The Bureau of Meteorology

Australian VLab Centre of Excellence Regional Focus Group meeting 22nd 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

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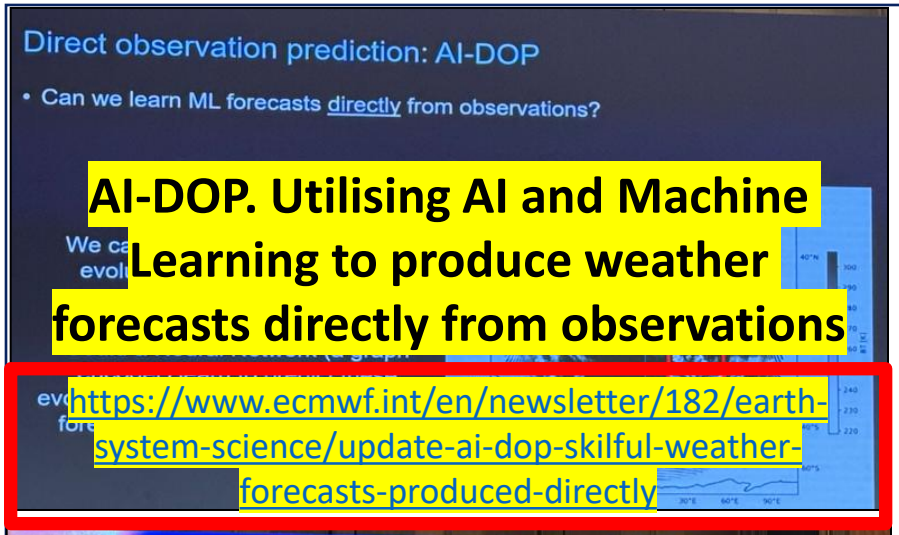
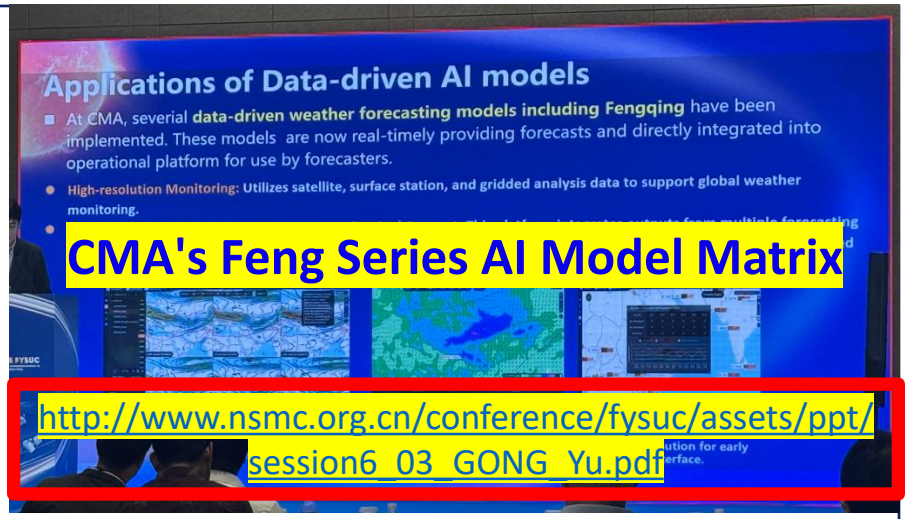
AOMSUC-15 Conference Presentations: AI in Satellite Meteorology

Including useful web links



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

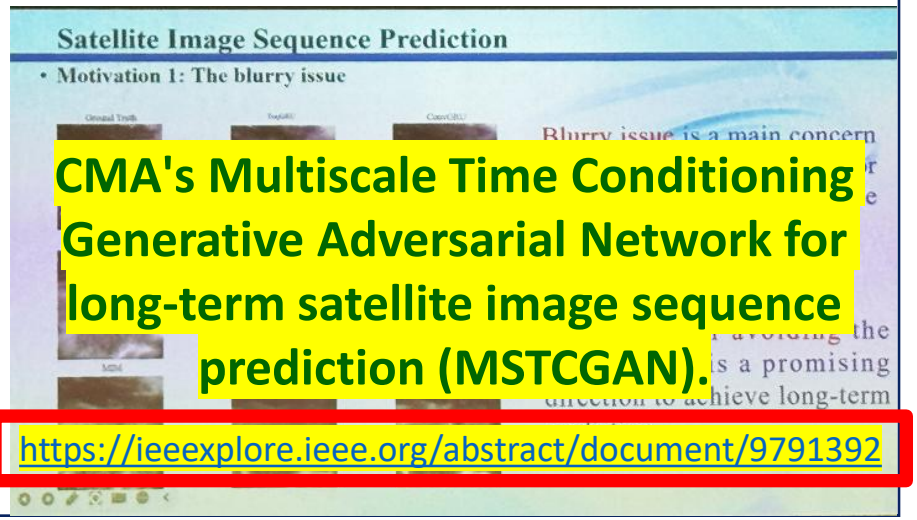


CMA's Feng Series AI Model Matrix

http://www.nsmc.org.cn/conference/fysuc/assets/ppt/session6_03_GONG_Yu.pdf

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

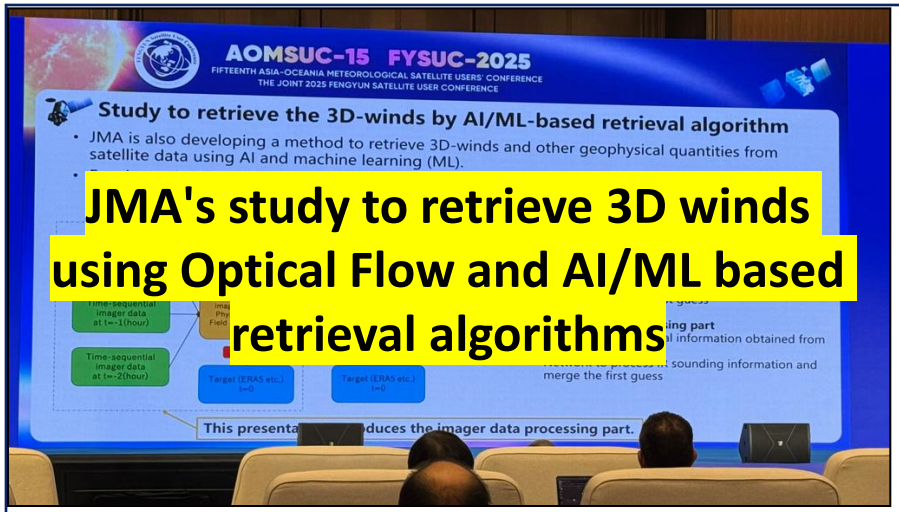


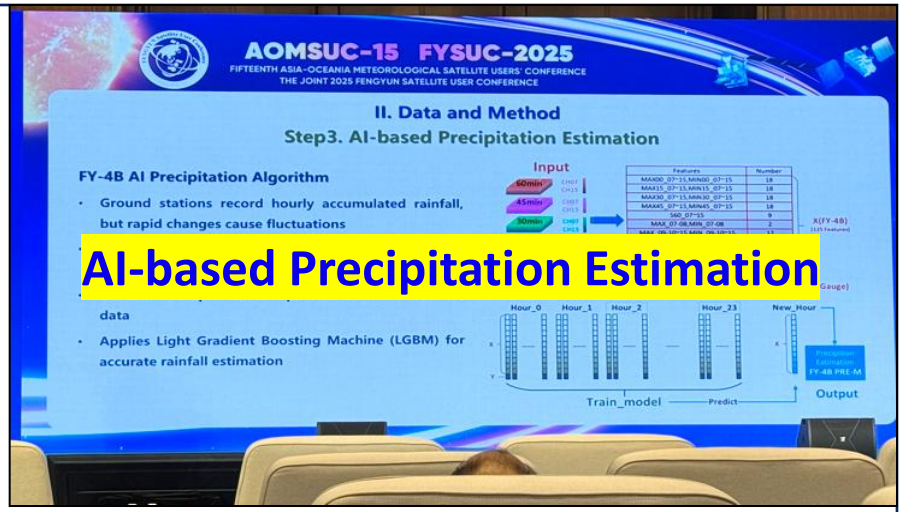
CMA's Multiscale Time Conditioning Generative Adversarial Network for long-term satellite image sequence prediction (MSTCGAN).

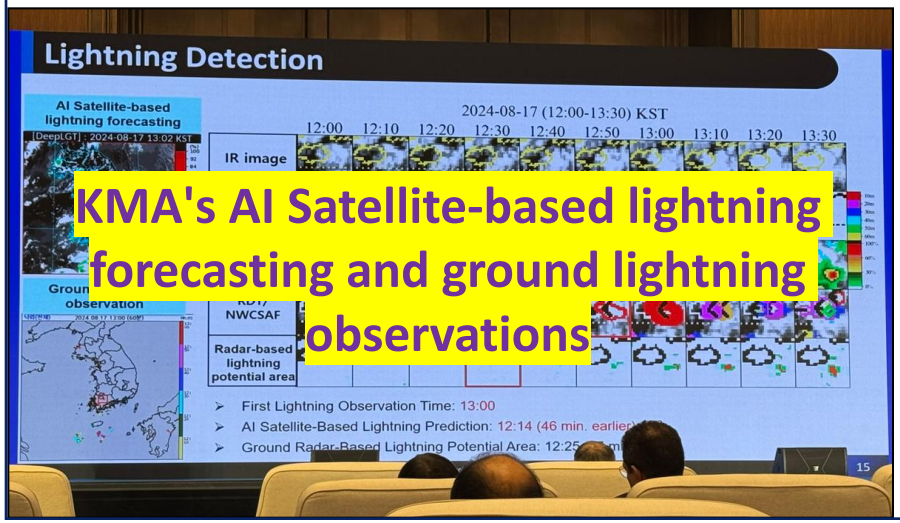
https://ieeexplore.ieee.org/abstract/document/9791392

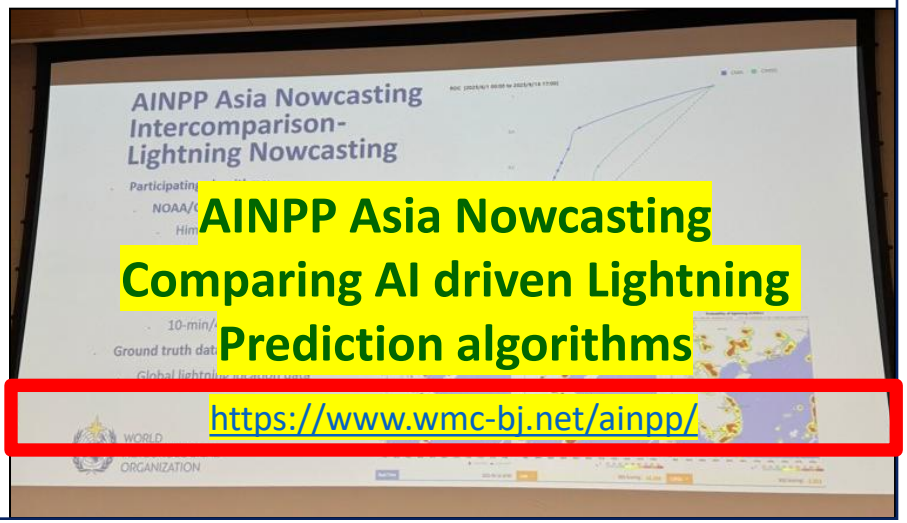
AOMSUC-15 Conference Presentations: AI in Satellite Meteorology

Including a useful web link









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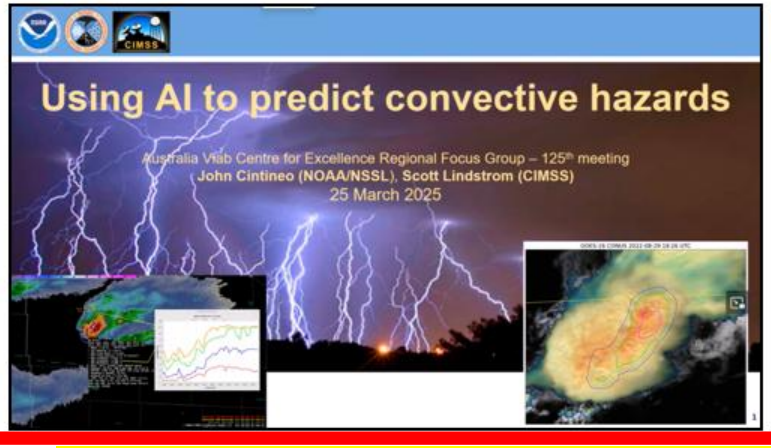
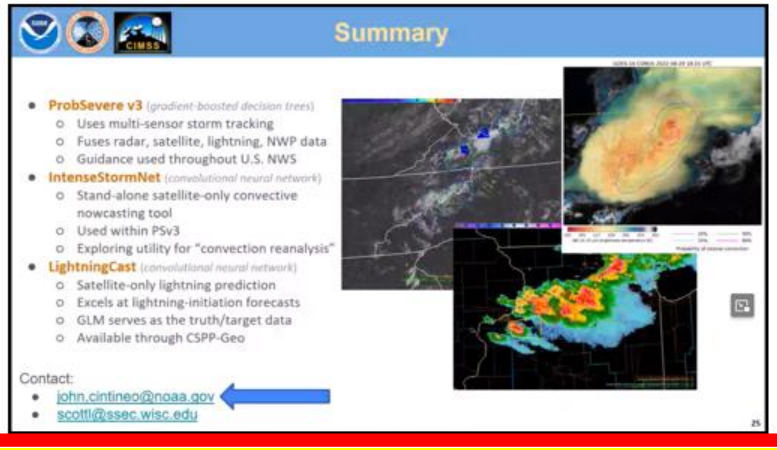
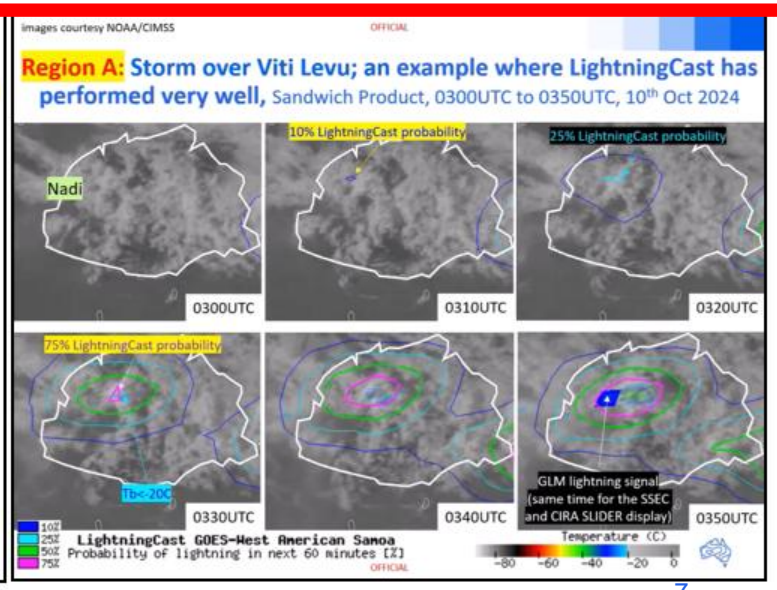
Using AI to predict convective hazards: the ProbSevere products

March 2025 RFG meeting.





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



ProbSevere as a suite of different machine learning tools

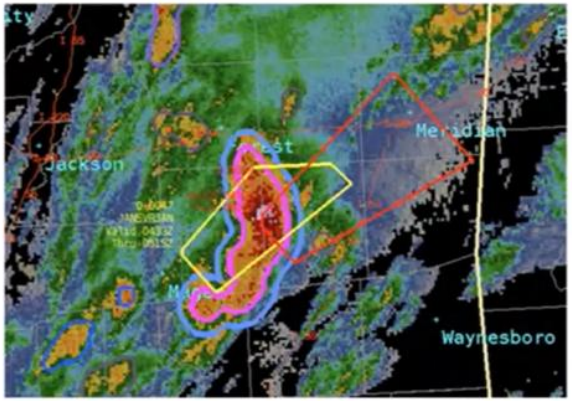
March 2025 presentation by Scott Lindstrom SSEC University of Wisconsin Madison

http://www.virtuallab.bom.gov.au/index.php/download_file/view/1831/227/

Overview of ProbSevere

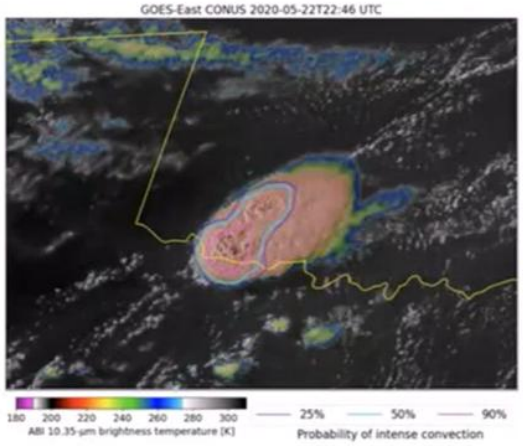
These are all machine learning tools that use ABI data from GOES-R satellites – and other data sources too. They give advance notice of Severe Weather, or of Lightning

1. ProbSevere v3



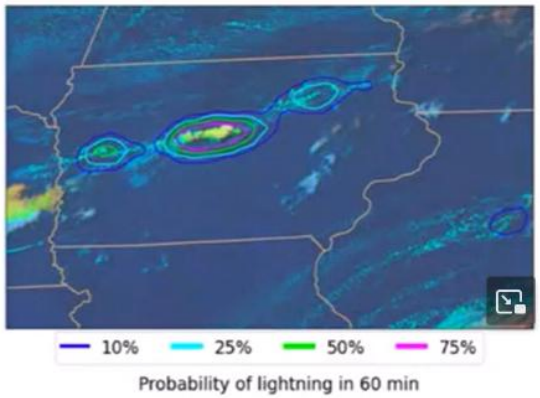
ML models for nowcasting large hail, wind gusts, and tornadoes

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

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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/

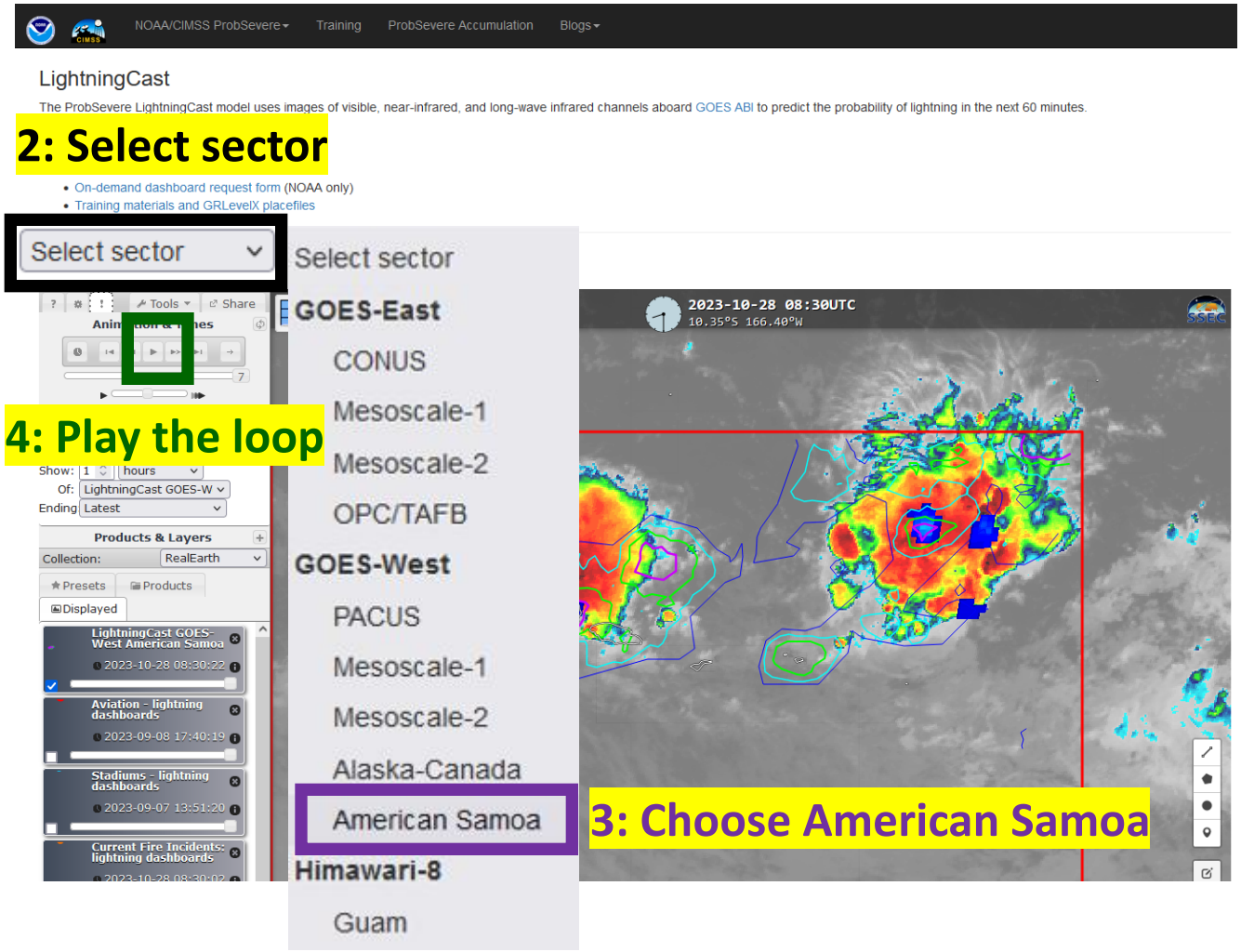


image courtesy NOAA / CIMSS

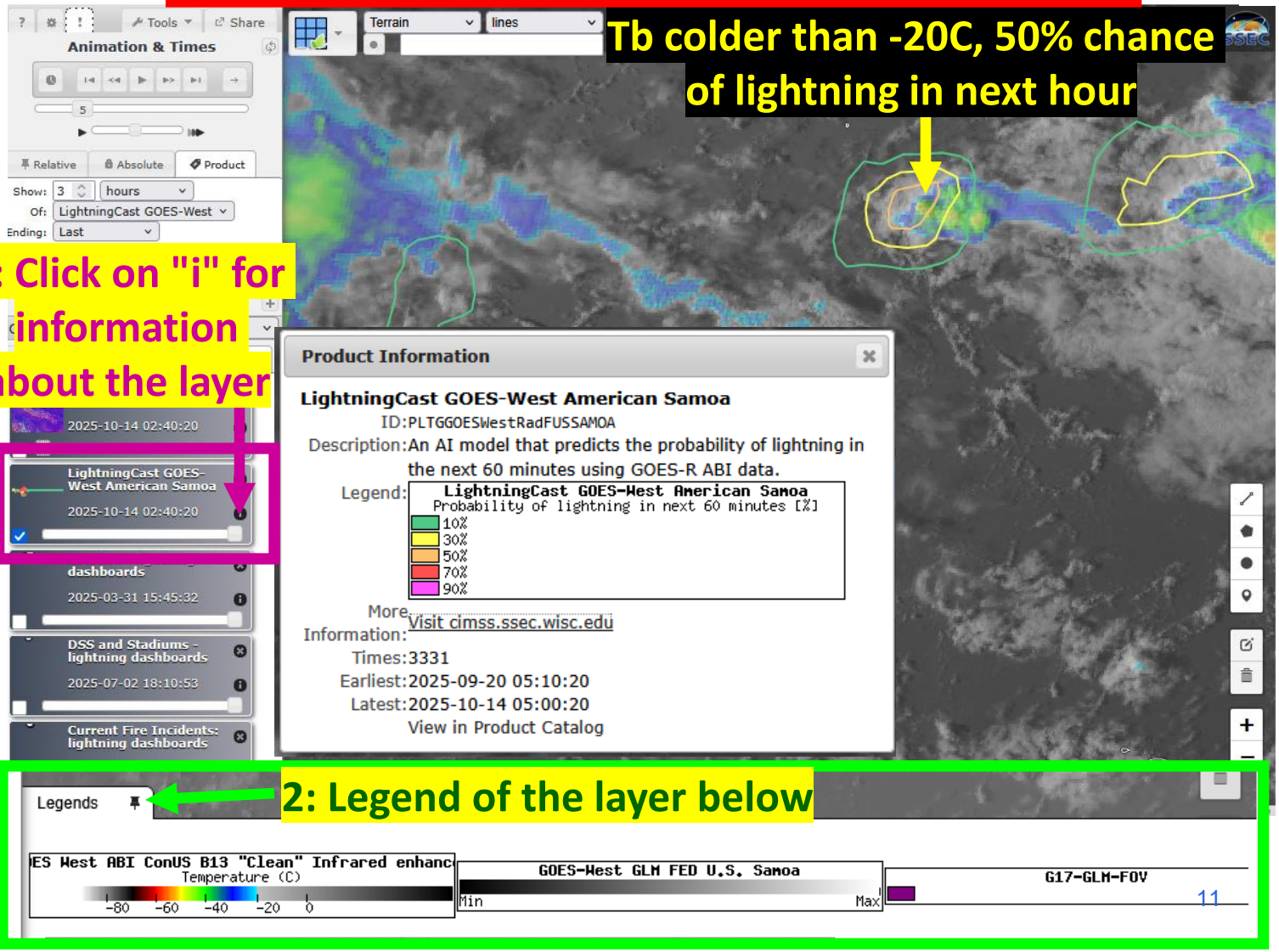
Exercise 4b

Interpreting LightningCast

using the NOAA / CIMSS web resource at

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/

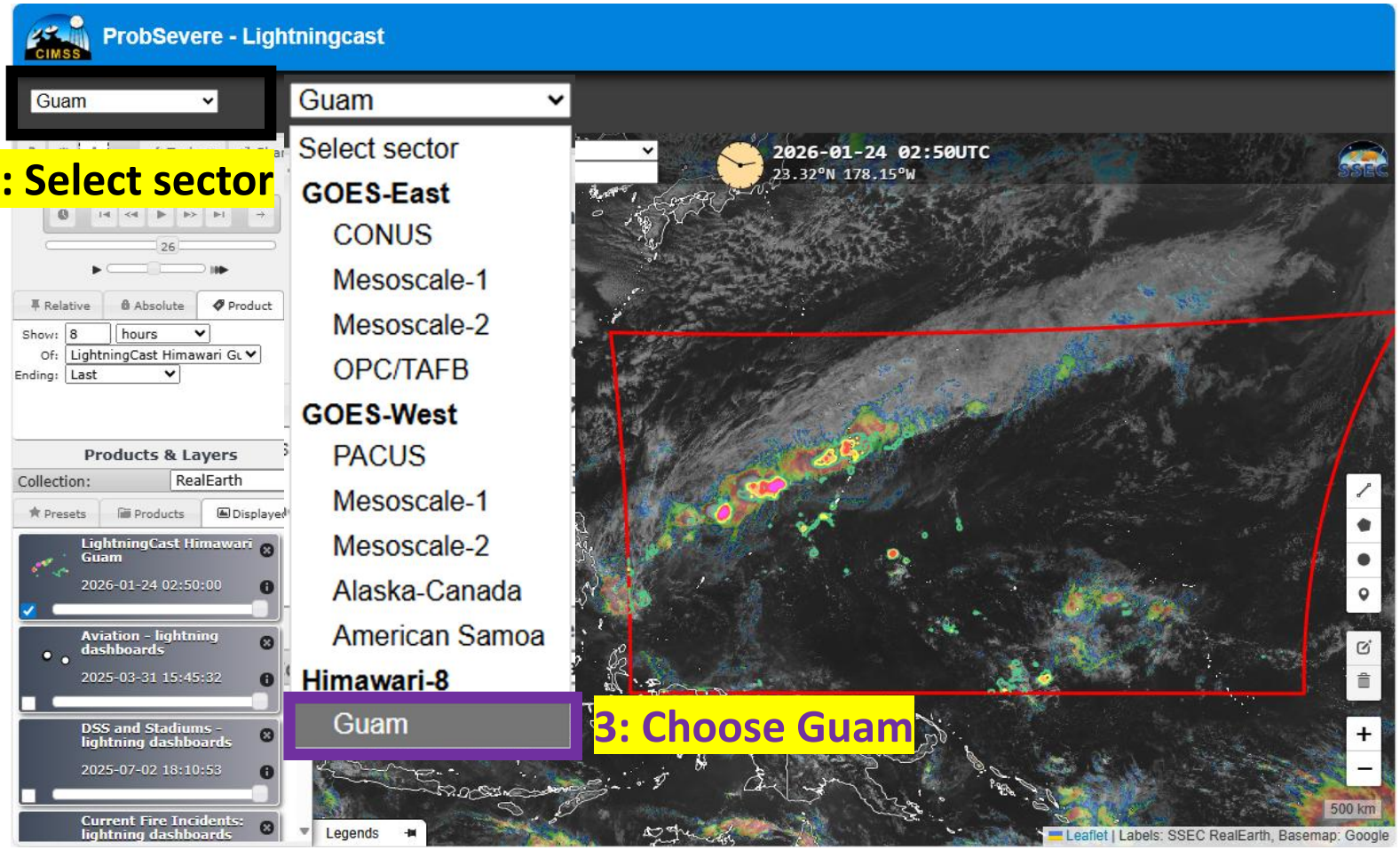


image courtesy NOAA / CIMSS

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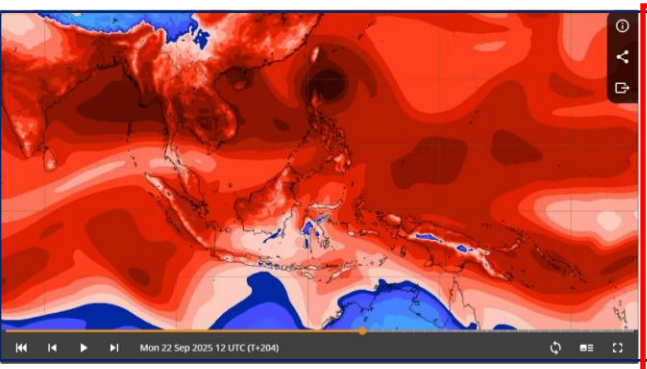
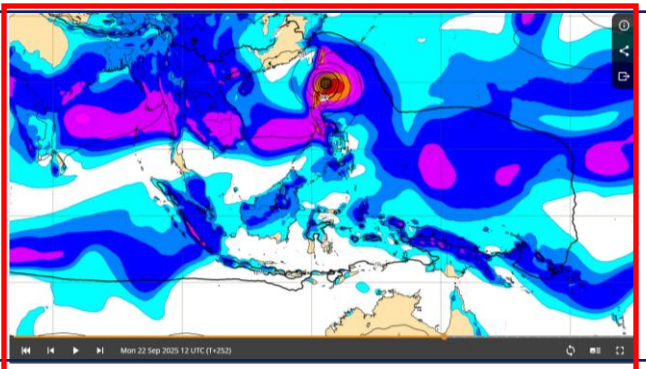
Comparison between ECMWF AIFS Experimental forecasts, and Satellite Data Products (September 2025 Regional Focus Group meeting)

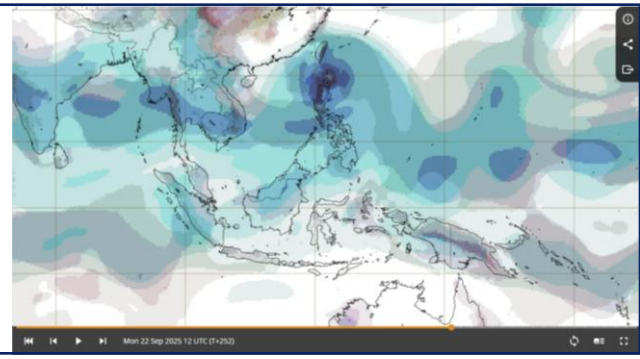
http://www.virtuallab.bom.gov.au/index.php/download_file/view/1845/227/



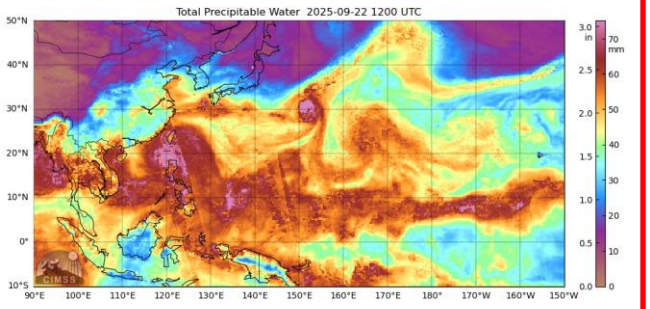
Total Column Water



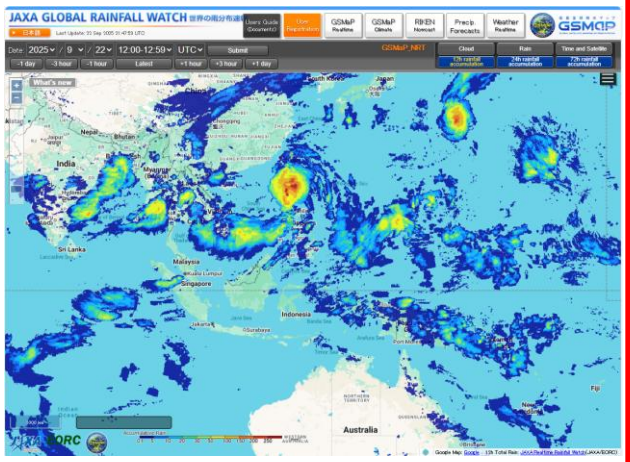
Rain and MSLP



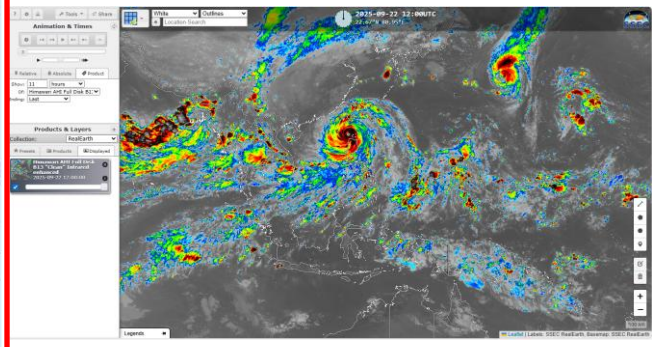
Total Cloud Cover



MIMIC-TPW



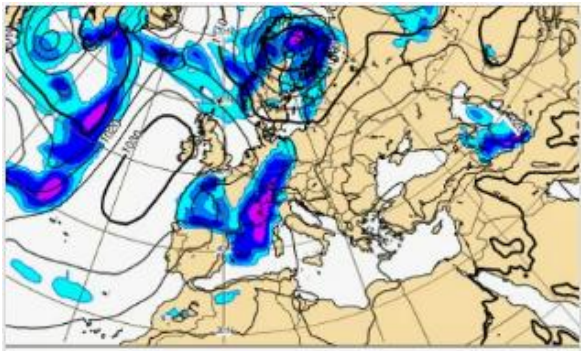
JAXA GSMAP

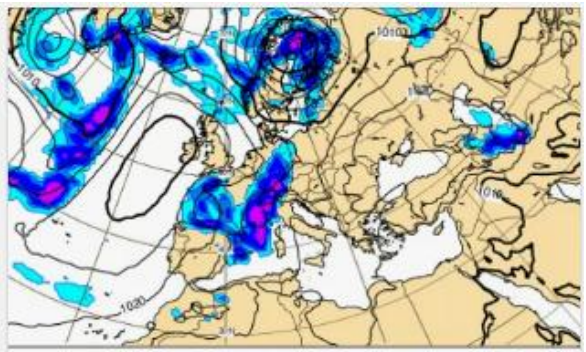


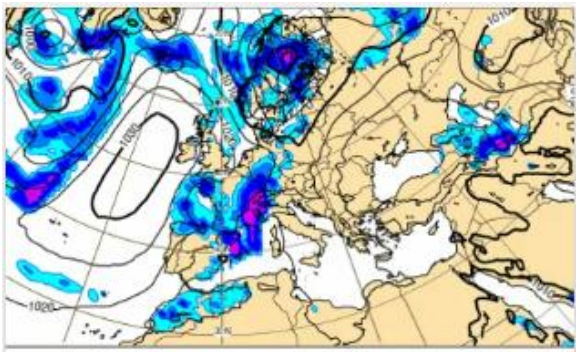
SSEC Real Earth

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

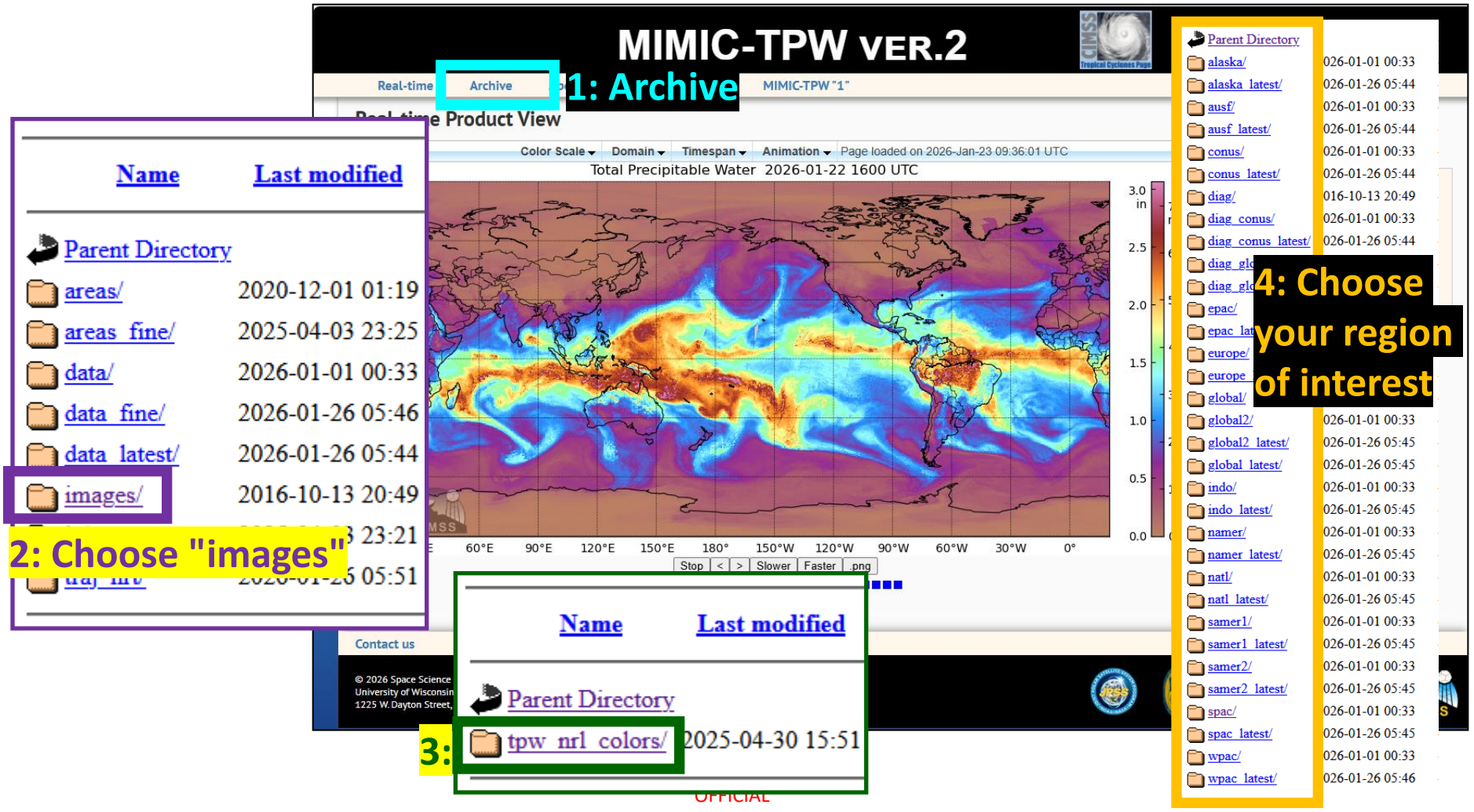
https://confluence.ecmwf.int/display/FUG/Section+2.2.4+AIFS+ENS++The+Ensemble+Model

ECMWF Control Forecast (ex-HRES)

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

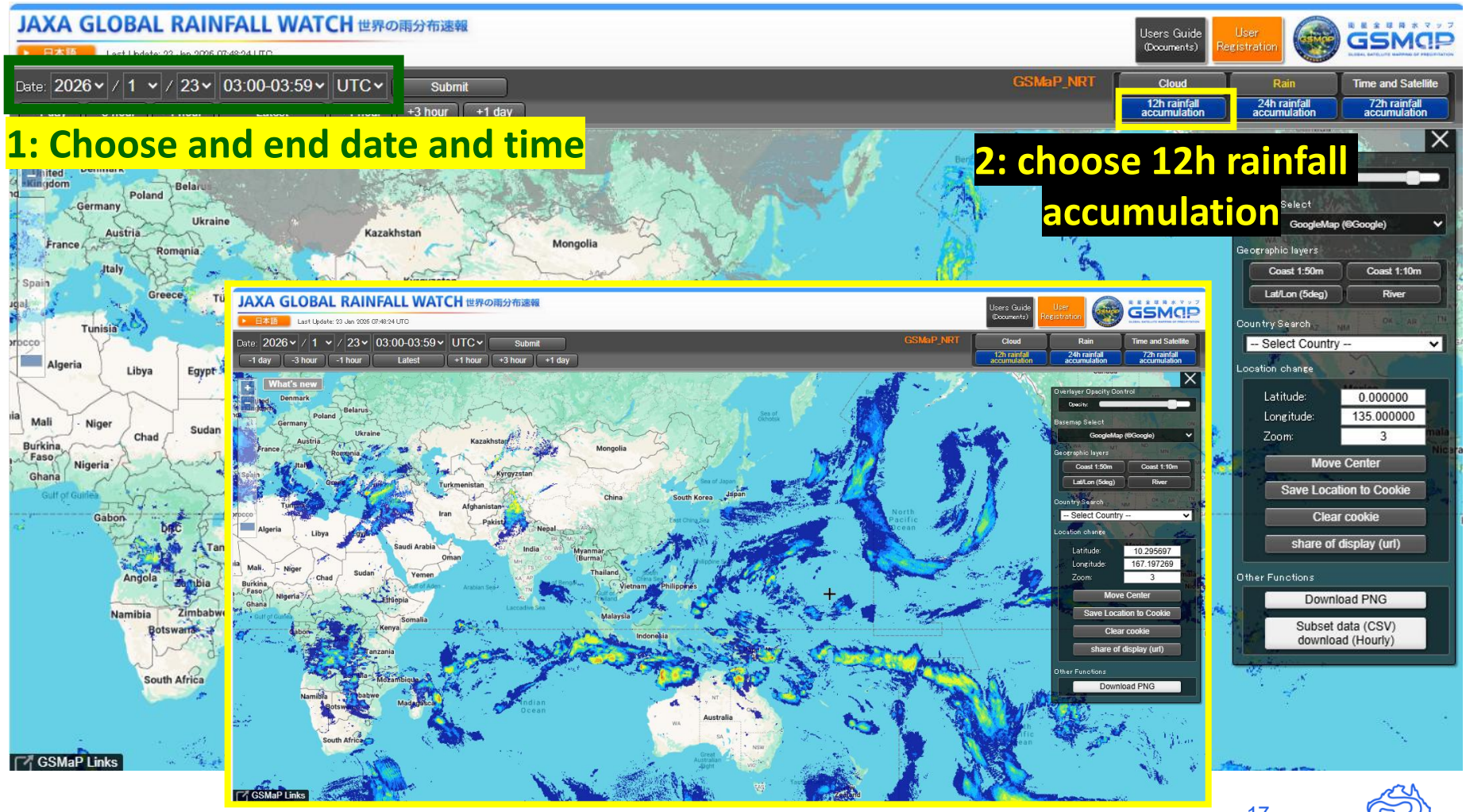
Satellite Data Product for comparison: MIMIC TPW, and archive

https://tropic.ssec.wisc.edu/real-time/mtpw2/product.php?color_type=tpw_nrl_colors&prod=global2&timespan=24hrs&anim=html5



Satellite Data Product, for comparison: JAXA GSMaP

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



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1. AI presentations and information during AOMSUC-14 and 15

2. Using AI to predict convective hazards: the ProbSevere products

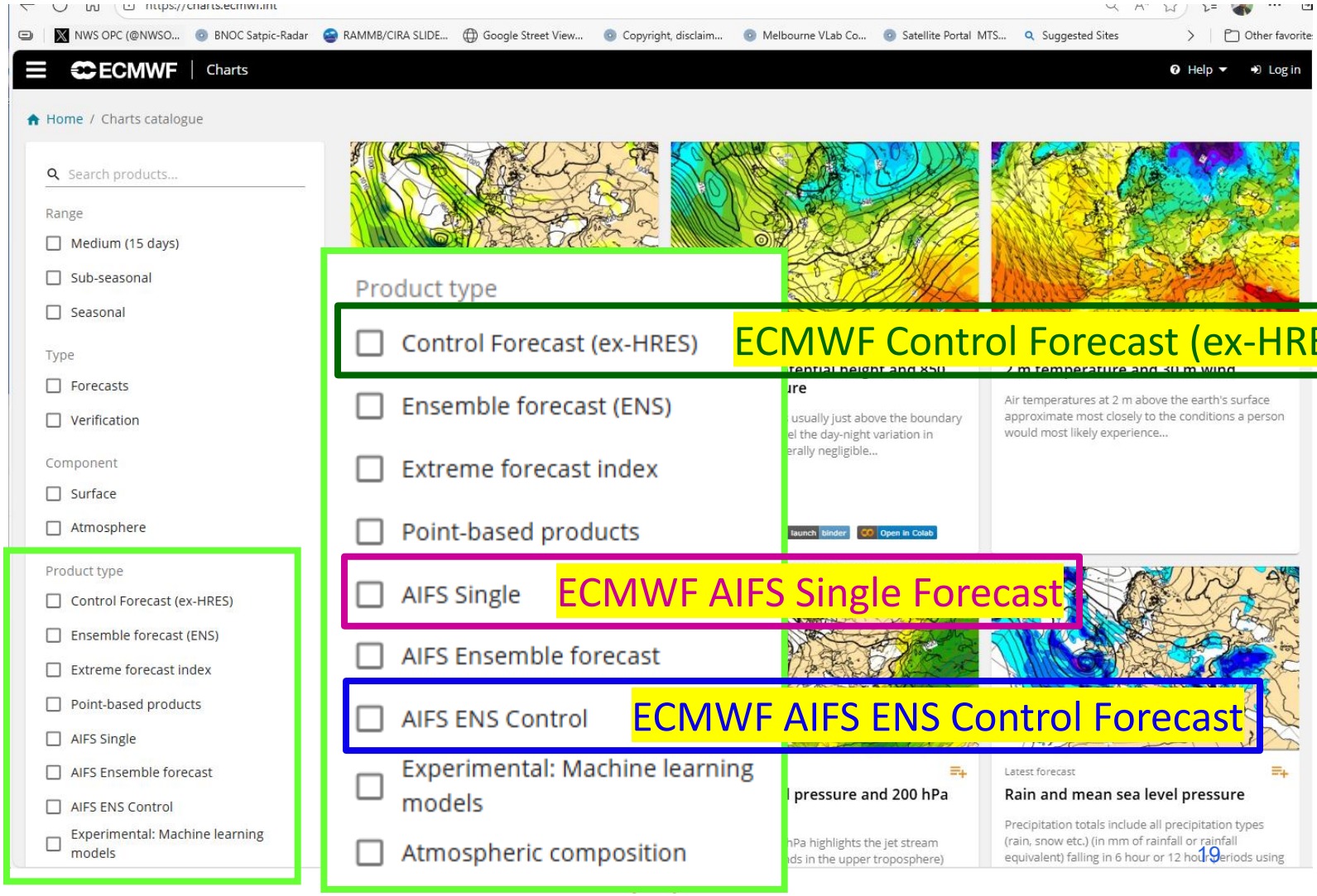
3. Familiarisation with near real time LightningCast data over the southern Pacific Ocean, from the SSEC Real Earth web page.

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.**

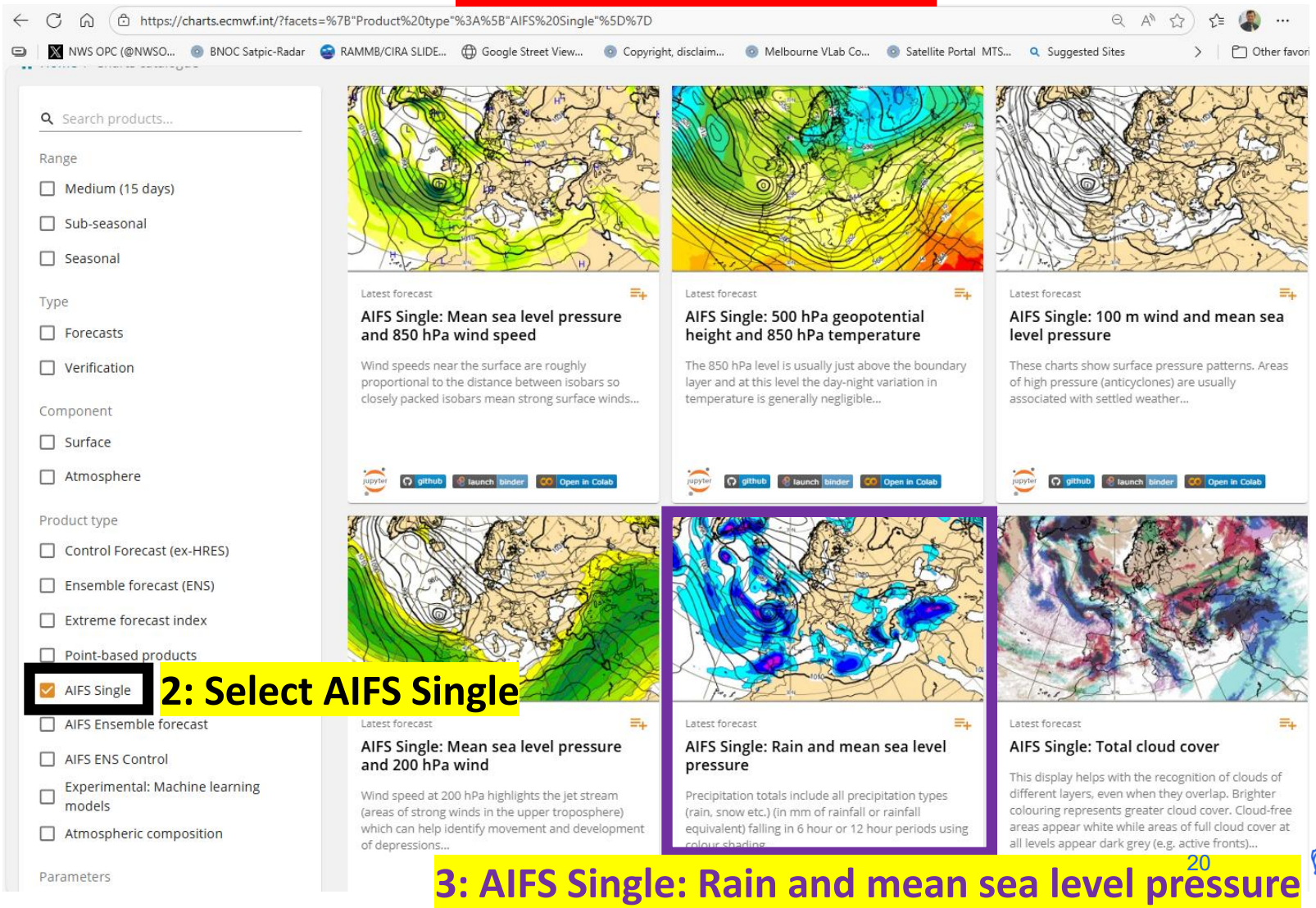
Exploring the ECMWF Experimental forecasts, including the Artificial Intelligence Forecasting System (AIFS).

https://charts.ecmwf.int/



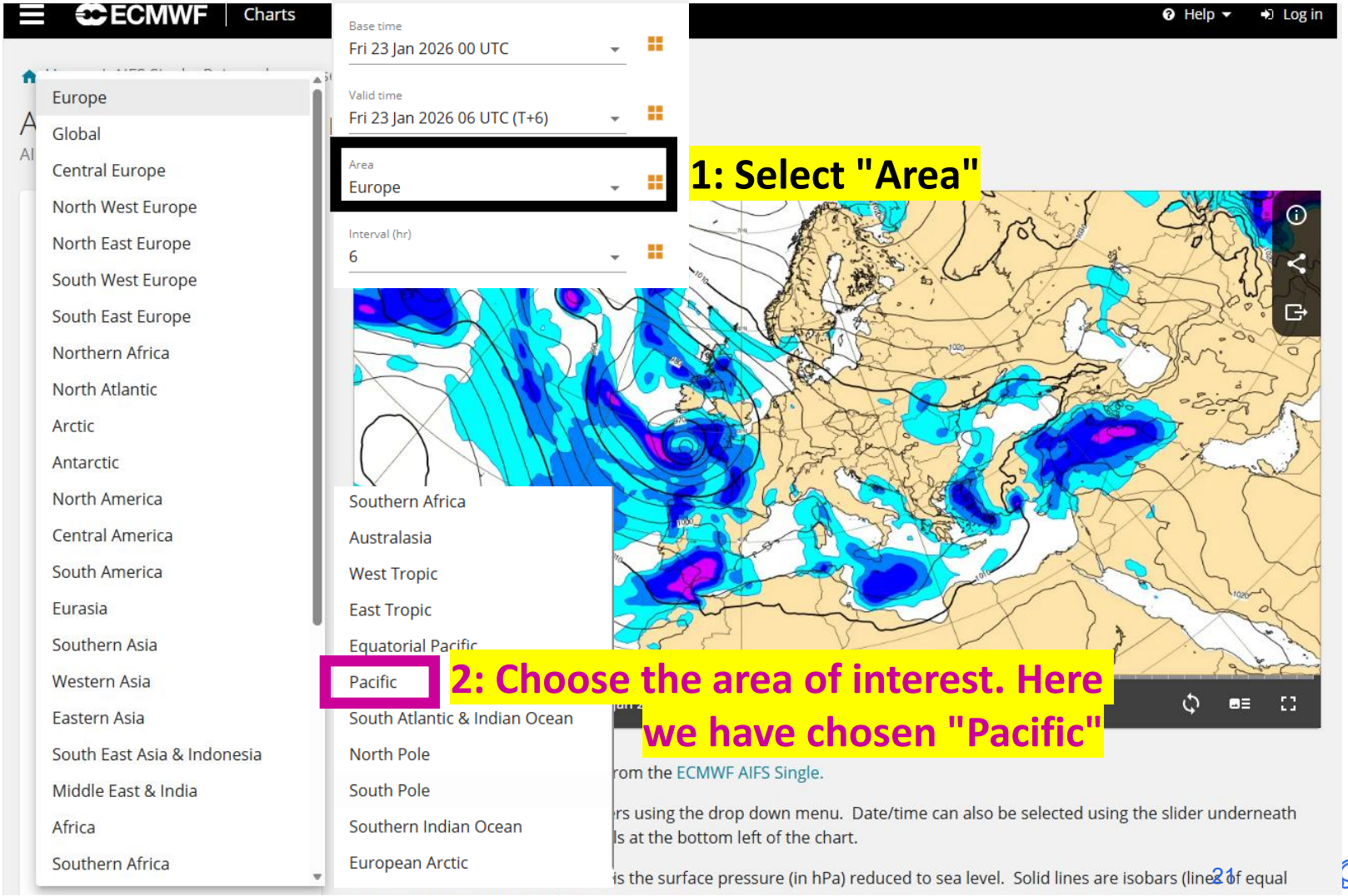
Choosing 12-hour precipitation and MSLP forecast from the AIFS ECMWF Single model

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



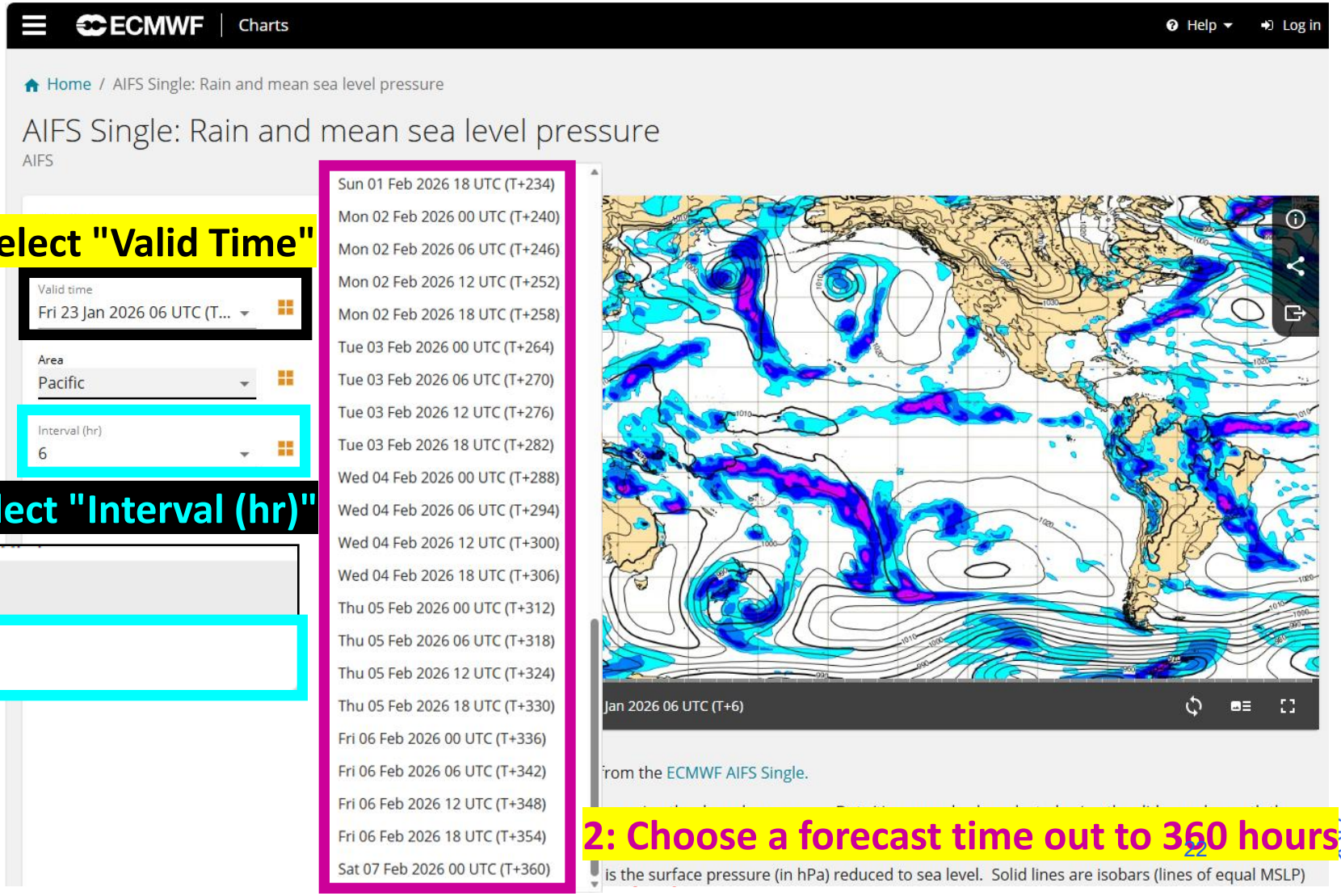
Choosing 12-hour precipitation and MSLP forecast from the AIFS ECMWF Single model

https://charts.ecmwf.int/

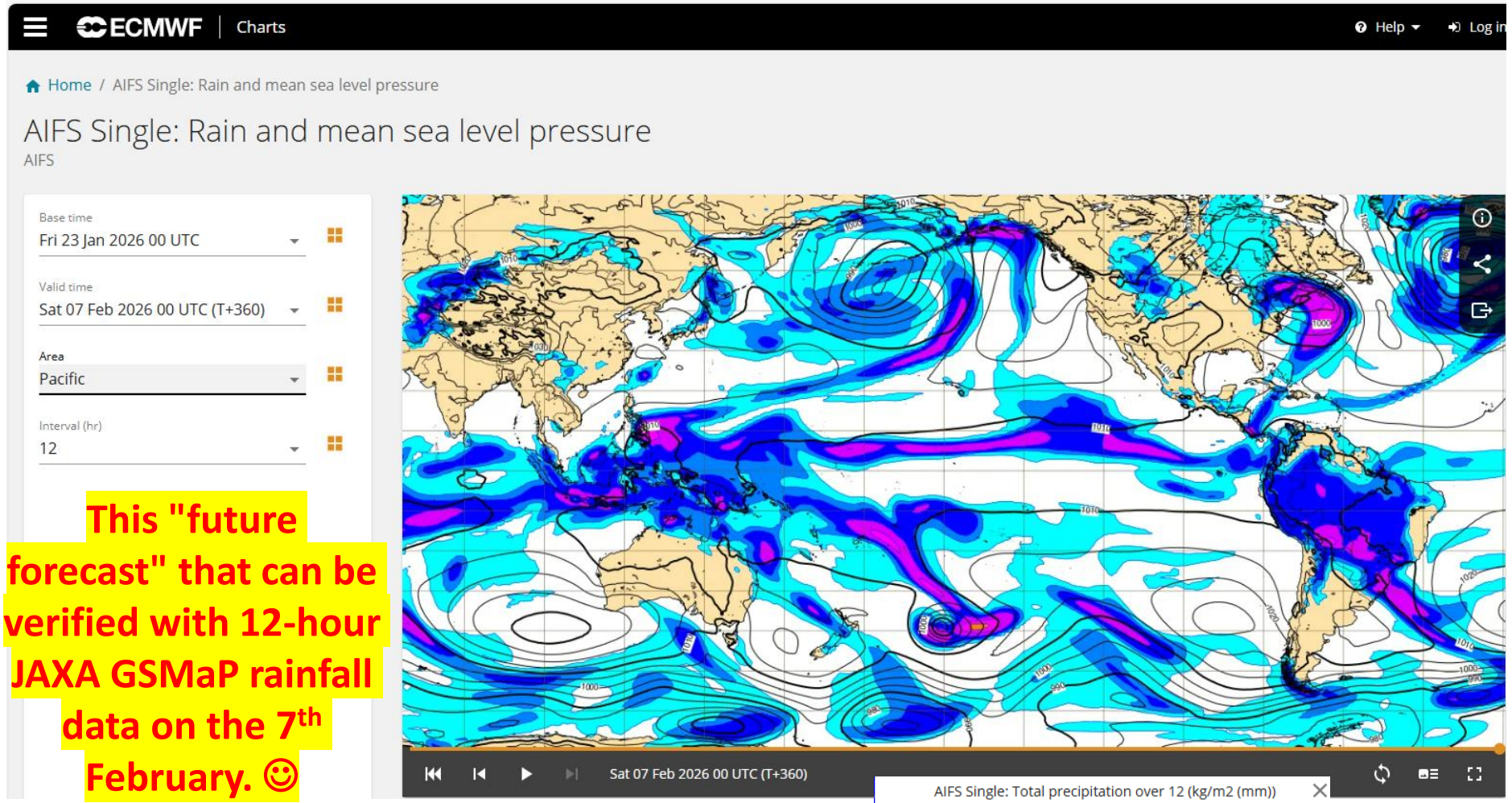


Choosing 12-hour precipitation and MSLP forecast from the AIFS ECMWF Single model

https://charts.ecmwf.int/



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

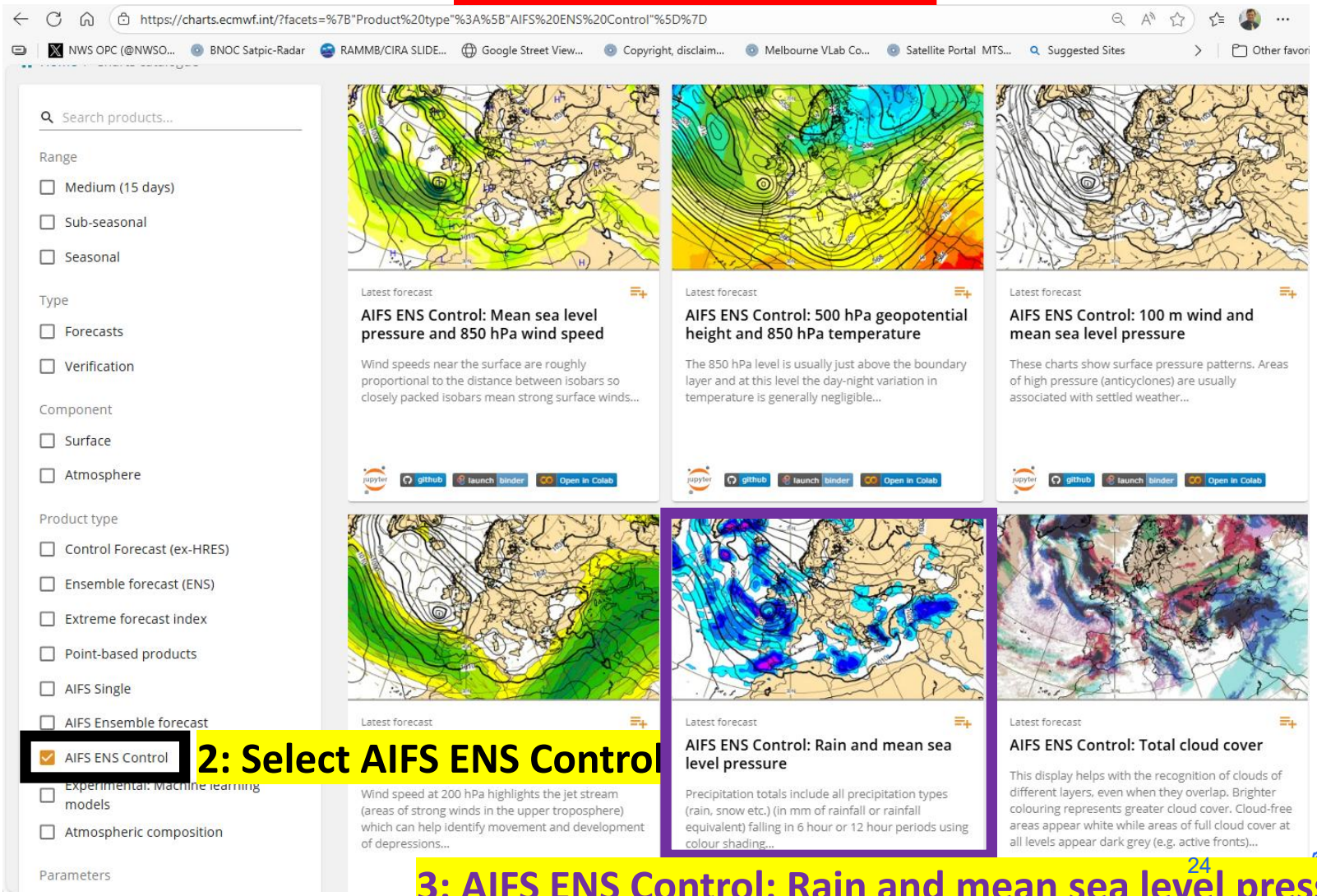


This "future forecast" that can be verified with 12-hour JAXA GSMaP rainfall data on the 7th February. ☺

image courtesy ECMWF

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

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



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

ECMWF | Charts

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Home / AIFS ENS Control: Rain and mean sea level pressure

AIFS ENS Control: Rain and mean sea level pressure

AIFS ENS

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 7th February. ☺

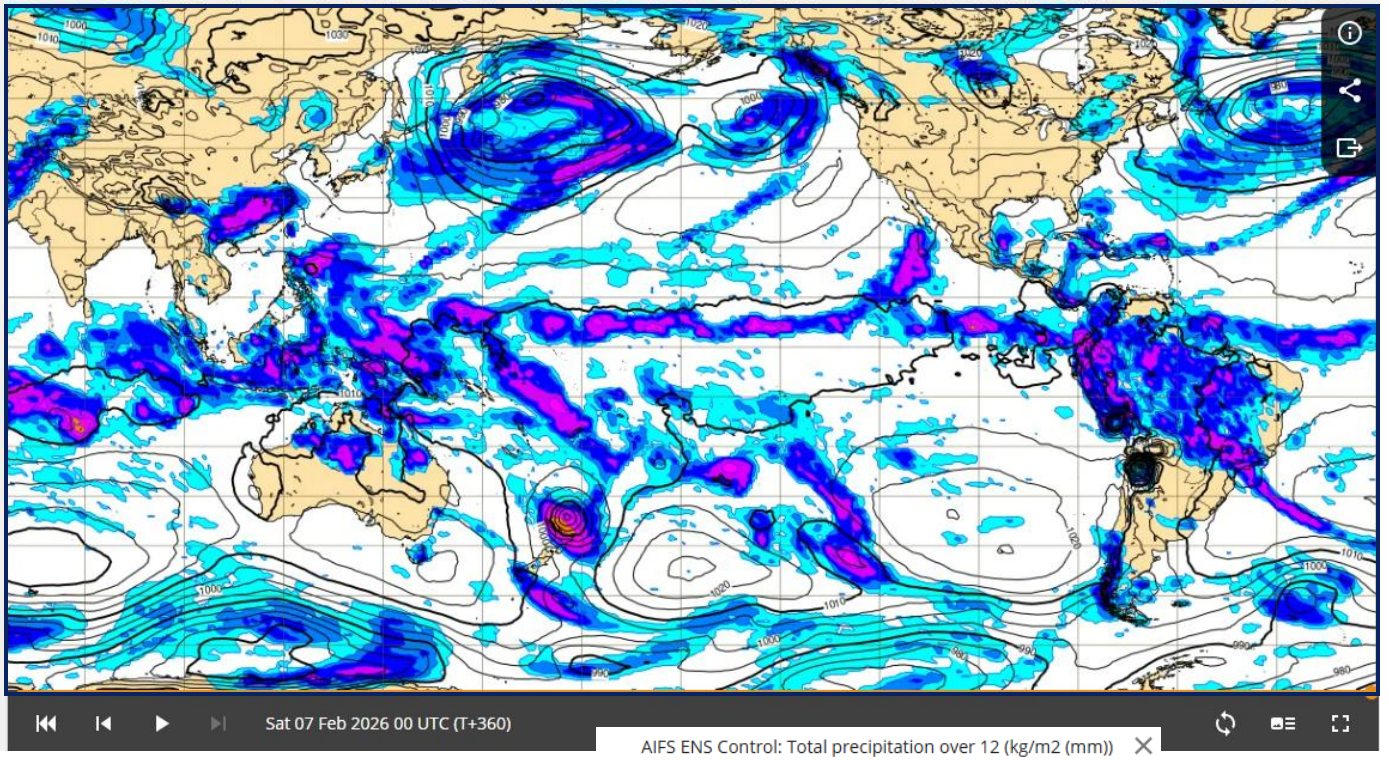
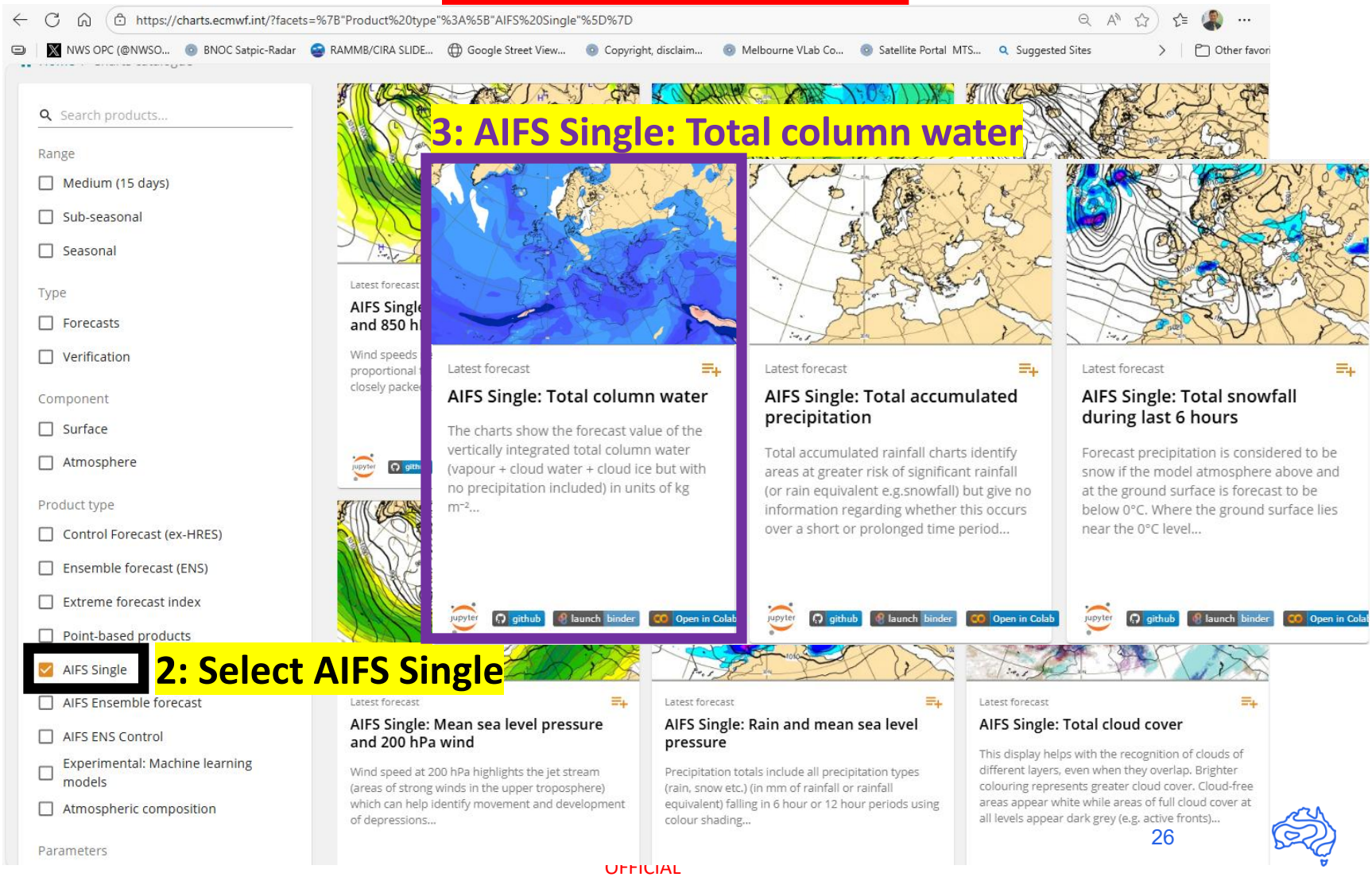


image courtesy ECMWF

Choosing Total Column Water forecast from the AIFS ECMWF Single model

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



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

ECMWF | Charts

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Home / AIFS Single: Total column water

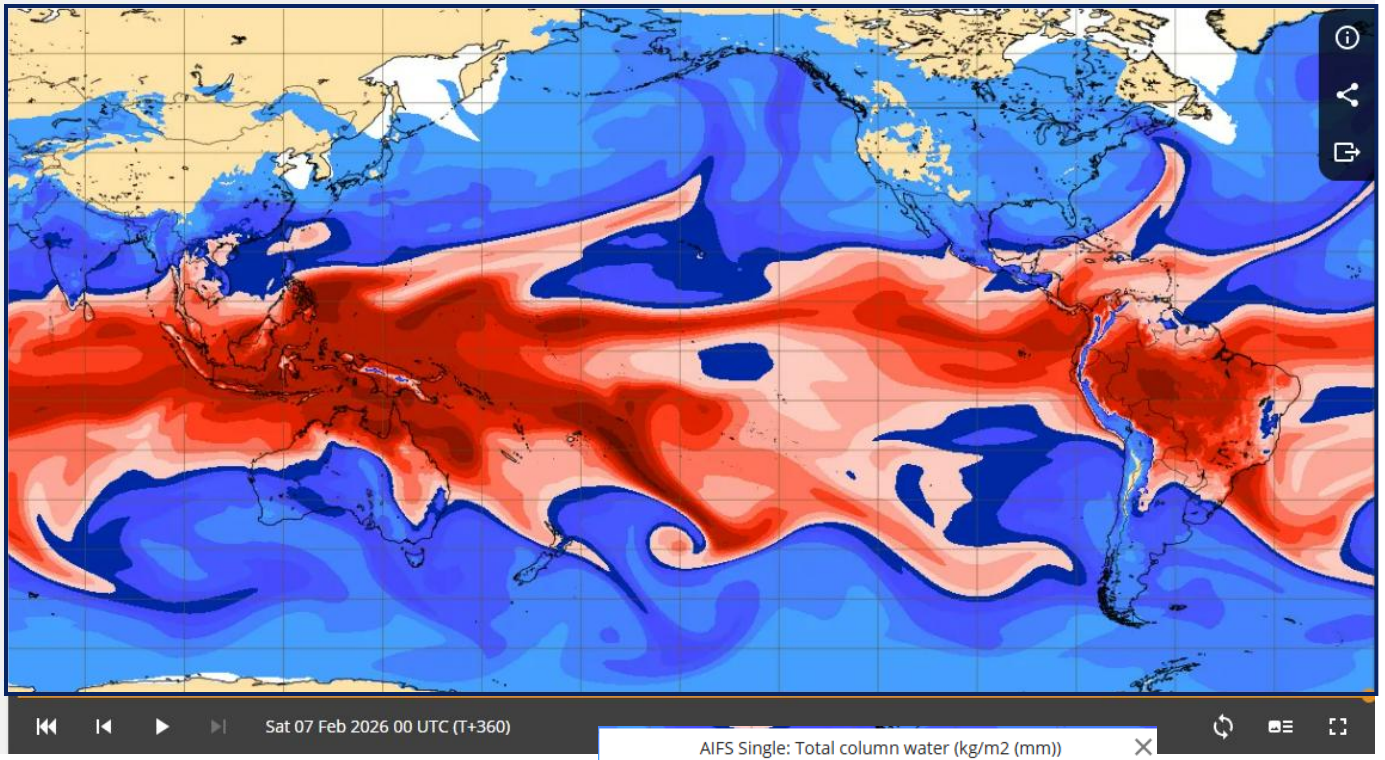
AIFS Single: Total column water

AIFS

Base time
Fri 23 Jan 2026 00 UTC

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

Area
Pacific

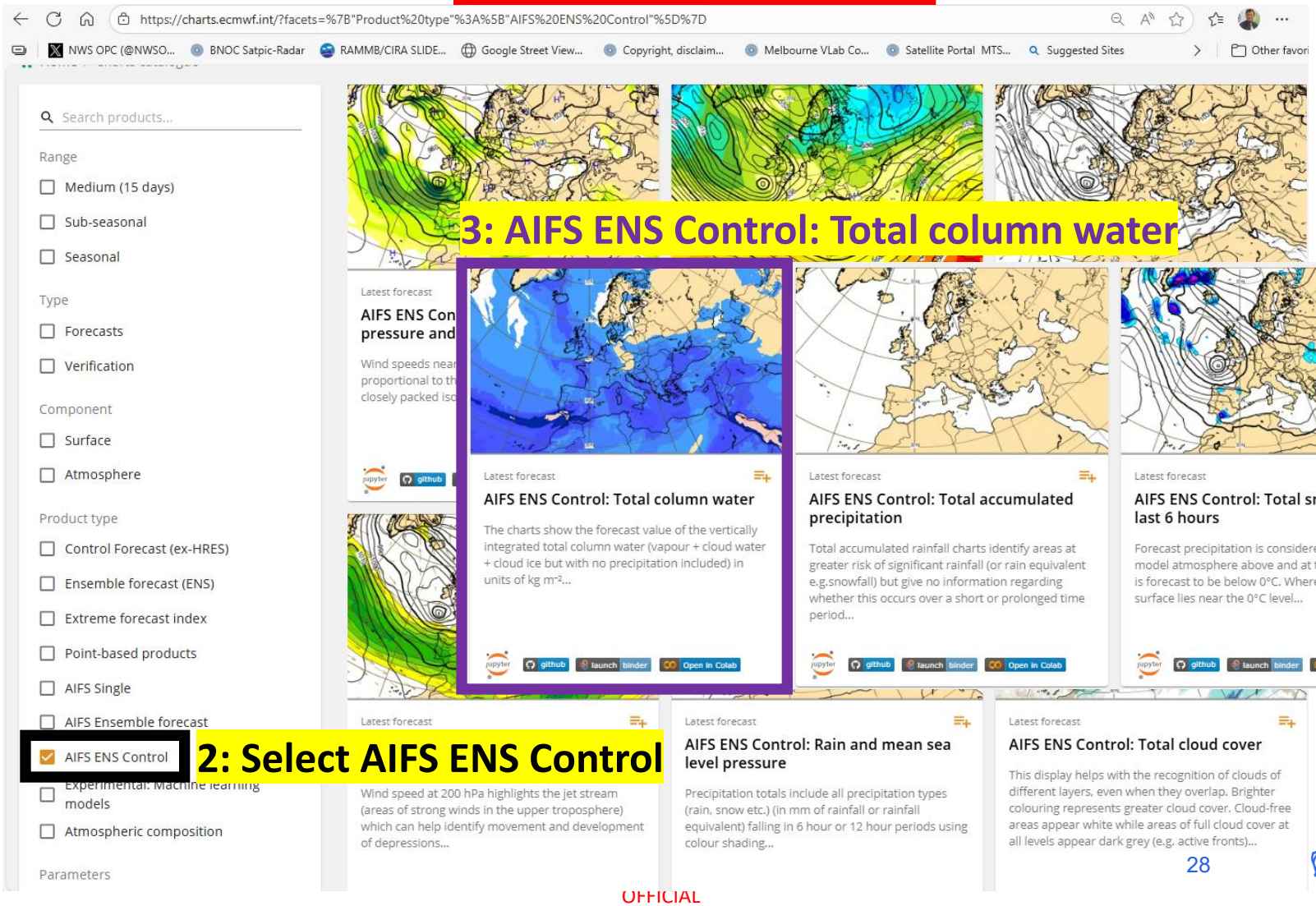


This "future forecast" that can be verified with MIMIC TPW Total Precipitable Water data on the 7th February. ☺

image courtesy ECMWF

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

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



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

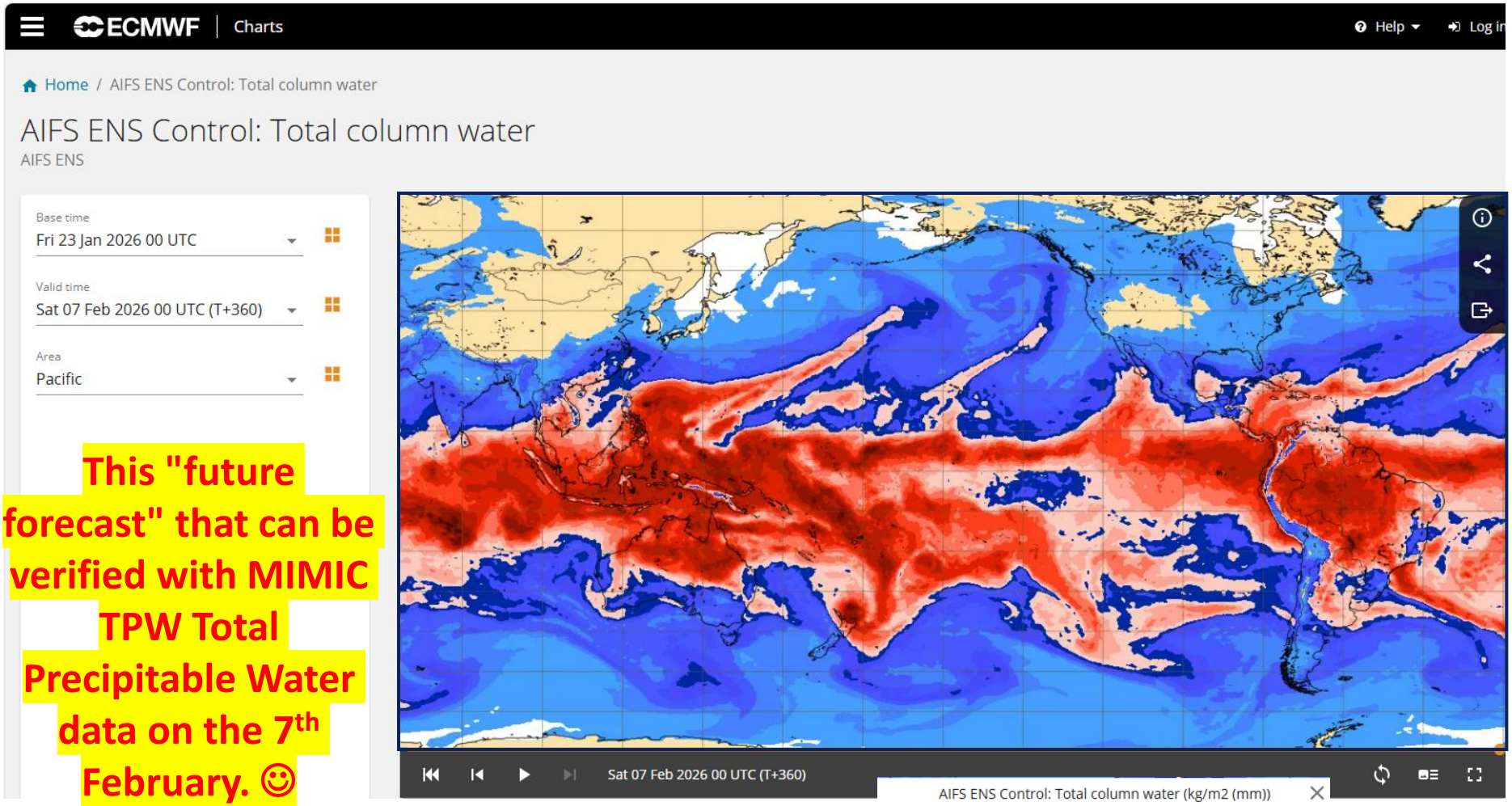
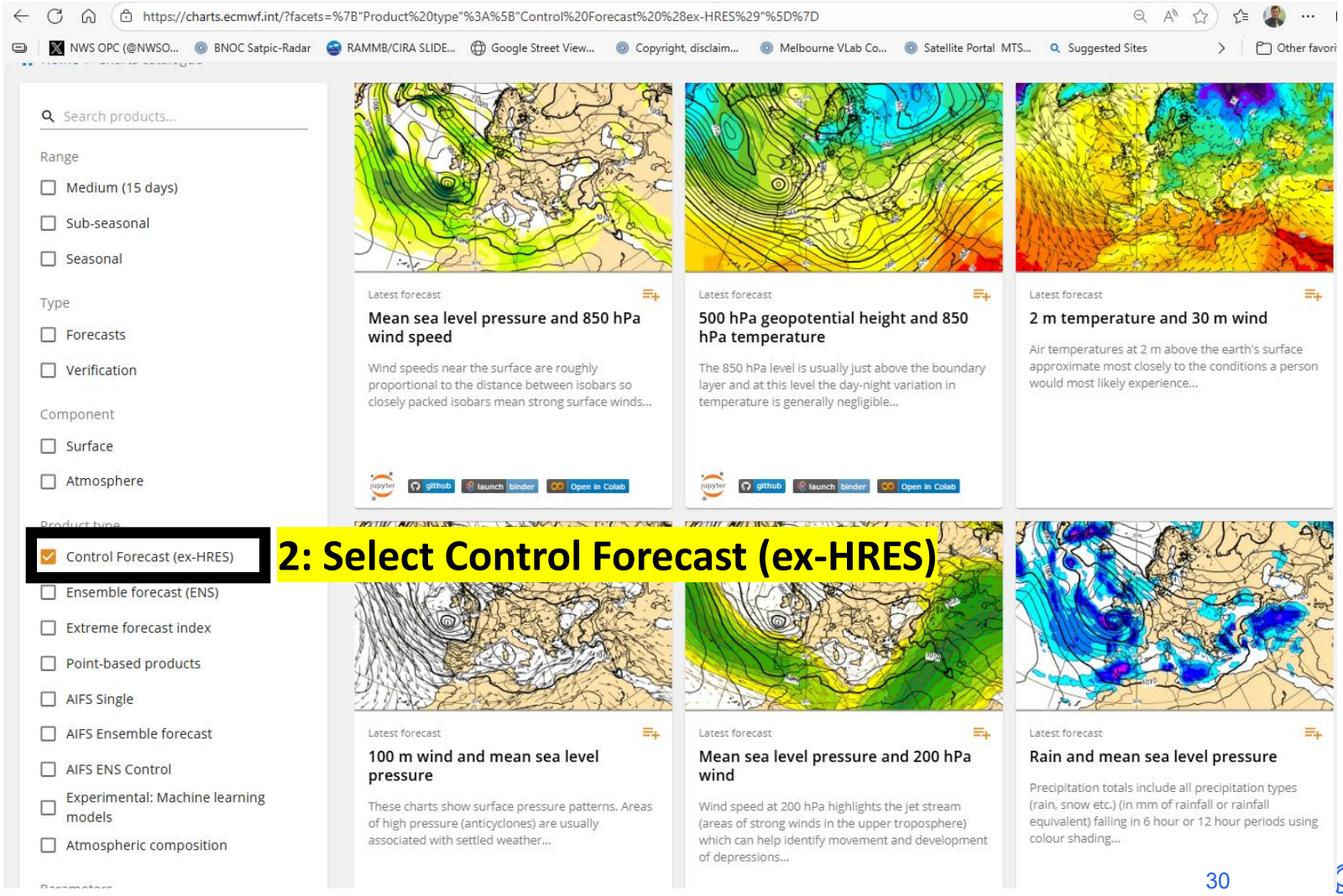


image courtesy ECMWF

Choosing the ECMWF Control Forecast (ex-HRES)

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



The Bureau of Meteorology

Thank You ☺

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