initiative

**0100-0210 LightningCast Probabilities**  
First introduction:  
RFG meeting Dec 2022  
Dr. Scott Lindstrom

**Availability of LightningCast over the South Pacific on the SSEC web page**

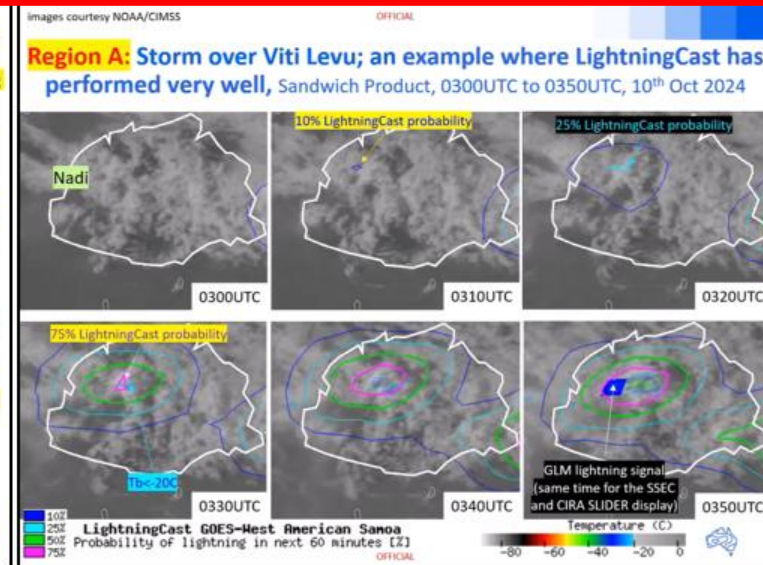
**Real time use of LightningCast, BMTC Forecasting Day, April 2024**

**RFG meeting June 2024**  
Using LightningCast as an Aviation Forecasting tool  
Dr. Scott Lindstrom

**RFG meeting Nov 2024**  
The "beta" version for use with Himawari-9  
Dr. Scott Lindstrom

**BMTC Advanced Tropical Met. subject case studies, Oct 2024**

**Developing Case Studies & providing feedback to NOAA/CIMSS May-Oct 2024**



# ProbSevere as a suite of different machine learning tools

March 2025 presentation by Scott Lindstrom SSEC University of Wisconsin Madison

[http://www.virtuallab.bom.gov.au/index.php/download\\_file/view/1831/227/](http://www.virtuallab.bom.gov.au/index.php/download_file/view/1831/227/)



## Overview of ProbSevere

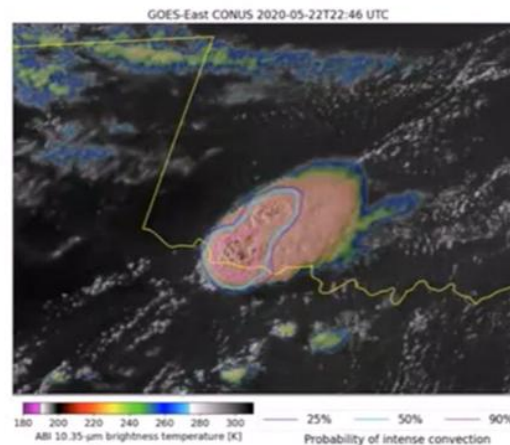
These are all machine learning tools that use ABI data from GOES-R satellites – and other data sources too. They give advance notice of Severe Weather, or of Lightning

### 1. ProbSevere v3



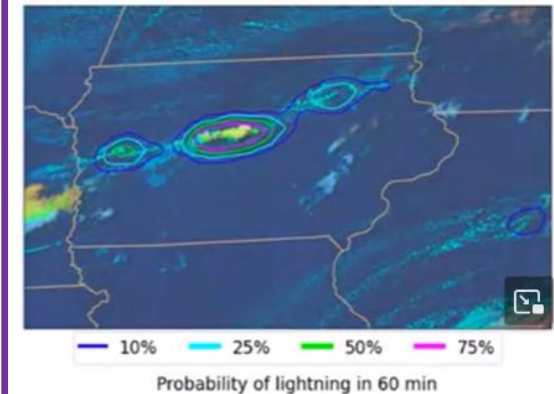
ML models for nowcasting large hail, wind gusts, and tornadoes

### 2. IntenseStormNet



Deep-learning model using only satellite images to detect "intense" parts of storms

### 3. LightningCast



Satellite-only deep-learning model for nowcasting lightning

Contact:

• [john.cintineo@noaa.gov](mailto:john.cintineo@noaa.gov)





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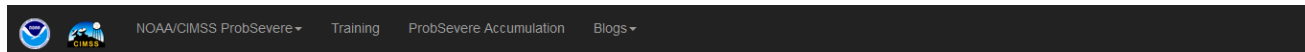
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# Exercise 4a: From my AOMSUC -15 Training Event

## 1: Open the NOAA / CIMSS web resource over Fiji / Tonga / Samoa

[https://cimss.ssec.wisc.edu/probsevere/lc\\_viewer/](https://cimss.ssec.wisc.edu/probsevere/lc_viewer/)

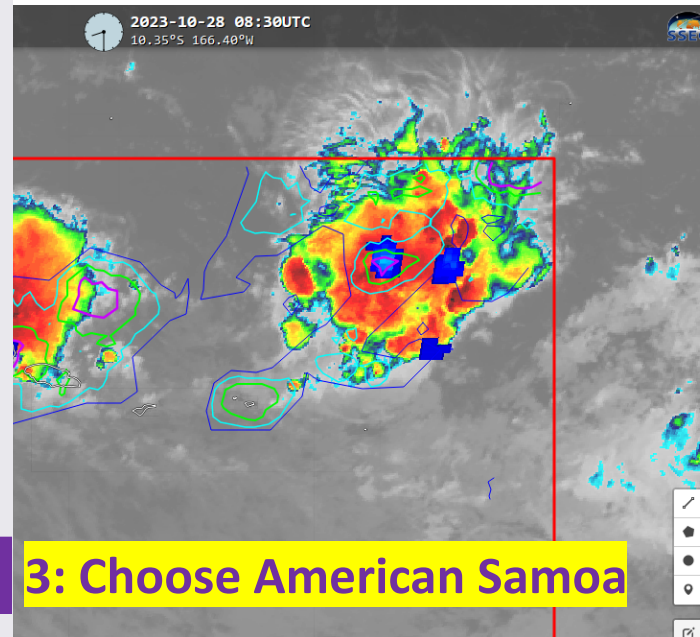
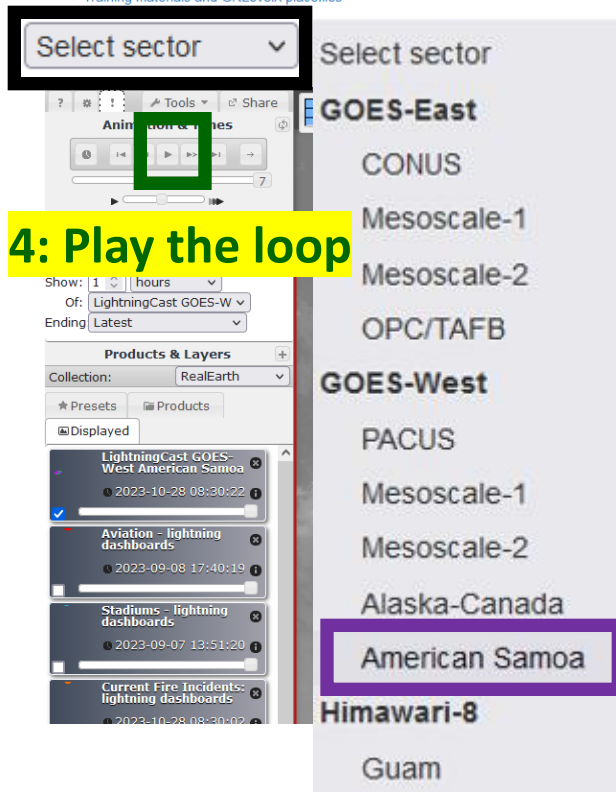


### LightningCast

The ProbSevere LightningCast model uses images of visible, near-infrared, and long-wave infrared channels aboard [GOES ABI](#) to predict the probability of lightning in the next 60 minutes.

## 2: Select sector

- On-demand dashboard request form (NOAA only)
- Training materials and GRLevelX placefiles



## 3: Choose American Samoa

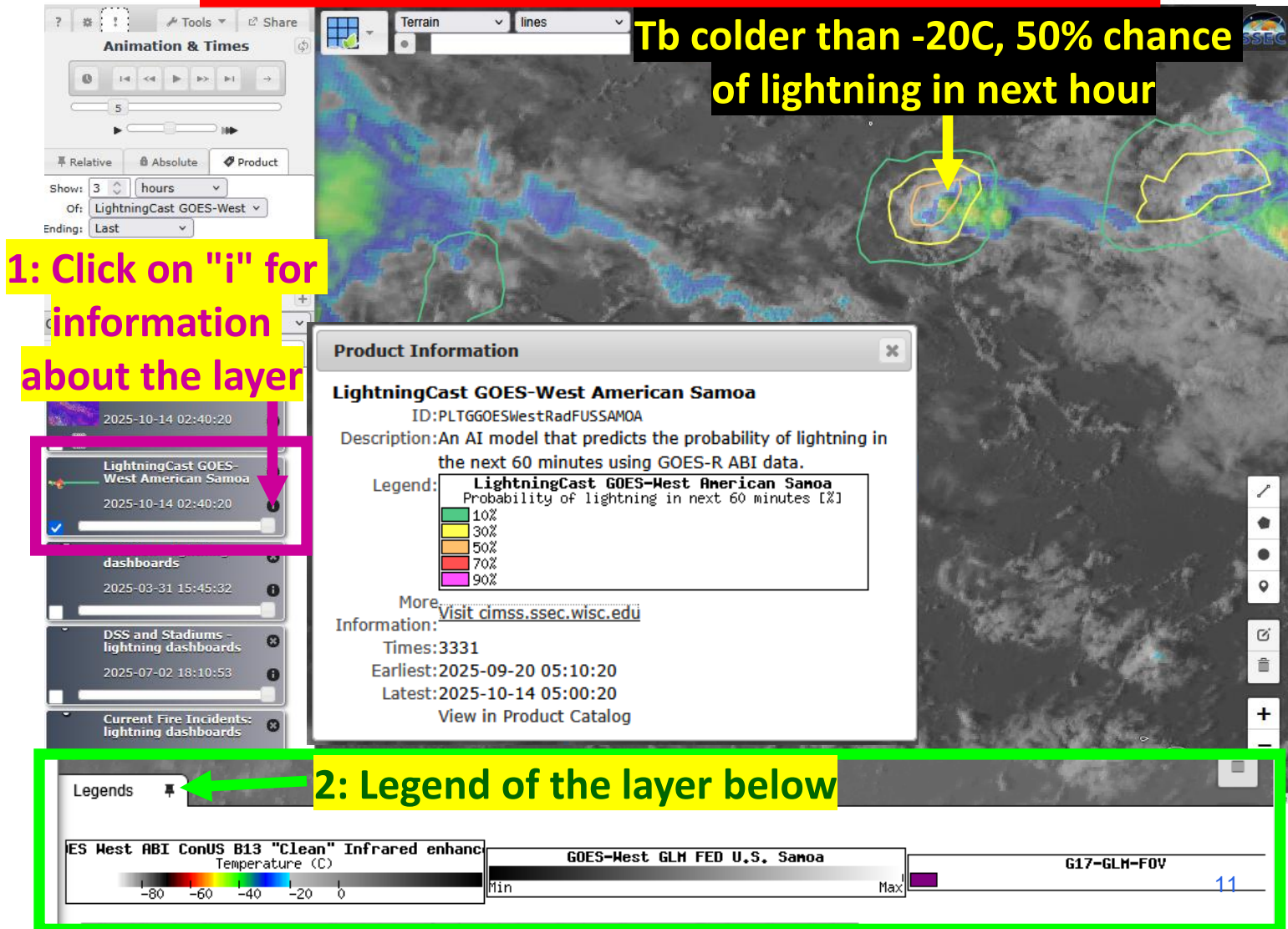


# Exercise 4b

## Interpreting LightningCast using the NOAA / CIMSS web resource at

[https://cimss.ssec.wisc.edu/probsevere/lc\\_viewer/](https://cimss.ssec.wisc.edu/probsevere/lc_viewer/)

image courtesy  
NOAA / CIMSS



# SSEC Real Earth also renders LightningCast over the Micronesian area, including Guam

1: [https://cimss.ssec.wisc.edu/probsevere/lc\\_viewer/](https://cimss.ssec.wisc.edu/probsevere/lc_viewer/)

**2: Select sector**

**3: Choose Guam**

image courtesy NOAA / CIMSS

12





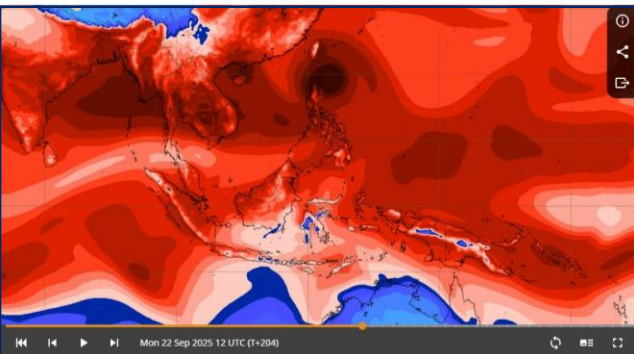
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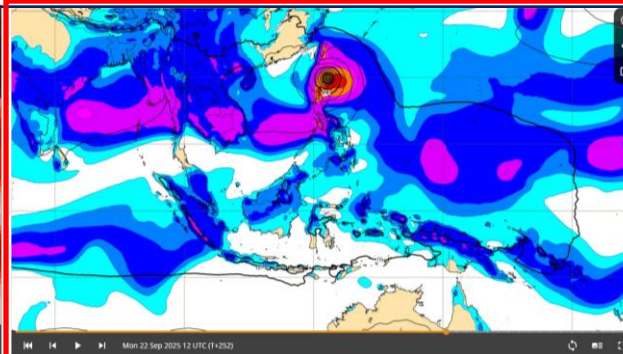


# Comparison between ECMWF AIFS Experimental forecasts, and Satellite Data Products (September 2025 Regional Focus Group meeting)

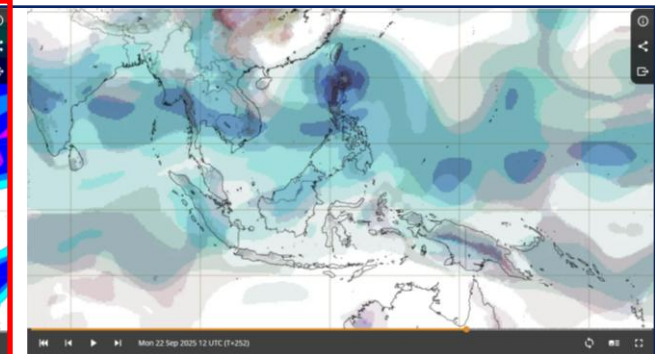
[http://www.virtuallab.bom.gov.au/index.php/download\\_file/view/1845/227/](http://www.virtuallab.bom.gov.au/index.php/download_file/view/1845/227/)



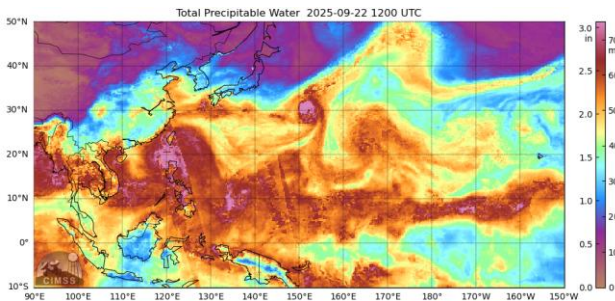
Total Column Water



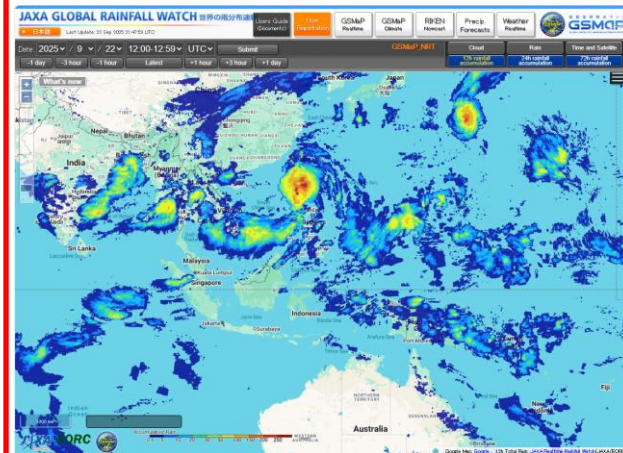
Rain and MSLP



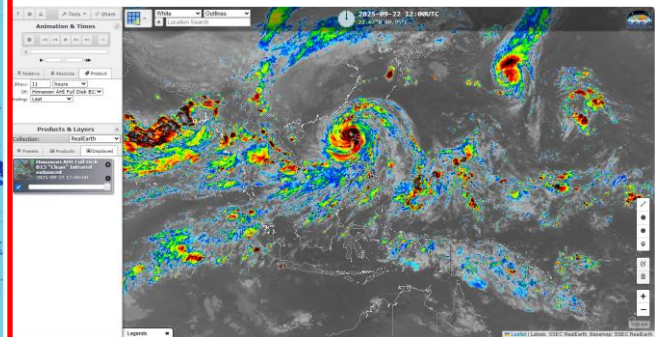
Total Cloud Cover



MIMIC-TPW



JAXA GSMAP

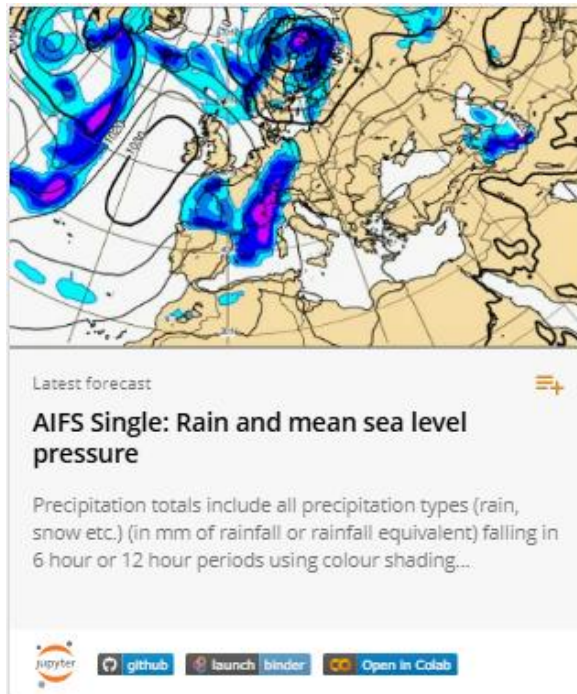


SSEC Real Earth



# ECMWF Experimental forecasts, including the Artificial Intelligence Forecasting System (AIFS). Including useful web links.

<https://charts.ecmwf.int/>



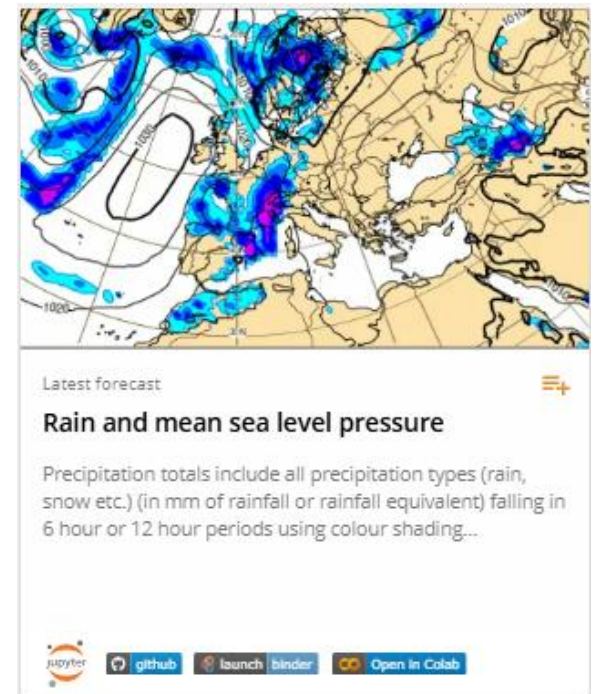
## ECMWF AIFS Single Forecast

<https://confluence.ecmwf.int/display/FUG/Section+2.2.3+AIFS+Single++The+Deterministic+Model>



## ECMWF AIFS ENS Control Forecast

<https://confluence.ecmwf.int/display/FUG/Section+2.2.4+AIFS+ENS++The+Ensemble+Model>



## ECMWF Control Forecast (ex-HRES)

<https://www.ecmwf.int/en/forecasts/documentation-and-support/medium-range-forecasts>



# Satellite Data Product for comparison: MIMIC TPW, and archive

[https://tropic.ssec.wisc.edu/real-time/mtpw2/product.php?color\\_type=tpw\\_nrl\\_colors&prod=global2&timespan=24hrs&anim=html5](https://tropic.ssec.wisc.edu/real-time/mtpw2/product.php?color_type=tpw_nrl_colors&prod=global2&timespan=24hrs&anim=html5)

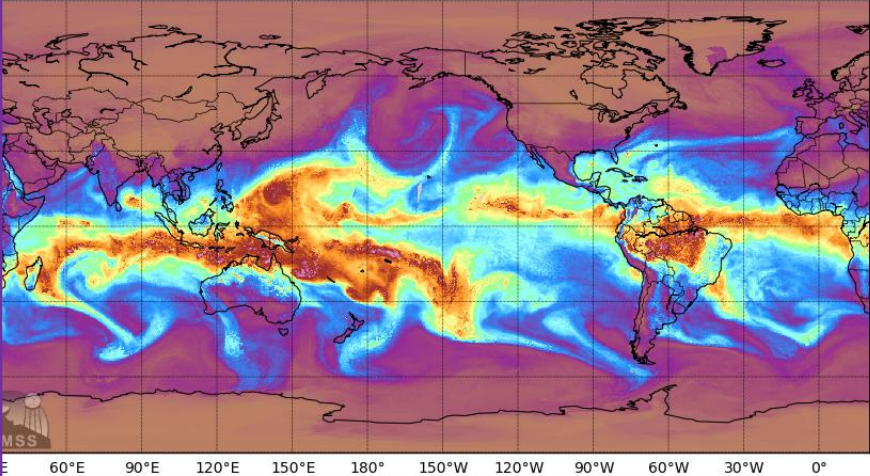
**MIMIC-TPW VER.2**

Real-time **Archive** MIMIC-TPW "1"

Real-time Product View

Color Scale Domain Timespan Animation Page loaded on 2026-Jan-23 09:36:01 UTC

Total Precipitable Water 2026-01-22 1600 UTC



3.0 in  
2.5  
2.0  
1.5  
1.0  
0.5  
0.0

60°E 90°E 120°E 150°E 180° 150°W 120°W 90°W 60°W 30°W 0°

Stop < > Slower Faster .png

**2: Choose "images"**

Name	Last modified
<a href="#">Parent Directory</a>	
<a href="#">areas/</a>	2020-12-01 01:19
<a href="#">areas_fine/</a>	2025-04-03 23:25
<a href="#">data/</a>	2026-01-01 00:33
<a href="#">data_fine/</a>	2026-01-26 05:46
<a href="#">data_latest/</a>	2026-01-26 05:44
<a href="#">images/</a>	2016-10-13 20:49
<a href="#">img_mv</a>	2020-01-26 05:51

**3:**

Name	Last modified
<a href="#">Parent Directory</a>	
<a href="#">tpw_nrl_colors/</a>	2025-04-30 15:51

**4: Choose your region of interest**

Parent Directory	
<a href="#">alaska/</a>	026-01-01 00:33
<a href="#">alaska_latest/</a>	026-01-26 05:44
<a href="#">ausf/</a>	026-01-01 00:33
<a href="#">ausf_latest/</a>	026-01-26 05:44
<a href="#">conus/</a>	026-01-01 00:33
<a href="#">conus_latest/</a>	026-01-26 05:44
<a href="#">diag/</a>	016-10-13 20:49
<a href="#">diag_conus/</a>	026-01-01 00:33
<a href="#">diag_conus_latest/</a>	026-01-26 05:44
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<a href="#">europe_latest/</a>	
<a href="#">global/</a>	
<a href="#">global2/</a>	026-01-01 00:33
<a href="#">global2_latest/</a>	026-01-26 05:45
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<a href="#">wpac/</a>	026-01-01 00:33
<a href="#">wpac_latest/</a>	026-01-26 05:46

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# Satellite Data Product, for comparison: JAXA GSMaP

<https://sharaku.eorc.jaxa.jp/GSMaP/>

**JAXA GLOBAL RAINFALL WATCH 世界の雨分布速報**

日本語 Last Update: 23 Jan 2026 07:48:04 UTC

Date: 2026 / 1 / 23 03:00-03:59 UTC Submit

GSMaP\_NRT Cloud Rain Time and Satellite

12h rainfall accumulation 24h rainfall accumulation 72h rainfall accumulation

**1: Choose and end date and time**

**2: choose 12h rainfall accumulation**

**JAXA GLOBAL RAINFALL WATCH 世界の雨分布速報**

日本語 Last Update: 23 Jan 2026 07:48:04 UTC

Date: 2026 / 1 / 23 03:00-03:59 UTC Submit

GSMaP\_NRT Cloud Rain Time and Satellite

12h rainfall accumulation 24h rainfall accumulation 72h rainfall accumulation

What's new

Geographic layers: Coast 1:50m Coast 1:10m Lat/Lon (5deg) River

Country Search: -- Select Country --

Location change: Latitude: 0.000000 Longitude: 135.000000 Zoom: 3

Move Center Save Location to Cookie Clear cookie share of display (url)

Other Functions: Download PNG Subset data (CSV) download (Hourly)

GSMaP Links



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# Exploring the ECMWF Experimental forecasts, including the Artificial Intelligence Forecasting System (AIFS).

<https://charts.ecmwf.int/>

The screenshot shows the ECMWF Charts website interface. The top navigation bar includes the ECMWF logo and 'Charts'. The main content area is titled 'Home / Charts catalogue'. On the left, there is a search bar and filters for 'Range' (Medium (15 days), Sub-seasonal, Seasonal), 'Type' (Forecasts, Verification), and 'Component' (Surface, Atmosphere). The 'Product type' section is highlighted with a green box and contains the following options:

- ☐ Control Forecast (ex-HRES)
- ☐ Ensemble forecast (ENS)
- ☐ Extreme forecast index
- ☐ Point-based products
- ☐ AIFS Single
- ☐ AIFS Ensemble forecast
- ☐ AIFS ENS Control
- ☐ Experimental: Machine learning models
- ☐ Atmospheric composition

Three specific product types are highlighted with colored boxes and labels:

- ECMWF Control Forecast (ex-HRES)** (Green box)
- ECMWF AIFS Single Forecast** (Pink box)
- ECMWF AIFS ENS Control Forecast** (Blue box)

The right side of the interface shows several weather maps and forecast details, including 'Central height and 850 hPa', '7 m temperature and 10 m wind', and 'Rain and mean sea level pressure'.





# Choosing 12-hour precipitation and MSLP forecast from the AIFS ECMWF Single model

1: <https://charts.ecmwf.int/>

The screenshot shows the ECMWF charts website interface. On the left, there is a sidebar with search and filter options. The main area displays a grid of product cards for the AIFS Single model.

**Search products...**

**Range**

- ☐ Medium (15 days)
- ☐ Sub-seasonal
- ☐ Seasonal

**Type**

- ☐ Forecasts
- ☐ Verification

**Component**

- ☐ Surface
- ☐ Atmosphere

**Product type**

- ☐ Control Forecast (ex-HRES)
- ☐ Ensemble forecast (ENS)
- ☐ Extreme forecast index
- ☐ Point-based products
- ☒ **AIFS Single**
- ☐ AIFS Ensemble forecast
- ☐ AIFS ENS Control
- ☐ Experimental: Machine learning models
- ☐ Atmospheric composition

**Parameters**

**2: Select AIFS Single**

The main area shows six product cards for the AIFS Single model:

- AIFS Single: Mean sea level pressure and 850 hPa wind speed**  
Wind speeds near the surface are roughly proportional to the distance between isobars so closely packed isobars mean strong surface winds...
- AIFS Single: 500 hPa geopotential height and 850 hPa temperature**  
The 850 hPa level is usually just above the boundary layer and at this level the day-night variation in temperature is generally negligible...
- AIFS Single: 100 m wind and mean sea level pressure**  
These charts show surface pressure patterns. Areas of high pressure (anticyclones) are usually associated with settled weather...
- AIFS Single: Mean sea level pressure and 200 hPa wind**  
Wind speed at 200 hPa highlights the jet stream (areas of strong winds in the upper troposphere) which can help identify movement and development of depressions...
- AIFS Single: Rain and mean sea level pressure**  
Precipitation totals include all precipitation types (rain, snow etc.) (in mm of rainfall or rainfall equivalent) falling in 6 hour or 12 hour periods using colour shading.
- AIFS Single: Total cloud cover**  
This display helps with the recognition of clouds of different layers, even when they overlap. Brighter colouring represents greater cloud cover. Cloud-free areas appear white while areas of full cloud cover at all levels appear dark grey (e.g. active fronts)...

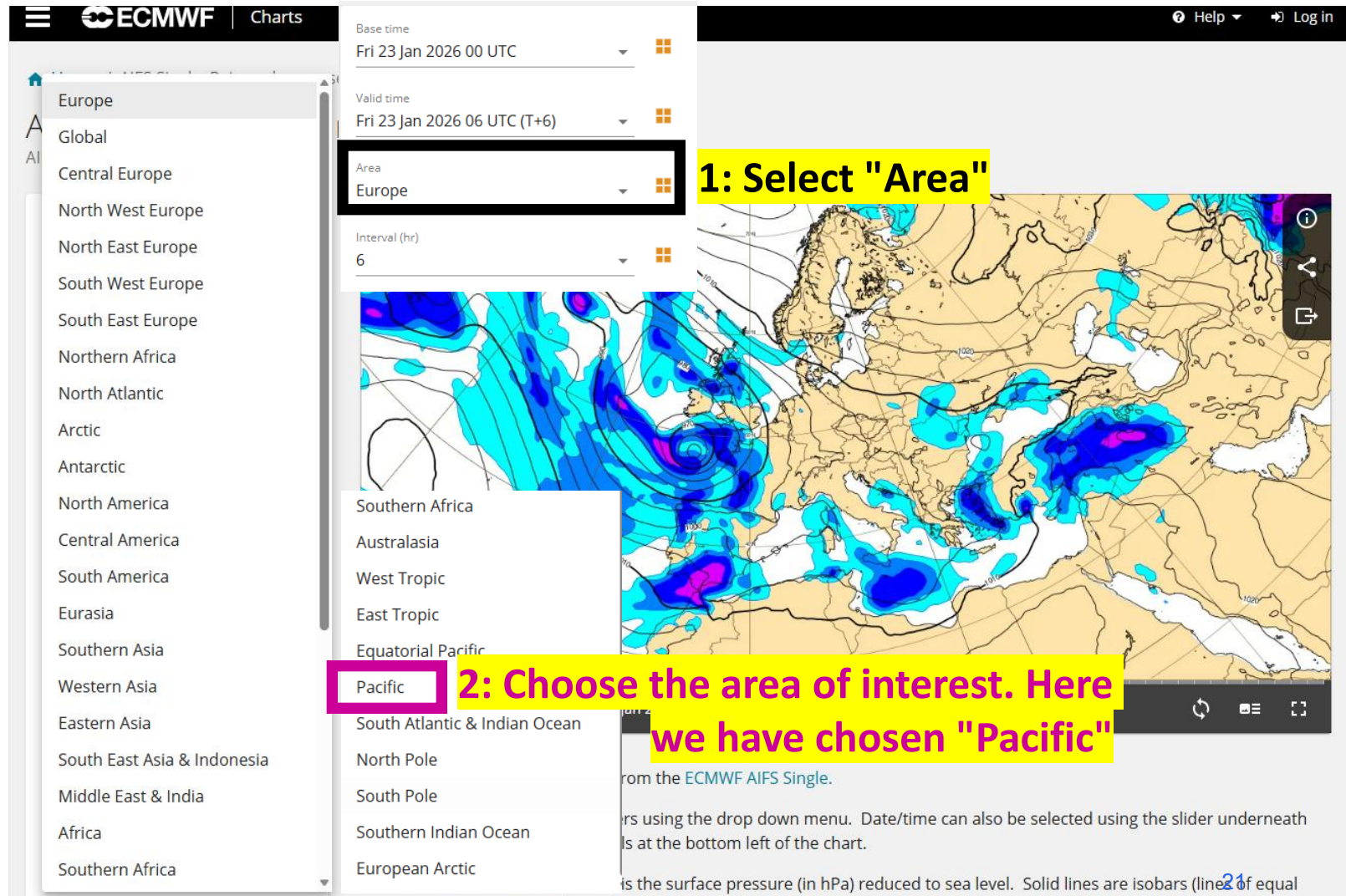
**3: AIFS Single: Rain and mean sea level pressure**





# Choosing 12-hour precipitation and MSLP forecast from the AIFS ECMWF Single model

<https://charts.ecmwf.int/>



# Choosing 12-hour precipitation and MSLP forecast from the AIFS ECMWF Single model

<https://charts.ecmwf.int/>

ECMWF | Charts

Home / AIFS Single: Rain and mean sea level pressure

## AIFS Single: Rain and mean sea level pressure

AIFS

**1: Select "Valid Time"**

Valid time  
Fri 23 Jan 2026 06 UTC (T+234)

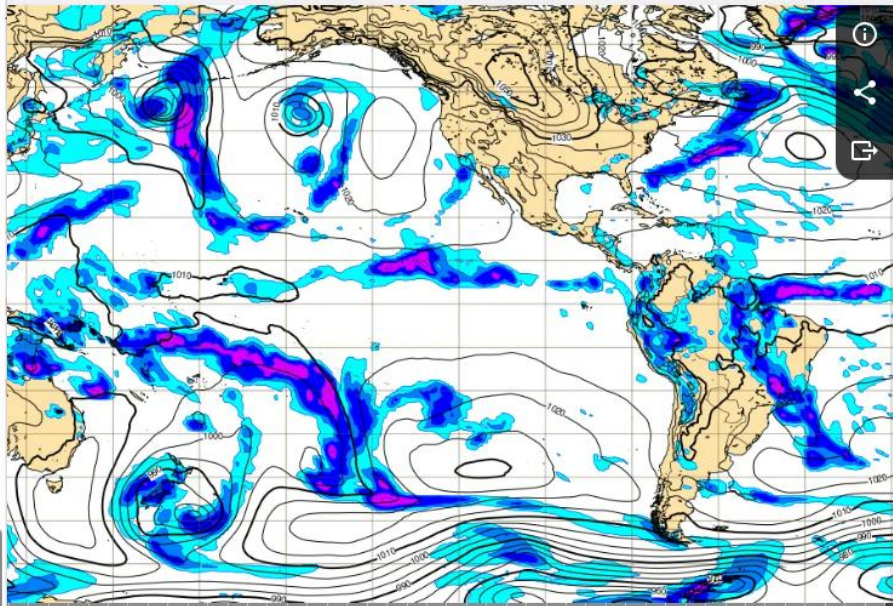
Area  
Pacific

**3: Select "Interval (hr)"**

Interval (hr)  
6

6  
12

Sun 01 Feb 2026 18 UTC (T+234)  
Mon 02 Feb 2026 00 UTC (T+240)  
Mon 02 Feb 2026 06 UTC (T+246)  
Mon 02 Feb 2026 12 UTC (T+252)  
Mon 02 Feb 2026 18 UTC (T+258)  
Tue 03 Feb 2026 00 UTC (T+264)  
Tue 03 Feb 2026 06 UTC (T+270)  
Tue 03 Feb 2026 12 UTC (T+276)  
Tue 03 Feb 2026 18 UTC (T+282)  
Wed 04 Feb 2026 00 UTC (T+288)  
Wed 04 Feb 2026 06 UTC (T+294)  
Wed 04 Feb 2026 12 UTC (T+300)  
Wed 04 Feb 2026 18 UTC (T+306)  
Thu 05 Feb 2026 00 UTC (T+312)  
Thu 05 Feb 2026 06 UTC (T+318)  
Thu 05 Feb 2026 12 UTC (T+324)  
Thu 05 Feb 2026 18 UTC (T+330)  
Fri 06 Feb 2026 00 UTC (T+336)  
Fri 06 Feb 2026 06 UTC (T+342)  
Fri 06 Feb 2026 12 UTC (T+348)  
Fri 06 Feb 2026 18 UTC (T+354)  
Sat 07 Feb 2026 00 UTC (T+360)



Jan 2026 06 UTC (T+6)

from the ECMWF AIFS Single.

**2: Choose a forecast time out to 360 hours**

is the surface pressure (in hPa) reduced to sea level. Solid lines are isobars (lines of equal MSLP)



# ECMWF AIFS Single 360-hour forecast of 12-hour precipitation and MSLP over the Pacific region for 00UTC 7<sup>th</sup> February 2026

ECMWF | Charts

Home / AIFS Single: Rain and mean sea level pressure

## AIFS Single: Rain and mean sea level pressure

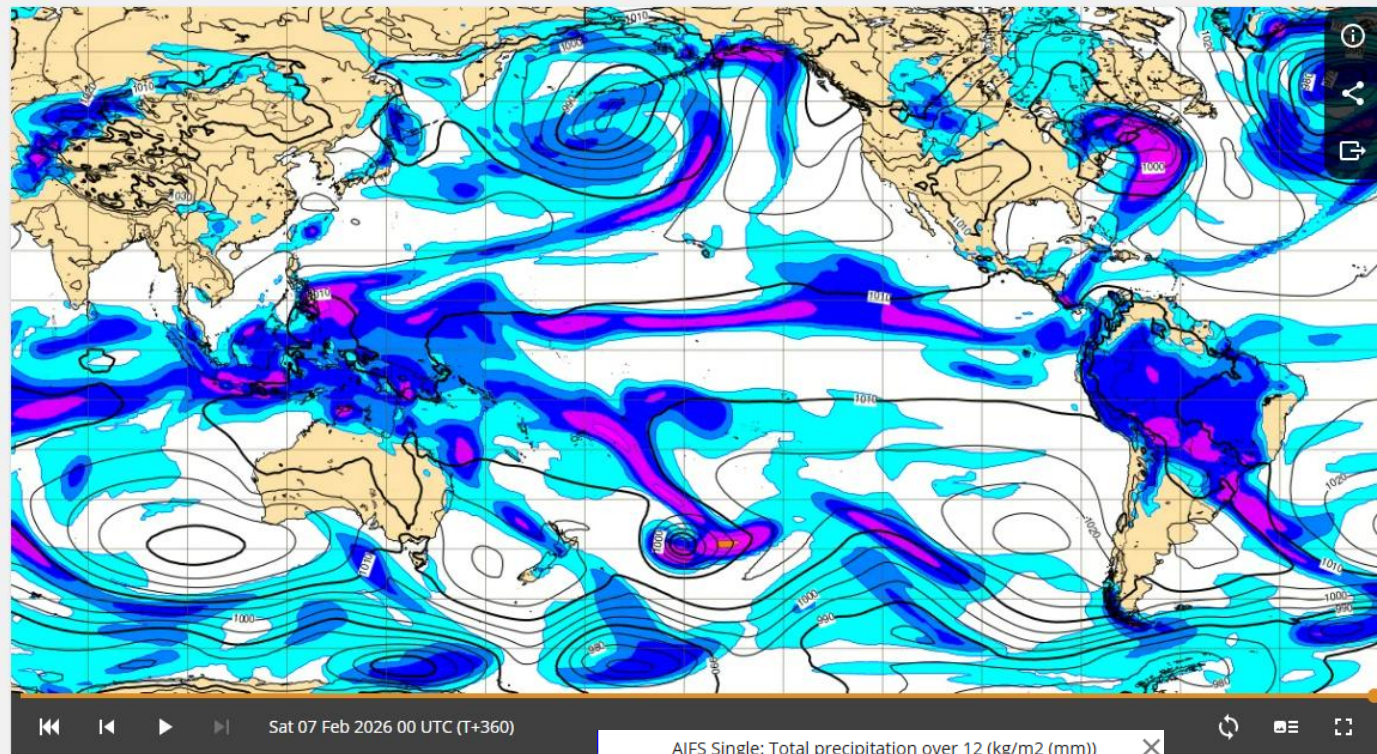
AIFS

Base time  
Fri 23 Jan 2026 00 UTC

Valid time  
Sat 07 Feb 2026 00 UTC (T+360)

Area  
Pacific

Interval (hr)  
12



This "future forecast" that can be verified with 12-hour JAXA GSMaP rainfall data on the 7<sup>th</sup> February. 😊

image courtesy ECMWF

# Choosing 12-hour precipitation and MSLP forecast from the AIFS ECMWF ENS Control model

1: <https://charts.ecmwf.int/>

The screenshot shows the ECMWF charts website interface. On the left, there is a sidebar with search and filter options. The main area displays a grid of product cards for the 'AIFS ENS Control' model.

**Search products...**

**Range**

- ☐ Medium (15 days)
- ☐ Sub-seasonal
- ☐ Seasonal

**Type**

- ☐ Forecasts
- ☐ Verification

**Component**

- ☐ Surface
- ☐ Atmosphere

**Product type**

- ☐ Control Forecast (ex-HRES)
- ☐ Ensemble forecast (ENS)
- ☐ Extreme forecast index
- ☐ Point-based products
- ☐ AIFS Single
- ☐ AIFS Ensemble forecast
- ☒ **AIFS ENS Control**
- ☐ Experimental: Machine learning models
- ☐ Atmospheric composition

**Parameters**

**2: Select AIFS ENS Control**

**3: AIFS ENS Control: Rain and mean sea level pressure**

The main area displays a grid of product cards for the 'AIFS ENS Control' model. The cards show various weather maps and their descriptions:

- AIFS ENS Control: Mean sea level pressure and 850 hPa wind speed**  
Wind speeds near the surface are roughly proportional to the distance between isobars so closely packed isobars mean strong surface winds...
- AIFS ENS Control: 500 hPa geopotential height and 850 hPa temperature**  
The 850 hPa level is usually just above the boundary layer and at this level the day-night variation in temperature is generally negligible...
- AIFS ENS Control: 100 m wind and mean sea level pressure**  
These charts show surface pressure patterns. Areas of high pressure (anticyclones) are usually associated with settled weather...
- AIFS ENS Control: Rain and mean sea level pressure**  
Precipitation totals include all precipitation types (rain, snow etc.) (in mm of rainfall or rainfall equivalent) falling in 6 hour or 12 hour periods using colour shading...
- AIFS ENS Control: Total cloud cover**  
This display helps with the recognition of clouds of different layers, even when they overlap. Brighter colouring represents greater cloud cover. Cloud-free areas appear white while areas of full cloud cover at all levels appear dark grey (e.g. active fronts)...





# ECMWF AIFS Ensemble 360-hour forecast of 12-hour precipitation and MSLP over the Pacific region for 00UTC 7<sup>th</sup> February 2026

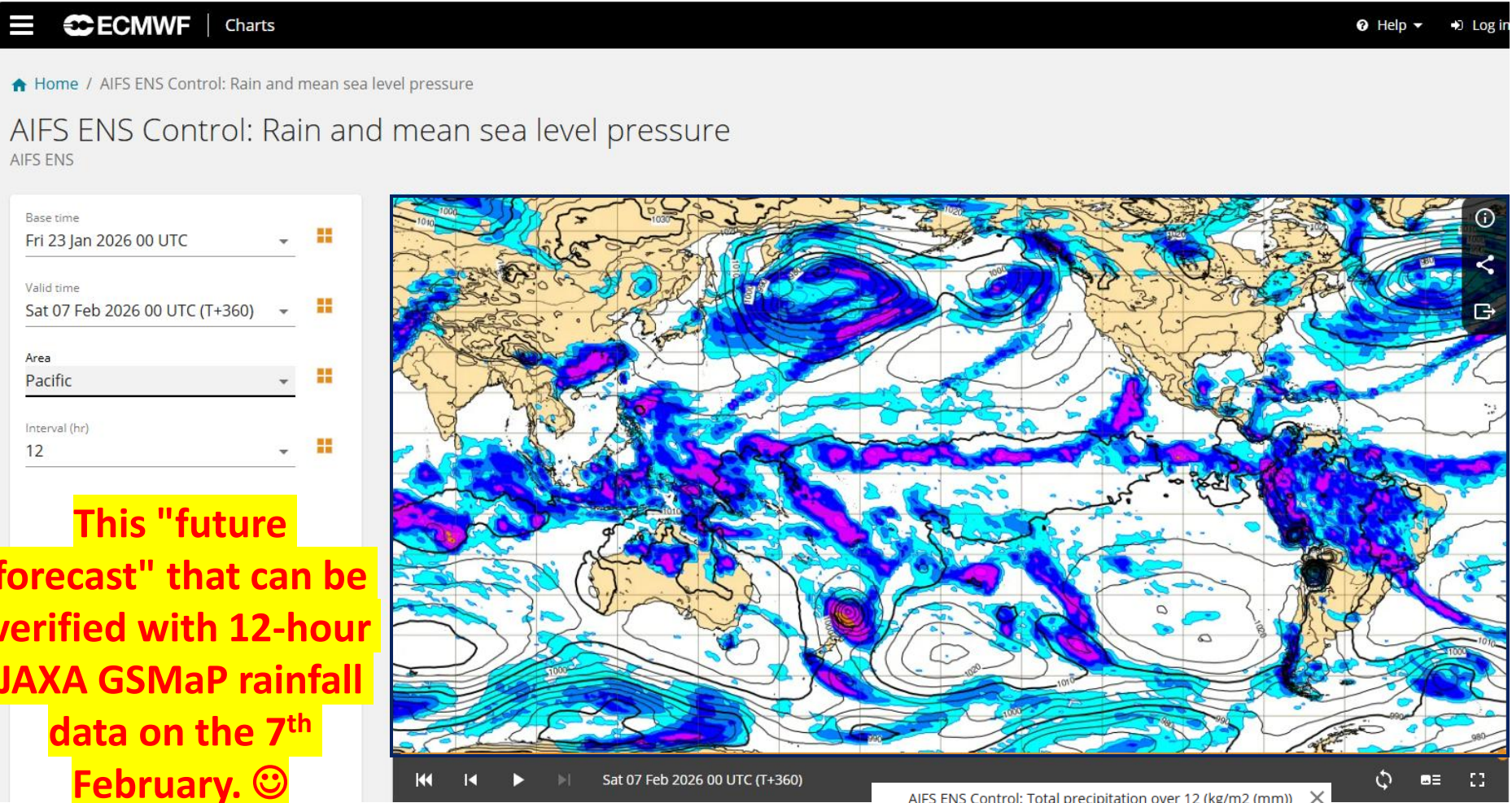


image courtesy ECMWF



# Choosing Total Column Water forecast from the AIFS ECMWF Single model

1: <https://charts.ecmwf.int/>

The screenshot shows the ECMWF charts website interface. The browser address bar displays the URL <https://charts.ecmwf.int/?facets=%7B%20Product%20type%3A%5B%20AIFS%20Single%5D%7D>. The left sidebar contains filters for Range, Type, Component, Product type, and Parameters. The 'AIFS Single' option is selected under the 'Product type' filter. The main content area displays a grid of forecast charts. A yellow box highlights the 'AIFS Single: Total column water' chart, and a purple box highlights the 'AIFS Single' option in the sidebar. A yellow banner at the top of the chart grid reads '3: AIFS Single: Total column water'. A yellow banner at the bottom of the sidebar reads '2: Select AIFS Single'. The 'AIFS Single: Total column water' chart description states: 'The charts show the forecast value of the vertically integrated total column water (vapour + cloud water + cloud ice but with no precipitation included) in units of  $\text{kg m}^{-2}$ ...'. Other visible charts include 'AIFS Single: Total accumulated precipitation', 'AIFS Single: Total snowfall during last 6 hours', 'AIFS Single: Mean sea level pressure and 200 hPa wind', 'AIFS Single: Rain and mean sea level pressure', and 'AIFS Single: Total cloud cover'.

3: AIFS Single: Total column water

2: Select AIFS Single

**AIFS Single: Total column water**

The charts show the forecast value of the vertically integrated total column water (vapour + cloud water + cloud ice but with no precipitation included) in units of  $\text{kg m}^{-2}$ ...

**AIFS Single: Total accumulated precipitation**

Total accumulated rainfall charts identify areas at greater risk of significant rainfall (or rain equivalent e.g. snowfall) but give no information regarding whether this occurs over a short or prolonged time period...

**AIFS Single: Total snowfall during last 6 hours**

Forecast precipitation is considered to be snow if the model atmosphere above and at the ground surface is forecast to be below  $0^{\circ}\text{C}$ . Where the ground surface lies near the  $0^{\circ}\text{C}$  level...

**AIFS Single: Mean sea level pressure and 200 hPa wind**

Wind speed at 200 hPa highlights the jet stream (areas of strong winds in the upper troposphere) which can help identify movement and development of depressions...

**AIFS Single: Rain and mean sea level pressure**

Precipitation totals include all precipitation types (rain, snow etc.) (in mm of rainfall or rainfall equivalent) falling in 6 hour or 12 hour periods using colour shading...

**AIFS Single: Total cloud cover**

This display helps with the recognition of clouds of different layers, even when they overlap. Brighter colouring represents greater cloud cover. Cloud-free areas appear white while areas of full cloud cover at all levels appear dark grey (e.g. active fronts)...





# ECMWF AIFS Single 360-hour forecast of Total Column Water over the Pacific region for 00UTC 7<sup>th</sup> February 2026

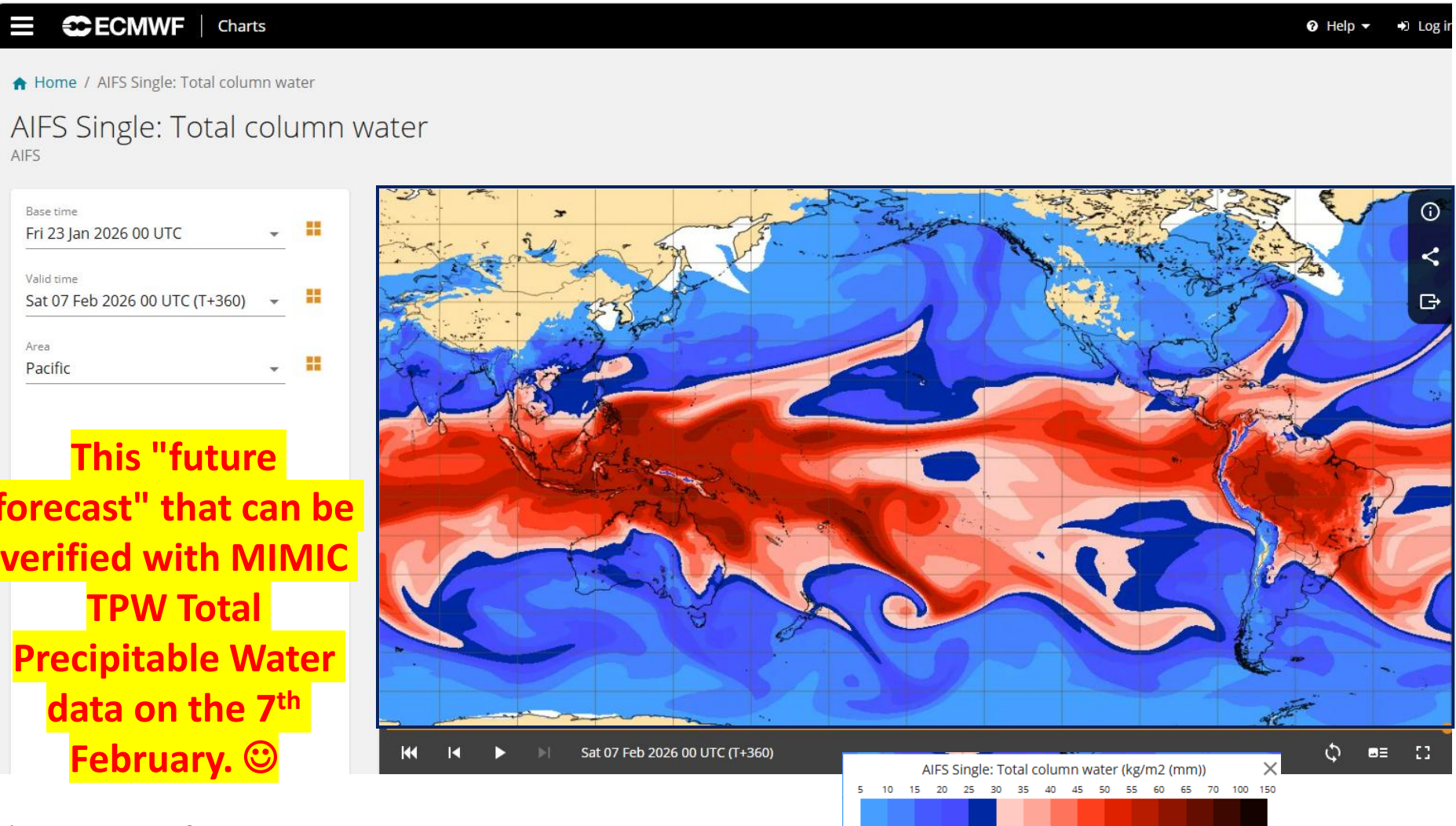


image courtesy ECMWF





# Choosing Total Column Water forecast from the AIFS ECMWF ENS Control model

1: <https://charts.ecmwf.int/>

The screenshot shows the ECMWF charts website interface. On the left, a sidebar contains search and filter options. The main area displays a grid of forecast charts. A yellow box highlights the 'AIFS ENS Control: Total column water' chart, and a purple box highlights the 'AIFS ENS Control' checkbox in the sidebar.

**Search products...**

**Range**

- ☐ Medium (15 days)
- ☐ Sub-seasonal
- ☐ Seasonal

**Type**

- ☐ Forecasts
- ☐ Verification

**Component**

- ☐ Surface
- ☐ Atmosphere

**Product type**

- ☐ Control Forecast (ex-HRES)
- ☐ Ensemble forecast (ENS)
- ☐ Extreme forecast index
- ☐ Point-based products
- ☐ AIFS Single
- ☐ AIFS Ensemble forecast
- ☒ **AIFS ENS Control**
- ☐ Experimental: Machine learning models
- ☐ Atmospheric composition

**Parameters**

**3: AIFS ENS Control: Total column water**

**AIFS ENS Control: Total column water**

The charts show the forecast value of the vertically integrated total column water (vapour + cloud water + cloud ice but with no precipitation included) in units of  $\text{kg m}^{-2}$ ...

**AIFS ENS Control: Total accumulated precipitation**

Total accumulated rainfall charts identify areas at greater risk of significant rainfall (or rain equivalent e.g. snowfall) but give no information regarding whether this occurs over a short or prolonged time period...

**AIFS ENS Control: Total snowfall during last 6 hours**

Forecast precipitation is considered to be snow if the model atmosphere above and at the ground surface is forecast to be below  $0^\circ\text{C}$ . Where the ground surface lies near the  $0^\circ\text{C}$  level...

**2: Select AIFS ENS Control**

**AIFS ENS Control: Rain and mean sea level pressure**

Precipitation totals include all precipitation types (rain, snow etc.) (in mm of rainfall or rainfall equivalent) falling in 6 hour or 12 hour periods using colour shading...

**AIFS ENS Control: Total cloud cover**

This display helps with the recognition of clouds of different layers, even when they overlap. Brighter colouring represents greater cloud cover. Cloud-free areas appear white while areas of full cloud cover at all levels appear dark grey (e.g. active fronts)...



# ECMWF AIFS Ensemble Control 360-hour forecast of Total Column Water over the Pacific region for 00UTC 7<sup>th</sup> February 2026

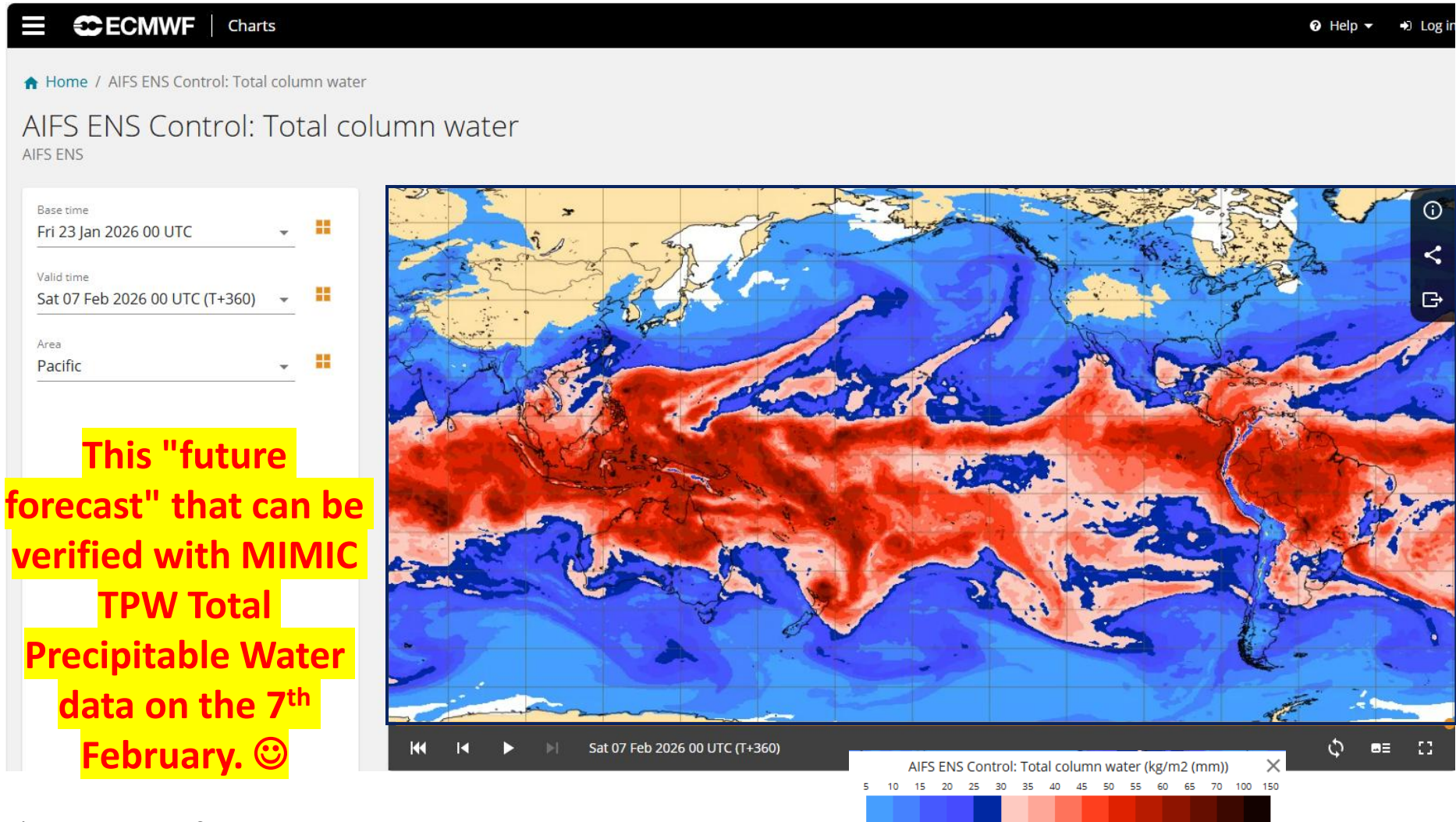


image courtesy ECMWF





# Choosing the ECMWF Control Forecast (ex-HRES)

1: <https://charts.ecmwf.int/>

The screenshot shows the ECMWF charts website interface. The browser address bar displays the URL: <https://charts.ecmwf.int/?facets=Product%20type%3A%5BControl%20Forecast%20ex-HRES%29%5D%7D>. The left sidebar contains filters for Range, Type, Component, and Product type. The 'Product type' section is expanded, and 'Control Forecast (ex-HRES)' is selected and highlighted with a black box. Below this, other product types like Ensemble forecast (ENS), Extreme forecast index, Point-based products, AIFS Single, AIFS Ensemble forecast, AIFS ENS Control, Experimental: Machine learning models, and Atmospheric composition are listed. The main content area displays six forecast panels, each with a map and descriptive text. The panels are: 1. Mean sea level pressure and 850 hPa wind speed; 2. 500 hPa geopotential height and 850 hPa temperature; 3. 2 m temperature and 30 m wind; 4. 100 m wind and mean sea level pressure; 5. Mean sea level pressure and 200 hPa wind; 6. Rain and mean sea level pressure. A yellow banner with the text '2: Select Control Forecast (ex-HRES)' is overlaid on the right side of the image.

Search products...

Range

- ☐ Medium (15 days)
- ☐ Sub-seasonal
- ☐ Seasonal

Type

- ☐ Forecasts
- ☐ Verification

Component

- ☐ Surface
- ☐ Atmosphere

Product type

- ☒ Control Forecast (ex-HRES)
- ☐ Ensemble forecast (ENS)
- ☐ Extreme forecast index
- ☐ Point-based products
- ☐ AIFS Single
- ☐ AIFS Ensemble forecast
- ☐ AIFS ENS Control
- ☐ Experimental: Machine learning models
- ☐ Atmospheric composition

Latest forecast

**Mean sea level pressure and 850 hPa wind speed**

Wind speeds near the surface are roughly proportional to the distance between isobars so closely packed isobars mean strong surface winds...

Latest forecast

**500 hPa geopotential height and 850 hPa temperature**

The 850 hPa level is usually just above the boundary layer and at this level the day-night variation in temperature is generally negligible...

Latest forecast

**2 m temperature and 30 m wind**

Air temperatures at 2 m above the earth's surface approximate most closely to the conditions a person would most likely experience...

Latest forecast

**100 m wind and mean sea level pressure**

These charts show surface pressure patterns. Areas of high pressure (anticyclones) are usually associated with settled weather...

Latest forecast

**Mean sea level pressure and 200 hPa wind**

Wind speed at 200 hPa highlights the jet stream (areas of strong winds in the upper troposphere) which can help identify movement and development of depressions...

Latest forecast

**Rain and mean sea level pressure**

Precipitation totals include all precipitation types (rain, snow etc.) (in mm of rainfall or rainfall equivalent) falling in 6 hour or 12 hour periods using colour shading...







The Bureau  
of Meteorology

# Thank You 😊

Bodo Zeschke,  
Bureau of Meteorology Training Centre  
Australian VLab Centre of Excellence