

BMKG HEADQUARTERS IN JAKARTA,
INDONESIA & ONLINE (VIA ZOOM)



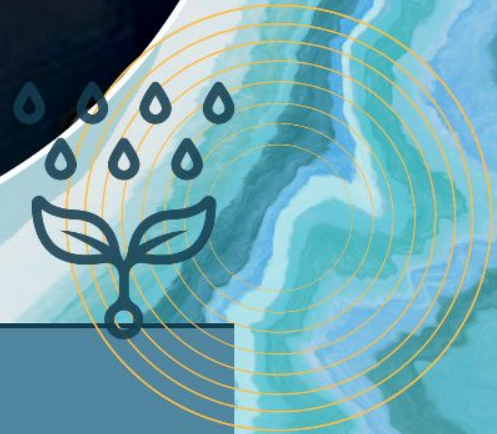
**Wavy
Tropics**

AGENCY FOR METEOROLOGY,
CLIMATOLOGY AND GEOPHYSICS
OF THE REPUBLIC OF INDONESIA

“Interaction of waves with
cold surges”
[PRACTICAL SESSION]



Dr Donaldi Permana



FRIDAY

24 NOVEMBER 2023



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Interaction of waves with cold surges [practical session]

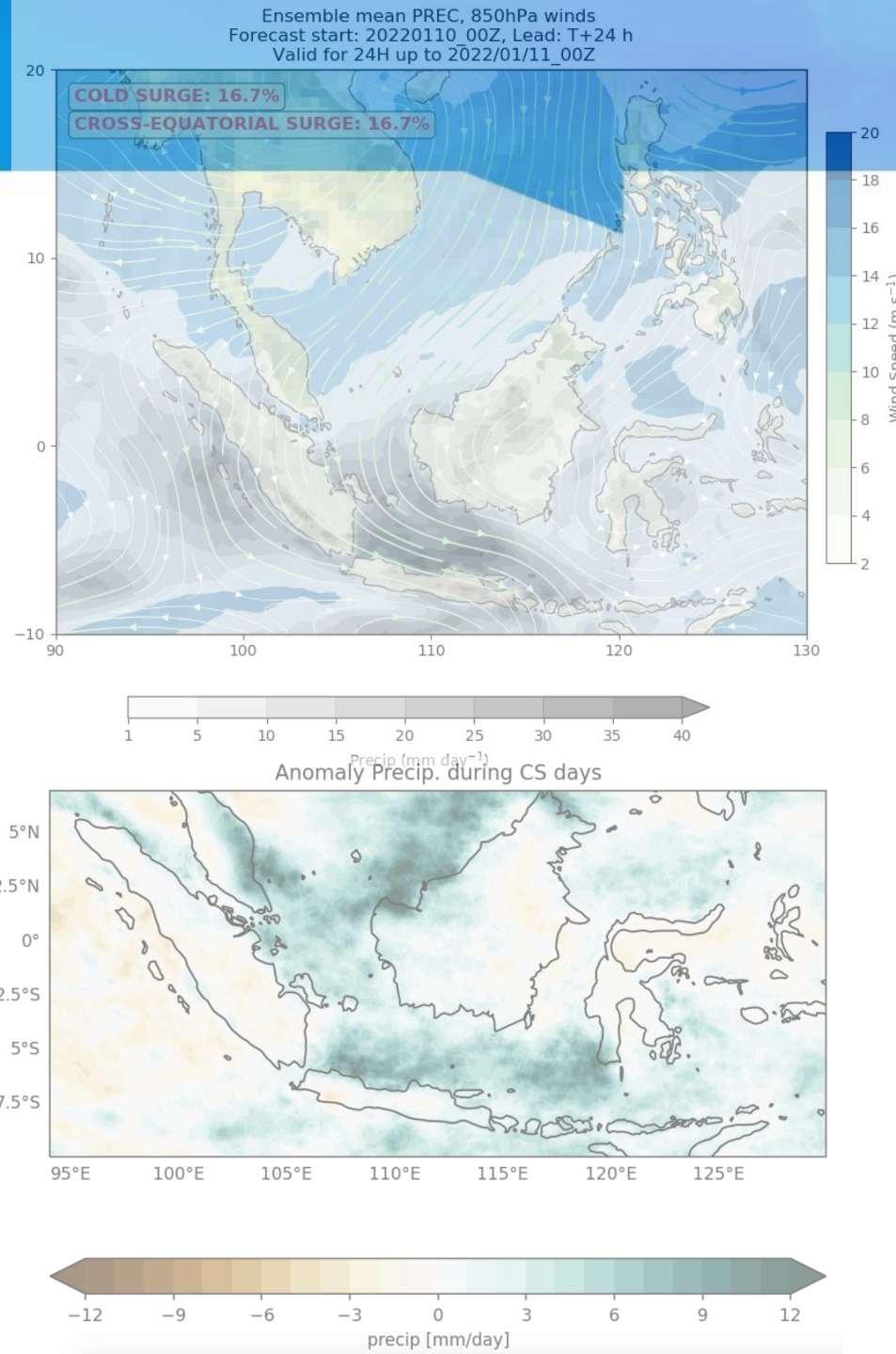
Donaldi Permana

Indonesia Agency for Meteorology Climatology and Geophysics
(BMKG)



WavyTropics

November 20-24, 2023
BMKG Jakarta & online





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Code :

<https://github.com/donaldisp/wavytropics>

Dataset :

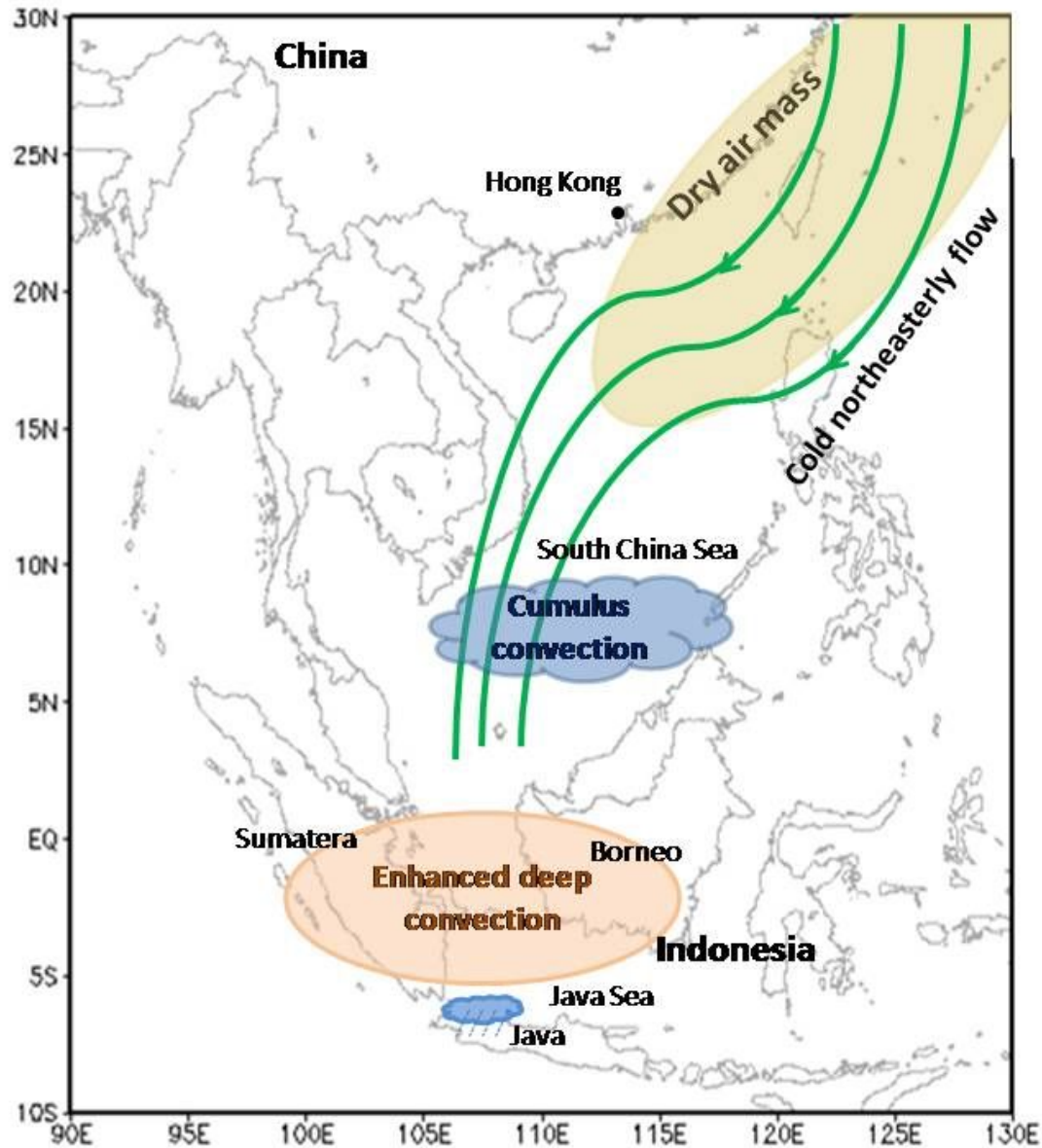
<https://link.bmkg.go.id/vy4c8>

- Cold Surge Life Cycle
- Cold Surge Definition
- Obtaining CS and CENS indices
- Interaction CS and MJO
 - Calculate Days with CS
 - Calculate days with MJO
 - Calculate days with CS + MJO
 - Investigate their impact on rainfall anomaly



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Cold Surge Life Cycle



<https://resources.eumetrain.org/satmanu/CM4SH/InNCS/index.htm>



Cold surges Definition

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height (m)

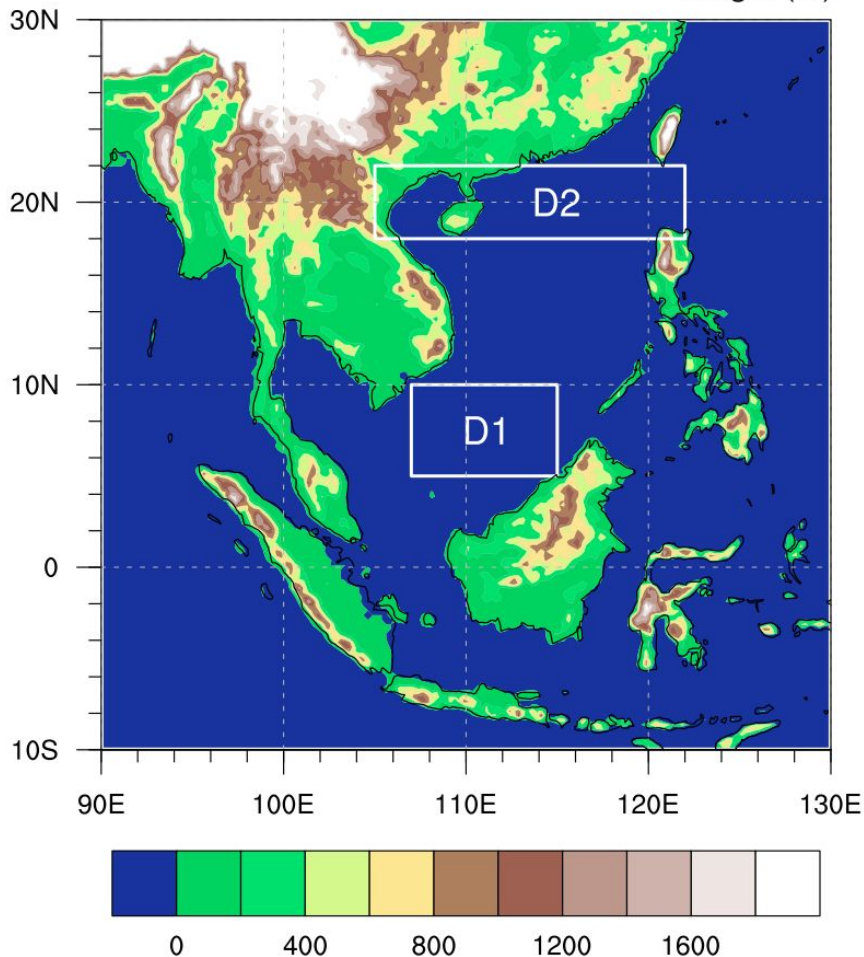


TABLE 1. Summary of cold surge indices based on the area-average 850-hPa winds and maximum MSLP over the domain indicated. Here u and v are zonal and meridional winds, respectively, \bar{V} denotes long-term average, and σ_V the standard deviation of the meridional wind speed V .

Variable	Criteria		Lat	Lon
850 hPa wind averaged over domain D1	Calm to easterly wind Northerly wind Normalized wind speed at least 0.75 standard deviations above long-term mean	$u \leq 0 \text{ m s}^{-1}$ $v < 0 \text{ m s}^{-1}$ $\frac{V - \bar{V}}{\sigma_V} \geq 0.75$	5°–10°N	107°–115°E
Max MSLP in domain D2	MSLP at least 1020 hPa	MSLP $\geq 1020 \text{ hPa}$	18°–22°N	105°–122°E

A single event includes a minimum duration of 2 days with a maximum allowable gap of 2 days between cold surge days.

Lim et al (2017)

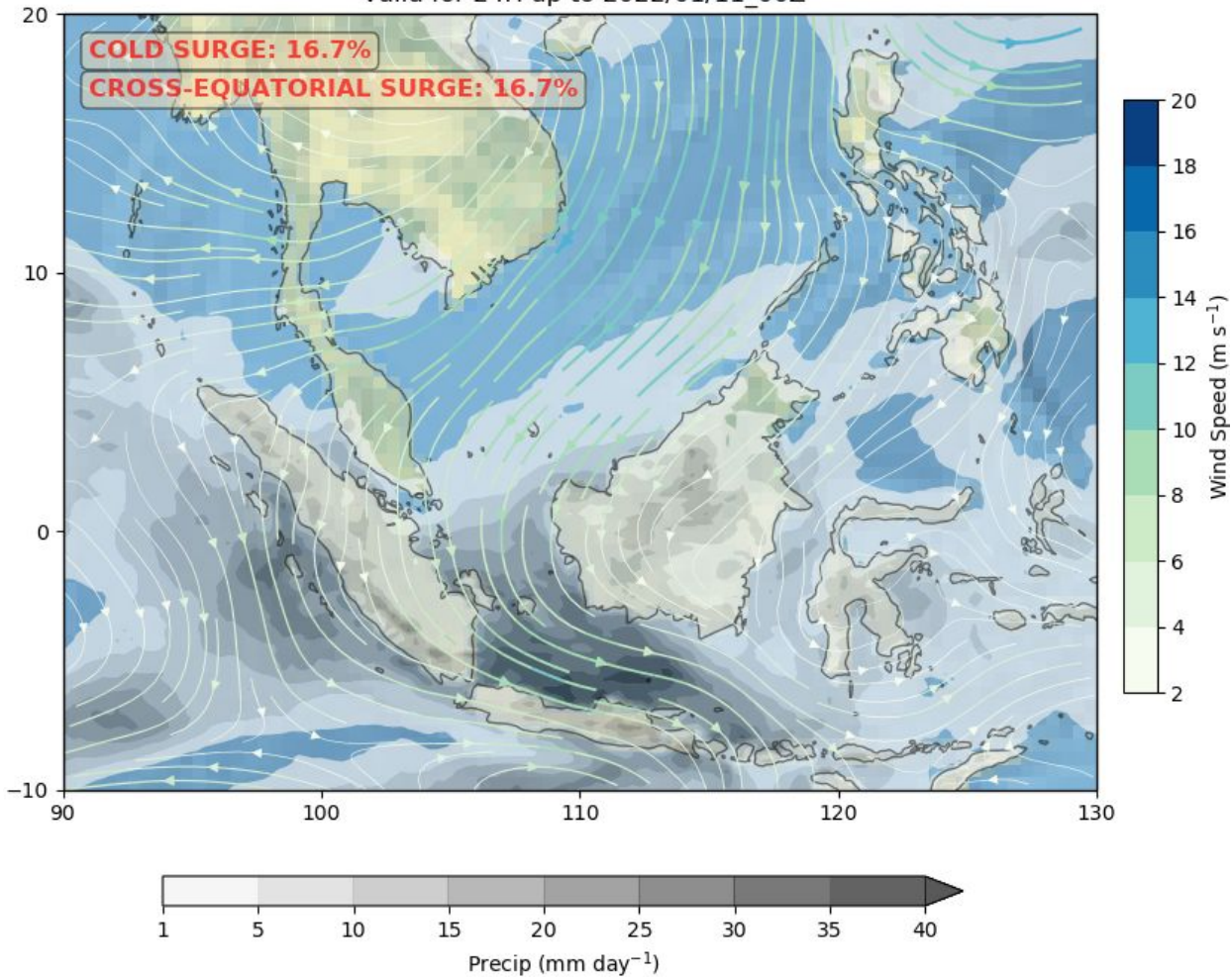
FIG. 1. Topography map (m) for Southeast Asia. The cold surge indices are defined in the two rectangular boxes: northerly or northeasterly wind speed in domain D1 (5°–10°N, 107°–115°E) and MSLP in domain D2 (18°–22°N, 105°–122°E).



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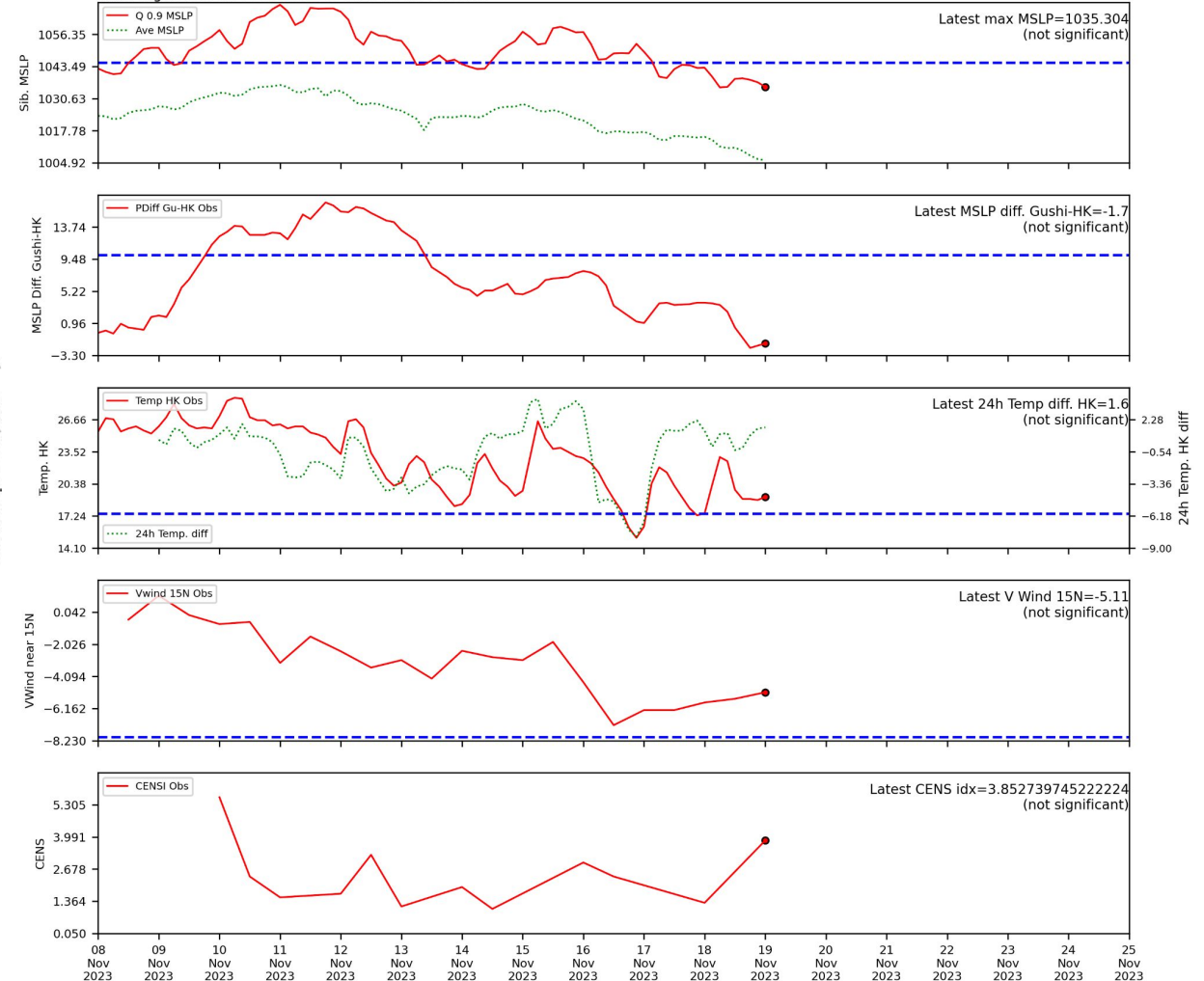
Cold surges monitoring

Ensemble mean PREC, 850hPa winds
Forecast start: 20220110_00Z, Lead: T+24 h
Valid for 24H up to 2022/01/11_00Z



Northerly ColdSurge Monitoring Graph

Timerange: 2023-11-08 00:00:00 to 2023-11-25 00:00:00



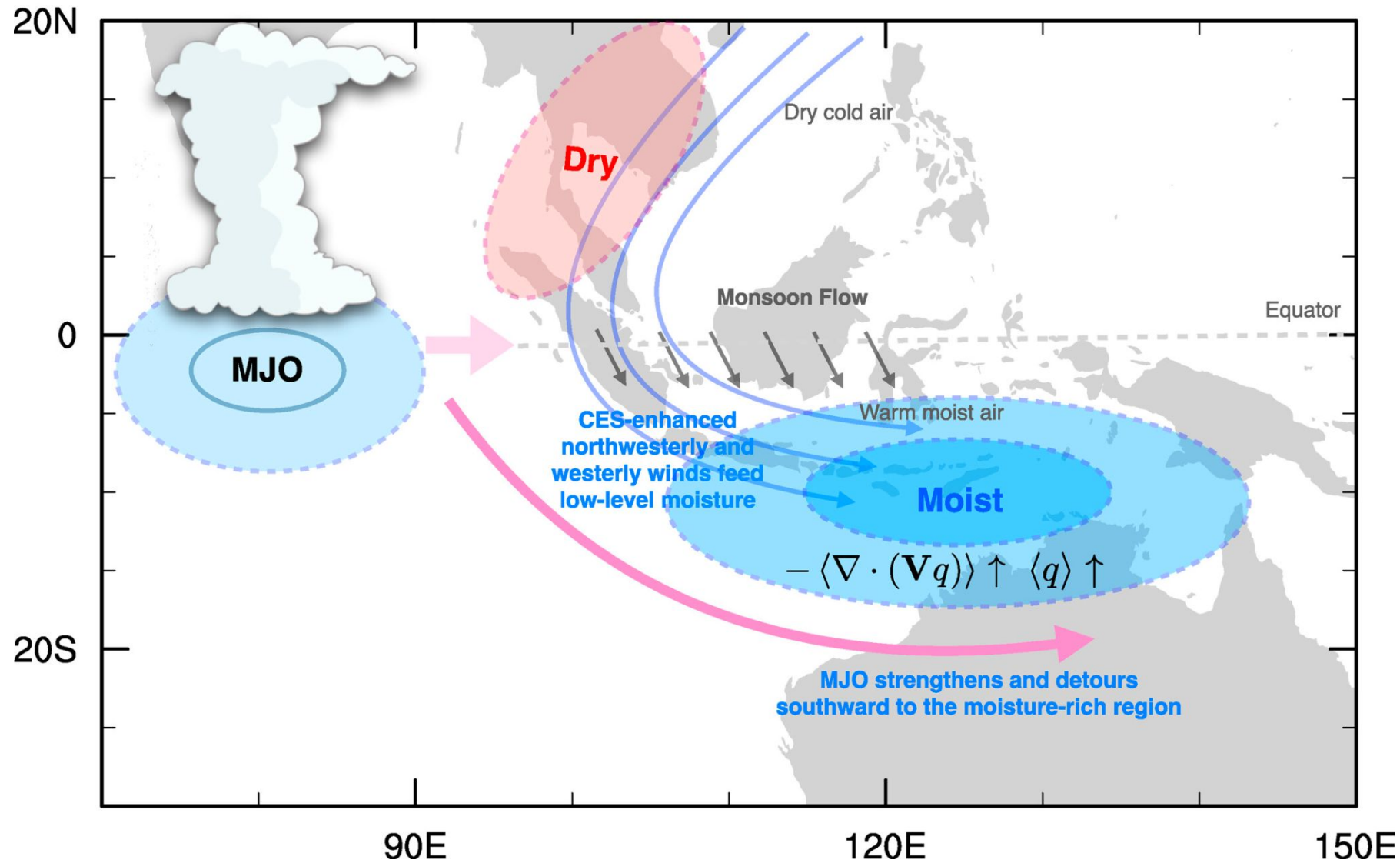
Latest Prod:20231119
Sub Bidang Prediksi Cuaca
Pusat Meteorologi Publik

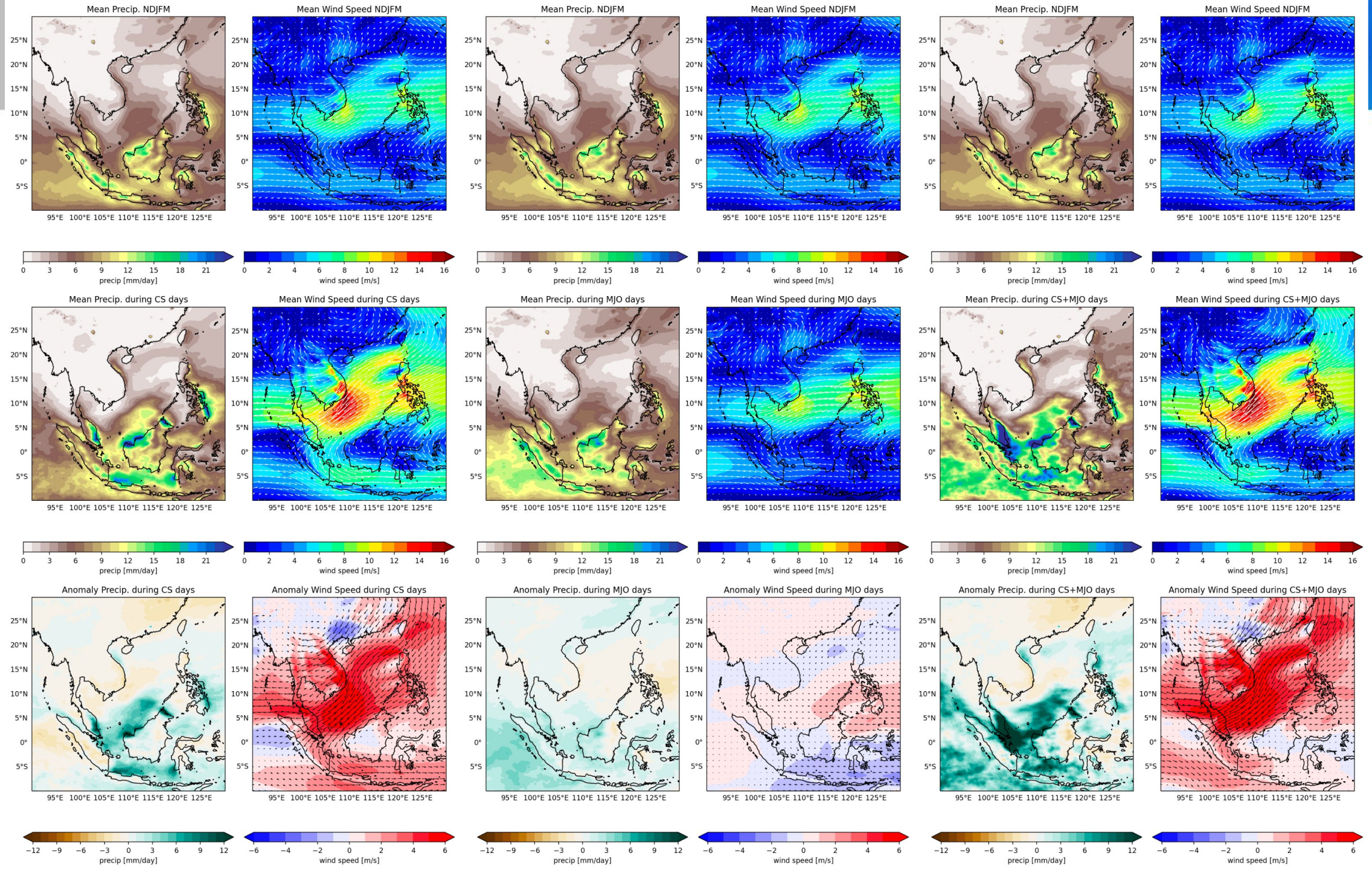
https://web.meteo.bmkg.go.id//media/data/bmkg/mfy/sur_idx.png



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Cold surges interaction with MJO







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Let's try on Jupyter-notebook !!

Code :

<https://github.com/donaldisp/wavytropics>

Dataset :

<https://link.bmkg.go.id/vy4c8>



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Thanks for your attention

Questions ??

Contact me : donaldi.permana@bmkg.go.id

- Lead of Working Package 1, WCSSP SEA-Indonesia
- Member of the WGNE – MJO Task Force
- Member of Asian-Australian Monsoon WG
- Member of EC-PHORS