SCIC Dialogue Session 2026:

Overview of Singapore's Climate and Severe Weather Phenomena

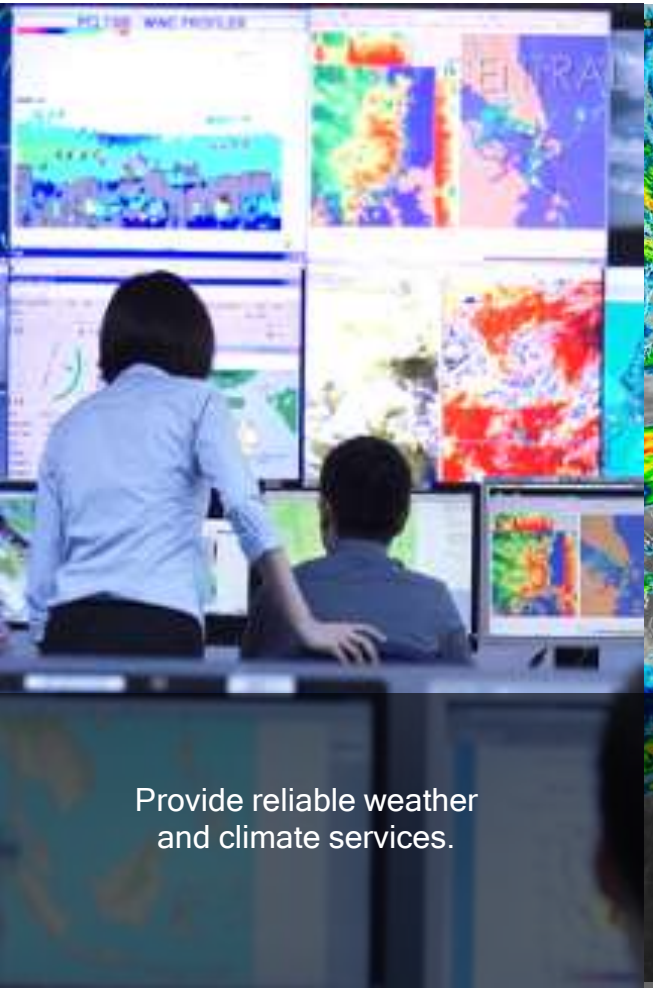
Darrell Lim (Executive Meteorologist)

What we will talk about today

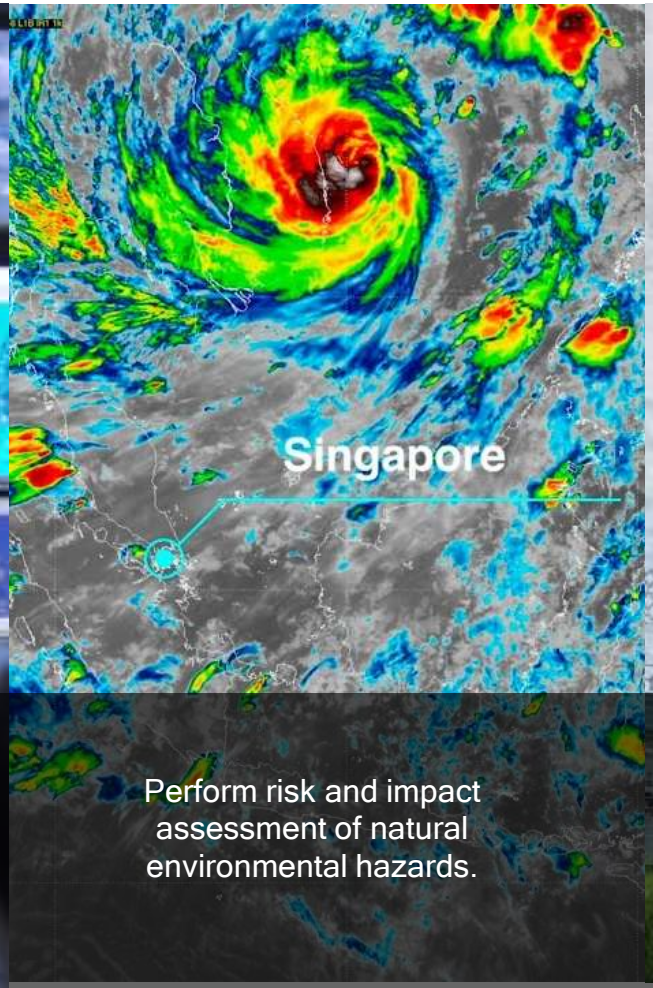
- About MSS
- General Weather & Climate of Singapore
- MSS Warnings & Alerting Services

Meteorological Service Singapore

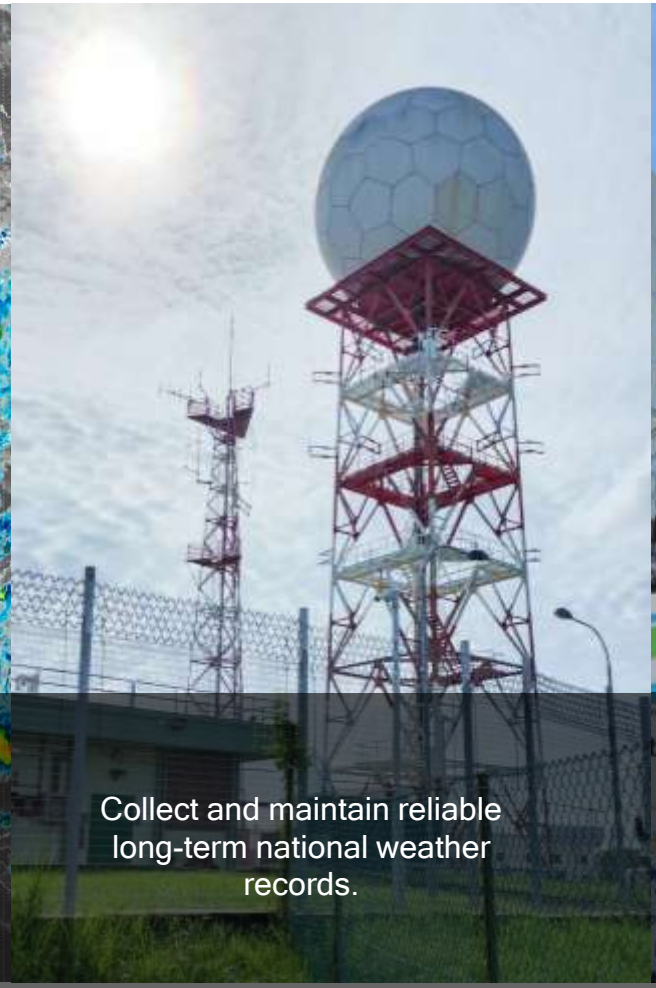
The Meteorological Service Singapore (MSS) is Singapore's national authority on the weather and climate. It is an operational pillar under the National Environment Agency (NEA). The key areas within our mission are:



Provide reliable weather and climate services.



Perform risk and impact assessment of natural environmental hazards.



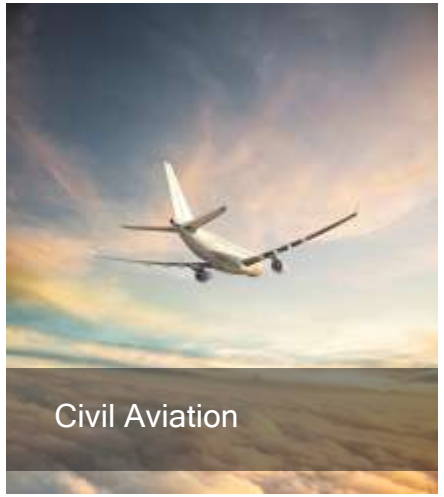
Collect and maintain reliable long-term national weather records.



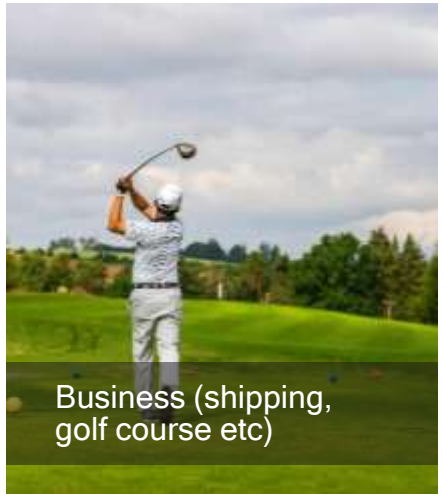
Conduct high-quality research to advance understanding and prediction of the weather and climate of Singapore and the region.

Key Services

Weather Forecast and Warning Service







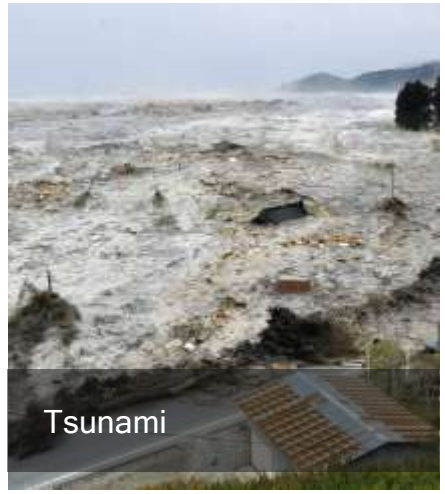


Monitoring and Early Warning of Hazards



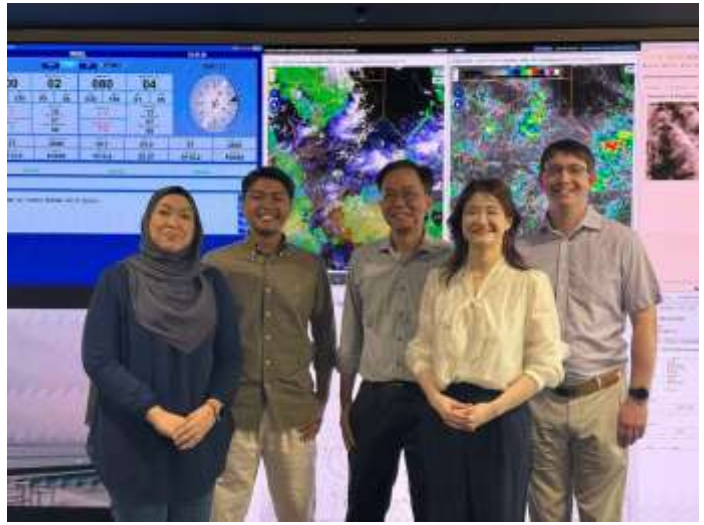






Forecast Operations Department (Central Forecast Office)







Weather and Climate in Singapore

Equatorial Climate and Seasonality

- Located ~1° north of the equator – uniformly warm and humid year-round
- No distinct dry season – rain can occur throughout the year
- Thunderstorms are the most common severe weather event
- Weather patterns strongly influenced by monsoon seasons
  - Monsoon refers to the seasonal reversal of winds - a sustained change in wind direction is observed for certain periods of the year
  - Winds are weak and variable in direction in the inter-monsoon periods

NE Monsoon — **Dec – Mar**

Cool, wet; persistent rain from NE winds

1st Inter-Monsoon — **Apr – Jun**

Afternoon thunderstorms; variable winds; warm season

SW Monsoon — **Jul – Oct**

Drier; haze risk; higher occurrence of Sumatra Squalls

2nd Inter-Monsoon — **Oct – Nov**

Frequent thunderstorms; heavy showers

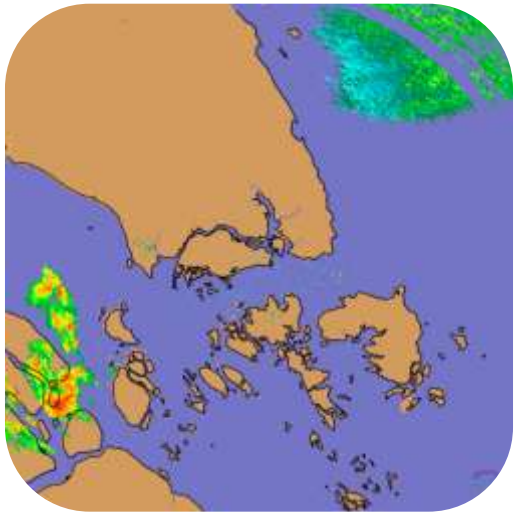
Weather & Climate in Singapore

Three main types of rain-bearing systems



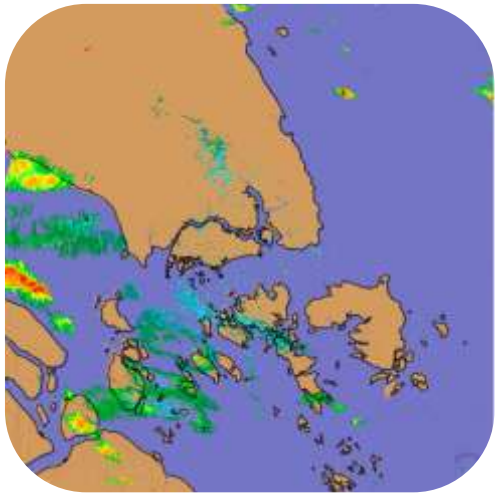
Localized convective thunderstorms

- Caused by heating on a warm day
- Can be particularly intense during the inter-monsoons



Sumatra squalls

- Line of thunderstorms that originate from Sumatra or the Strait of Malacca
- Typically, in the pre-dawn and early morning
- Brings gusty winds



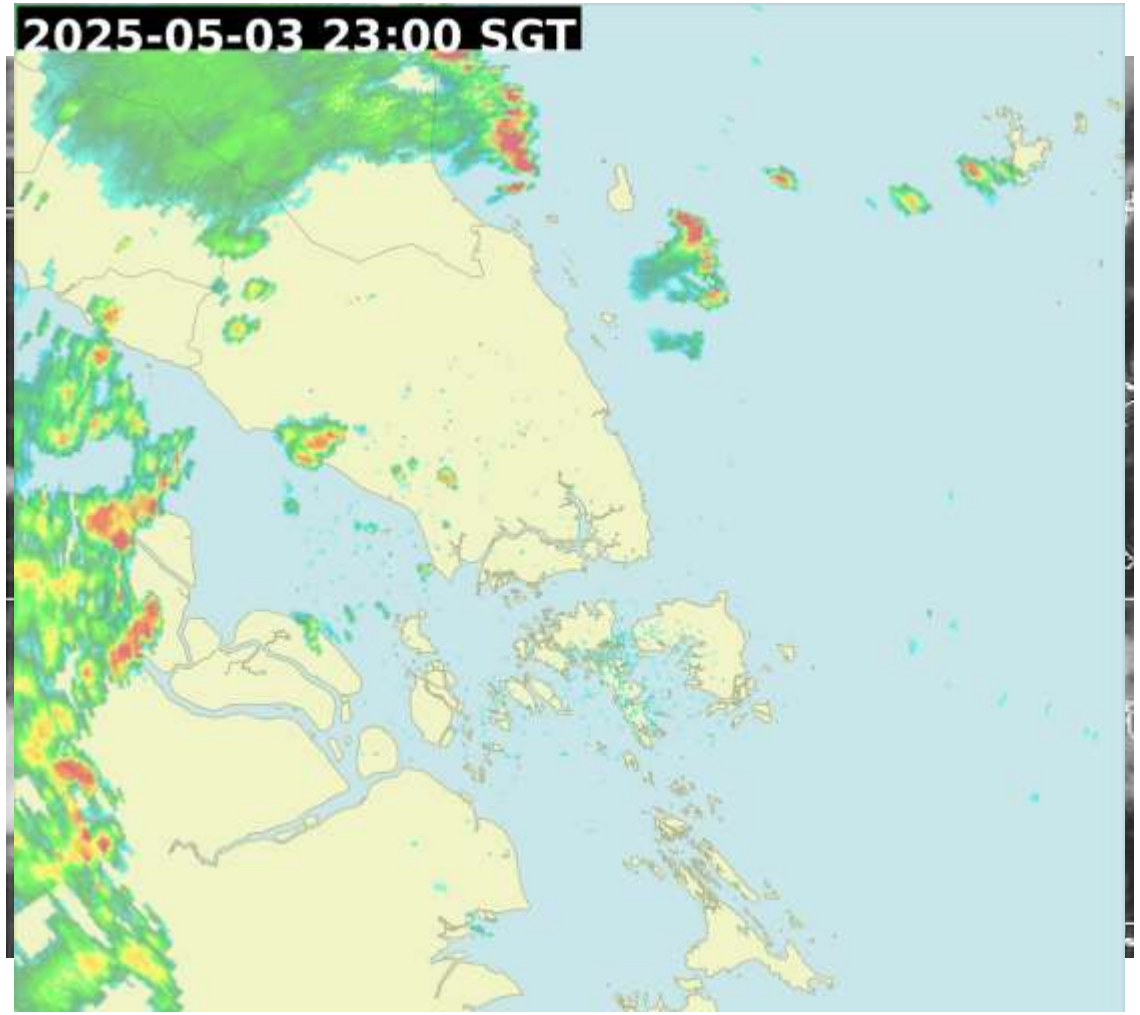
Monsoon surges

- Strengthening northeast winds over South China Sea
- Widespread continuous rain, at times with thunder
- Cooler and windier conditions

Weather and Climate in Singapore

Sumatra Squalls

- Organized line of thunderstorms originating over Sumatra Island or the Strait of Malacca
- Typically moves eastwards towards Singapore under southwesterly or westerly winds
- Common during the Southwest Monsoon and inter-monsoon periods
- Usually affects Singapore overnight or in the morning
- Sudden strong gusty winds of 40–80 km/h, accompanied by heavy rain lasting 1–2 hours



Weather & Climate in Singapore

Hazards

Flash floods

- The rapid development of thunderstorms, or a prolonged monsoon surge, can lead to significant quantities of rainfall accumulated in a short duration

Landslips

- Two monsoon surge events brought heavy rainfall on 2 and 10 January 2021 - second wettest January since 1869

Uprooted trees

- Gusty winds, typically from a Sumatra squall or an intense monsoon surge, can uproot trees

Lightning

- Development of thunderstorms can lead to lightning activities



Source: CNA, 20 Aug 2021



Source: The Straits Times, 4 Jan 2021



Source: CNA, 8 May 2019

Weather Forecast & Warning Services (Public)

Weather Forecasts

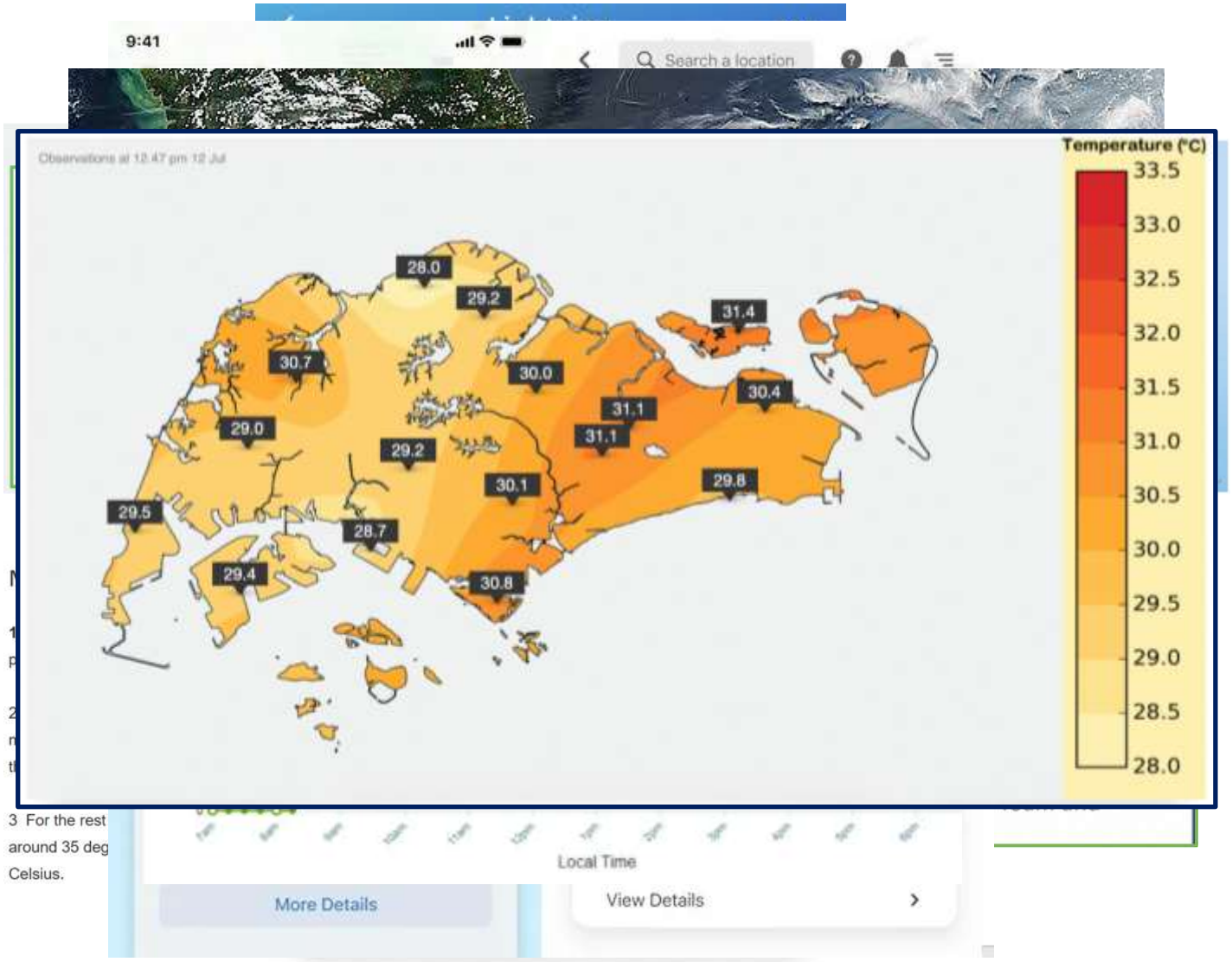
- 2-hour Nowcast
- 24-hour forecast
- 4-day outlook
- Fortnightly Weather Outlook
- Heavy Rain Warning

Public Safety Alerts/Info

- Lightning Information Service
- Heat Stress Advisory
- UV Index

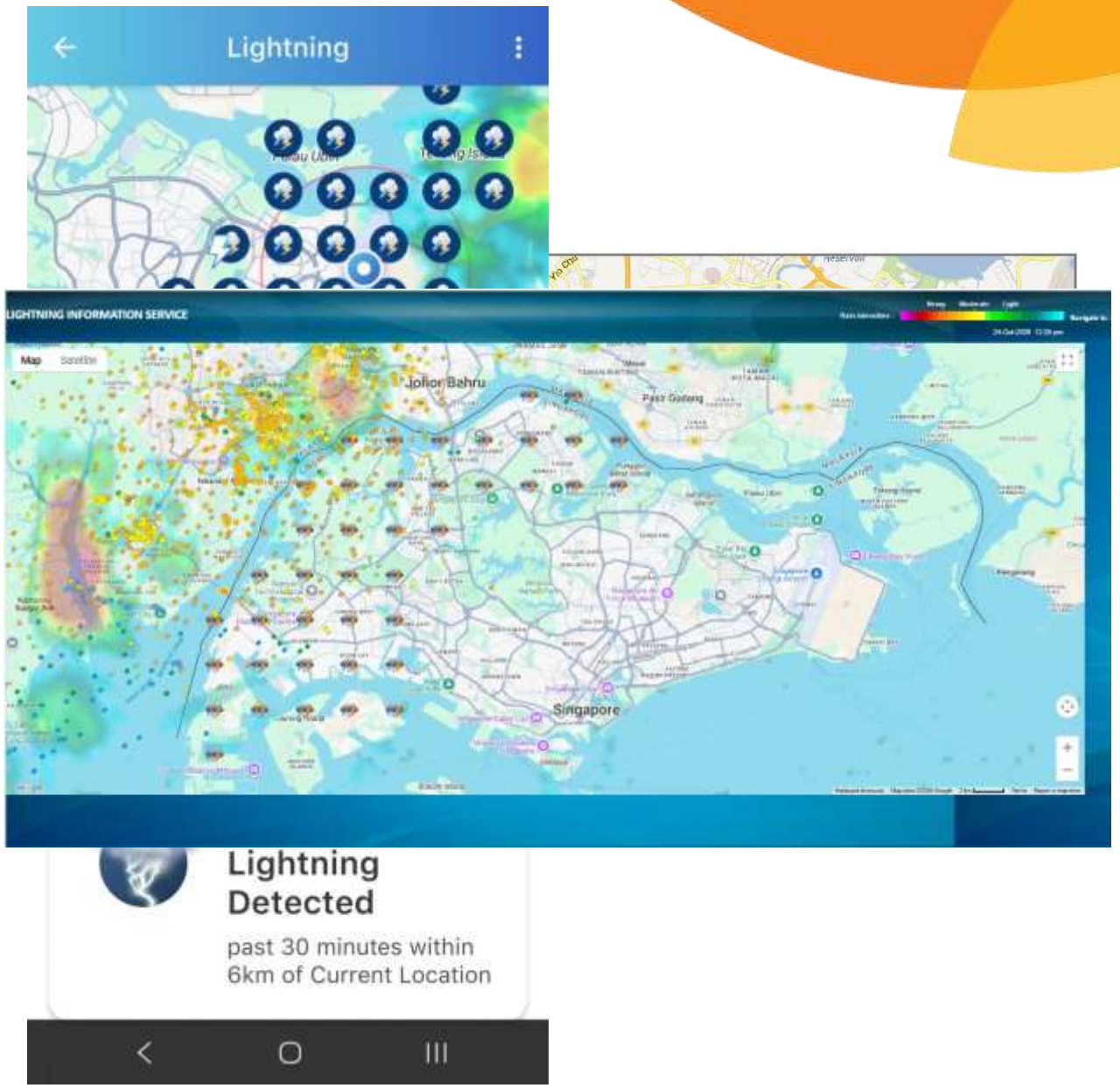
Seasonal Advisories

- Transboundary haze e.g. forecast of 24-hr PSI
- Extreme temperatures e.g. advisory on heat wave



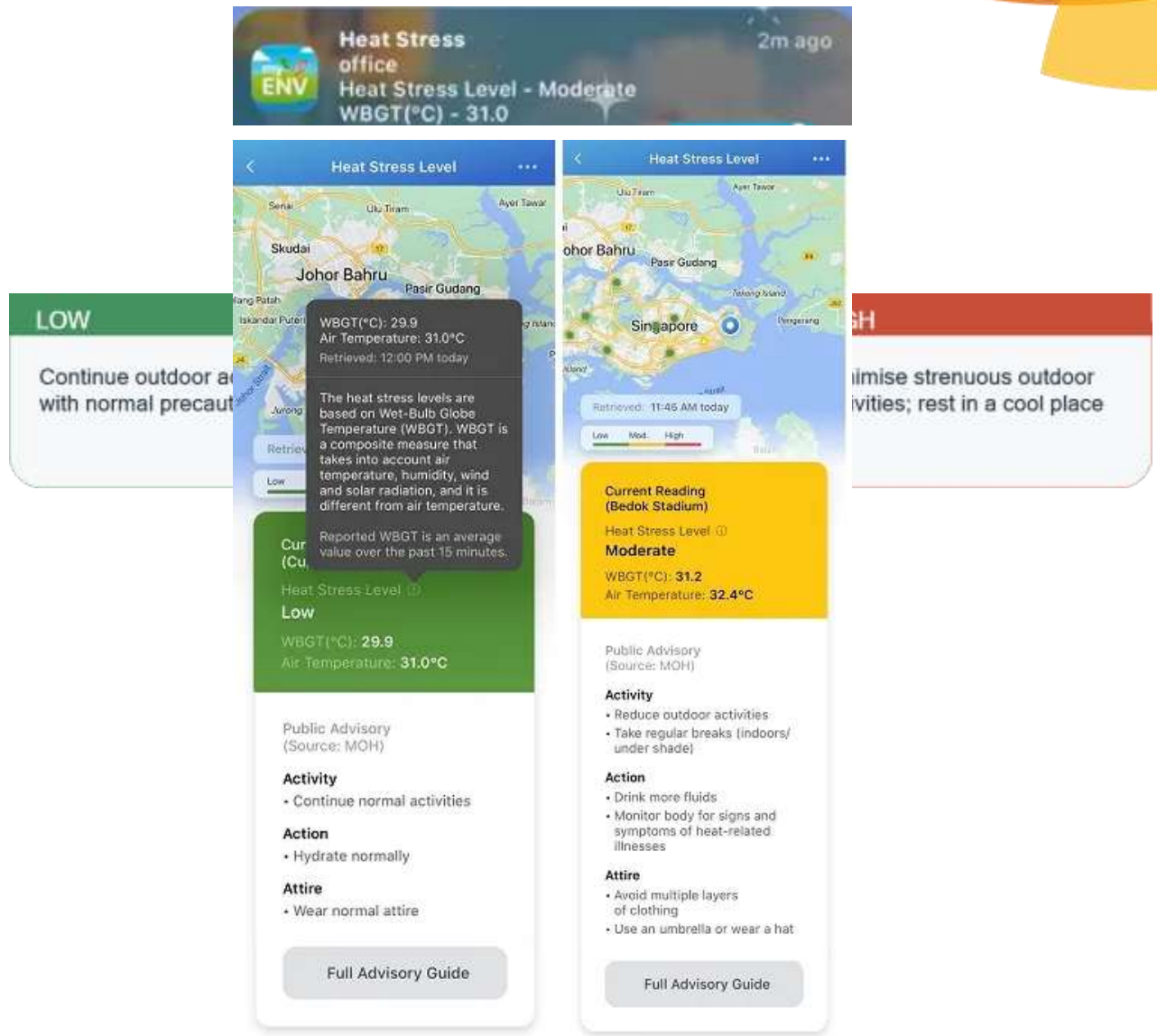
Lightning Information System

- Displays cloud-to-cloud and cloud-to-ground lightning detected over the past 30 minutes.
- Lightning locations are updated every 5 minutes and colour-coded by time of detection.
- Interactive map overlays rain radar and thundery showers forecasts.
- Customised alerts for up to 3 locations, using 6 km or 8 km alert rings.



Heat Stress Advisory

- NEA's Heat Stress Advisory helps the public plan outdoor activities and reduce heat-related illness.
- The Advisory follows three levels of risk of heat stress – low, moderate, and high
- Heat stress is assessed using Wet Bulb Globe Temperature (WBGT)
- myENV app can be set to provide notifications of moderate and high heat stress levels



Meteorological Observation Network

Manned Observation Stations | Automatic Weather Stations | WBGT Sensors | Weather Radar

Lightning Sensors | Upper Air Sounding & LIDAR | Satellite Ground Stn | Seismic Stations | All





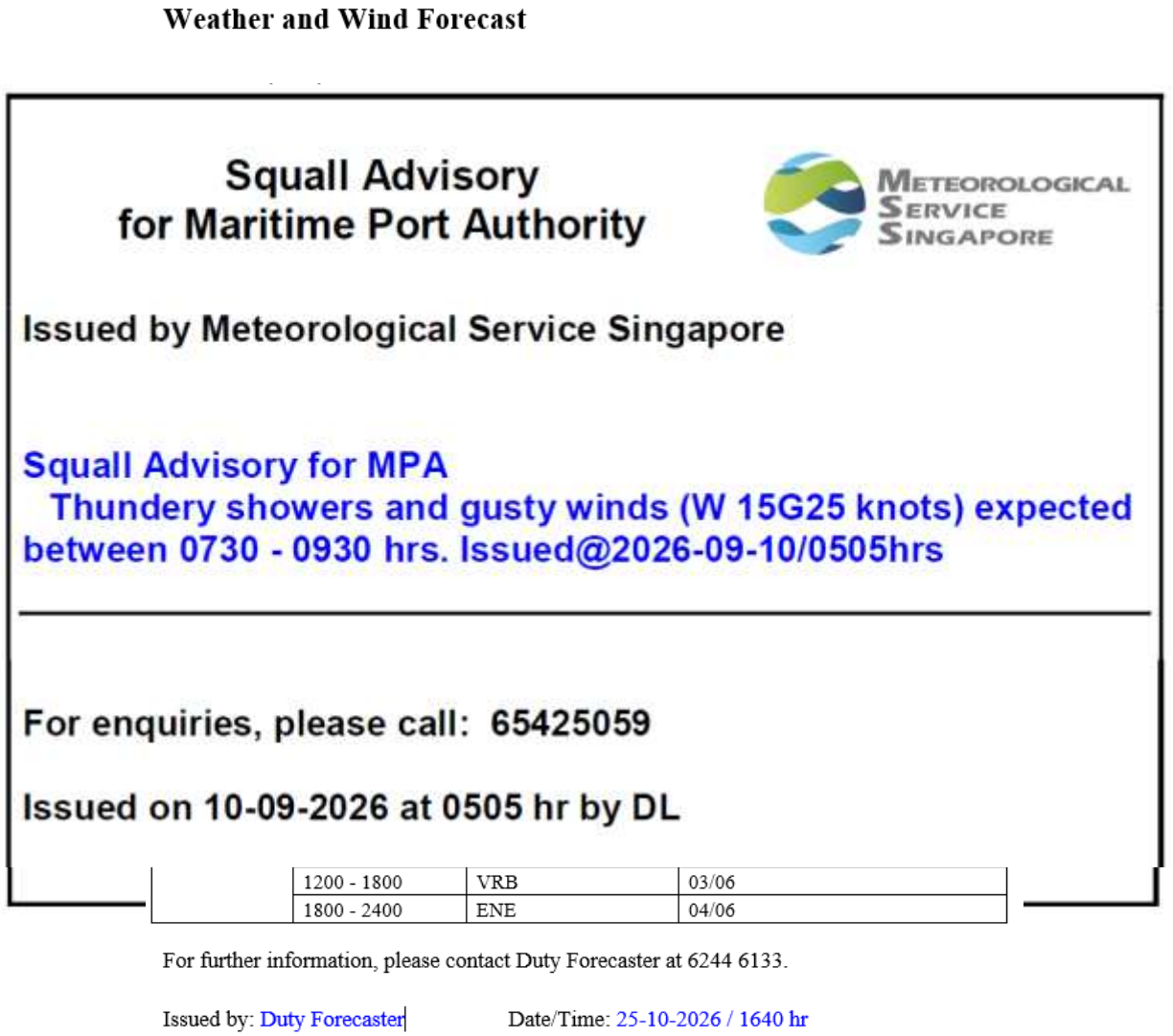
Weather Forecast & Warning Services (Subscribers)

Customised weather forecasts

- Weather Forecast (Next 24hrs)
- Squall Forecast (Next 24hrs)
- Wind Forecast (Next 3 days)

Customised weather advisories and warnings

- Squall advisories (2hr lead time)
- Squall warnings (1hr lead time)
- Lightning warnings (15-20min lead time)



Weather and Wind Forecast

Squall Advisory for Maritime Port Authority

METEOROLOGICAL SERVICE SINGAPORE

Issued by Meteorological Service Singapore

Squall Advisory for MPA
Thundery showers and gusty winds (W 15G25 knots) expected between 0730 - 0930 hrs. Issued@2026-09-10/0505hrs

For enquiries, please call: 65425059

Issued on 10-09-2026 at 0505 hr by DL

	1200 - 1800	VRB	03/06
	1800 - 2400	ENE	04/06

For further information, please contact Duty Forecaster at 6244 6133.

Issued by: Duty Forecaster Date/Time: 25-10-2026 / 1640 hr

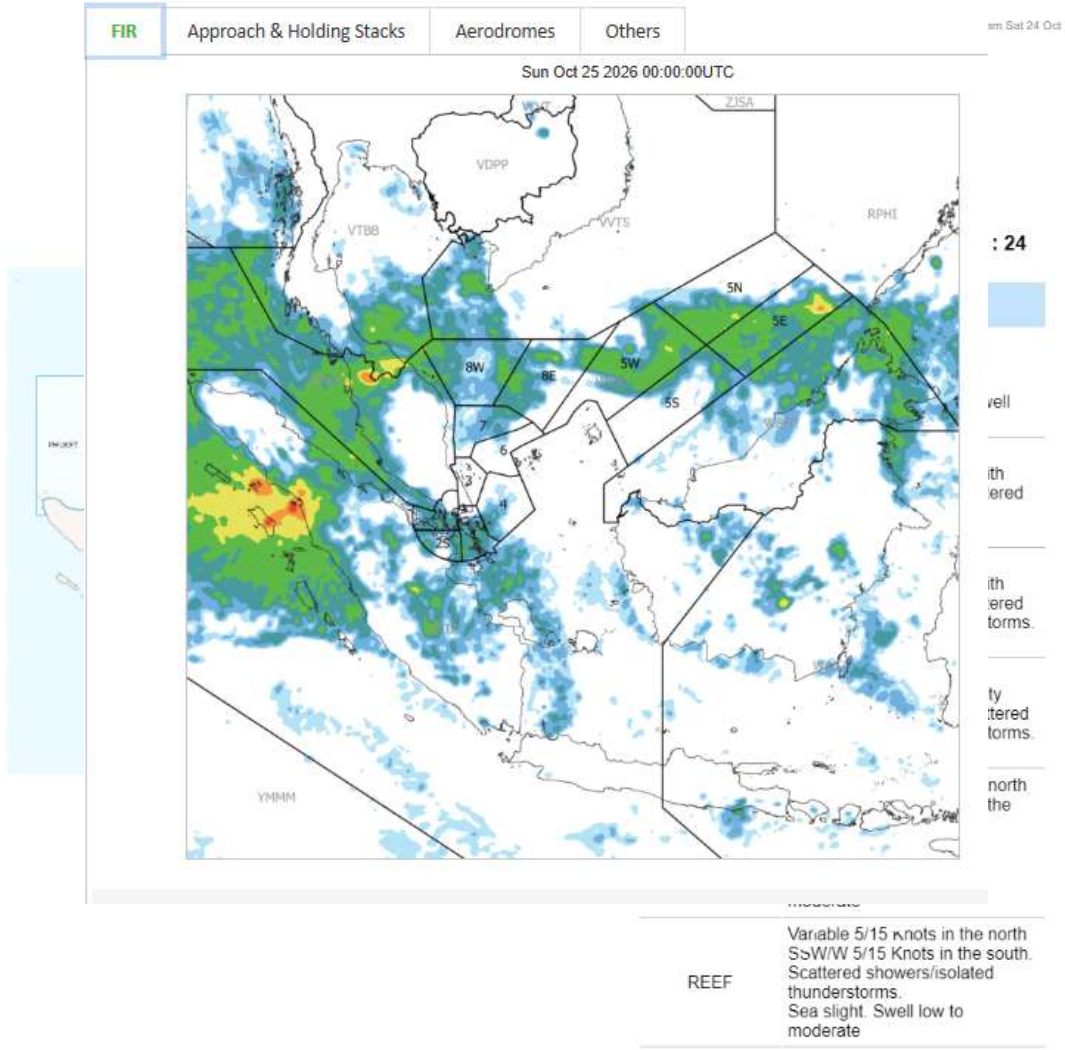
Weather Forecast & Warning Services (Aviation & Marine)

Changi & Seletar airports

- Communication with Air Traffic Control (ATC)
- Forecasts for air routes and aerodromes
- Weather and strong wind warnings to aviation network and airport ground crew
- Typhoon alerts
- Coordination with neighboring FIRs

Maritime weather

- 24/7 weather and warning services for Singapore waters, Malacca Strait and South China Sea



Monitoring and Early Warning of Hazards

Hazards monitored for potential impact on Singapore:

- Transboundary haze
- Tropical cyclones
- Volcanic eruptions
- Earthquakes/Tsunami



Keep up with us!

Scan the QR code to access our YouTube channel.



Download myENV app to receive updates on the weather!



METEOROLOGICAL SERVICE SINGAPORE

Thank you!