Rural Training Center – Thailand (RTC-TH)



Community-based Environmental Education for the Self-sufficiency and Sustainability of Small Rural Family Farms

Advanced MEWS Weather bserving Lesson A6: Weather Forecasting





A Mobile Emergency Weather Station (MEWS) **Training Series** presentation





Rural Training Center-Thailand Emergency Communications Program

Ready to serve and sustain our community

For other lessons in the series e-mail hsØzhm@gmail.com www.neighborhoodlink.com/RTC-TH_Tech/pages

A part of the RTC-TH EmComm Program

The Rural Training Center-Thailand Emergency Communications program is a volunteer effort to provide emergency





amateur radio communications for local community self-sufficiency and sustainability in times of need.

The Rural Training Center-Thailand (RTC-TH)



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is an all volunteer organization providing community-based environmental education for self-sufficiency and sustainability of small rural family farms

www.neighborhoodlink.com/org/rtcth

E-mail: rtc2k5@gmail.com

MEWS adapts weather lessons from two existing RTC-TH programs







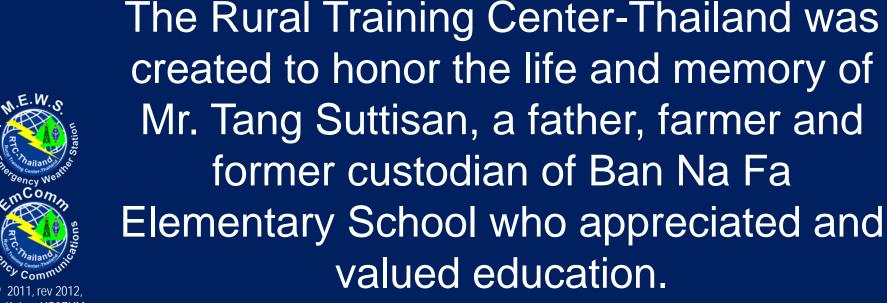
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CAUTION!

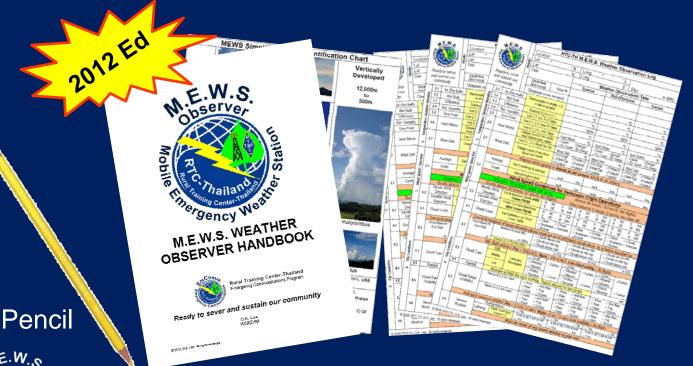
Weather forecasting by the methods in this lesson is very rough. MEWS is not a substitute for official government weather forecasts.

MEWS weather forecasting is made to give possible weather warning for survivors and on-site emergency relief leaders. *If you are not comfortable making a forecast, DON'T.* It is better to leave the forecasting to professionals rather than to mislead on-site emergency leaders and survivors.



Although this is an "Advanced" MEWS lesson, the forecasting methods are simplistic in contrast to professional forecasts from government agencies.

What you need to have to prepare a local weather forecast



Optional



Digital weather station or barometer / altimeter

MEWS Handbook and Cloud Chart

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Completed Log s from 2-3 days

Weather forecasting is NOT a standard MEWS activity so there is not space on the Log Form for it.

Key local forecast variables

Variable	Data Source	Note
Cloud changes	Previous 3 days MEWS Logs	Keep all logs
Pressure changes	Analog barometer, Altimeter, or digital weather station*	Optional equipment
Changes in wind direction	Previous 3 days MEWS Logs	Keep all logs

^{*} Generally analog barometers are less expensive than digital weather stations.







Analog barometers



Barometric altimeter



Digital weather station

Start with completed log forms

The key data are:

- Cloud cover (4.1)
- Cloud Base Height (4.2)
- Cloud type (4.3)



It may be useful to get completed logs from the previous 24-48 hours if they are available.

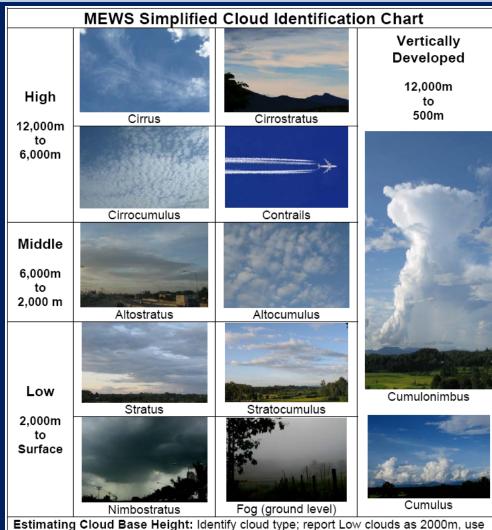
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Keep the Cloud Chart handy

Get familiar with the Cloud Chart so you can readily recognize the different types of clouds.



Don't worry about memorizing the chart. Repeated use and familiarity will enable you to learn these quickly.



Estimating Cloud Base Height: Identify cloud type; report Low clouds as 2000m, use lower limit for other cloud types.

Flight Advisories: Report flight advisory to air crews for the following conditions. Low Clouds near or at I60m AGL (day); 500m AGL (Night). No flights if below these minimum limits.

Reduced Visibility: Smoke, dust, haze, fog reducing visual range to 3.2 km (Day) or 5 km (Night); No flights if below these minimum limits.

Severe Weather: Thunderstorms, lightning, heavy rain, excessive winds, or other weather extremes.

Weather Forecasting Methods in this Lesson

- Forecasting by cloud changes:
 Detailed review
- Forecasting by Barometric Pressure Change
- Forecasting by Changes in Barometric Pressure and Wind Direction





You may want to review the addendum to MEWS Lesson B6 about forecasting weather by cloud changes.

Weather Forecasting by Cloud Changes

Watching the changes in clouds is fundamental to weather forecasting

Cloud Feature	Clear / Fair Weather	Changing Weather	Stormy / Rainy Weather
Cloud Type	Cumulus	Cirrus Cirrostratus Cirrocumulus	Altocumulus Altostratus Cumulonimbus Nimbostratus
Cloud (sky) cover	Decreasing cloudiness		Increasing cloudiness
Cloud Base Height	Increasing height		Decreasing height



Get the Cloud Type data from log form Section 4.3

Clouds Foretelling Weather Change







Altostratus clouds



Stratus Clouds



Cloud Type	Changing Weather
Cirrus	Storm clouds coming in 24-48 hours
Altostratus	Changing weather is approaching
Stratus	Bad weather is approaching

Weather Forecasting by Cloud Observation

If the change is from Cumulus to Cirrus type clouds, there may be a change in 24-48 hours to possible stormy or rainy weather.









Cumulus

Cirrus clouds

Cirrostratus

Cirrocumulus



Cloud Feature	Clear / Fair Weather	Changing Weather
4.1 Cloud cover	Decreasing cloudiness	Increasing cloudiness
4.2 Cloud Base Ht	Increasing height	Decreasing height
4.3 Cloud Type	Cumulus	Cirrus Cirrostratus Cirrocumulus

Weather Forecasting by Cloud Changes

If rain clouds are followed by Cirrus type clouds, fair / clear weather is 24-48 hours away.













Altocumulus

Altostratus

Cumulonimbus Nimbostratus

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Cloud Feature	Changing Weather	Stormy / Rainy Weather
4.1 Cloud cover	Decreasing cloudiness	Increasing cloudiness
4.2 Cloud Base Ht	Increasing height	Decreasing height
4.3 Cloud Type	Cirrus Cirrostratus Cirrocumulus	Altocumulus Altostratus Cumulonimbus Nimbostratus

Clouds of Fair Weather



Cumulus clouds

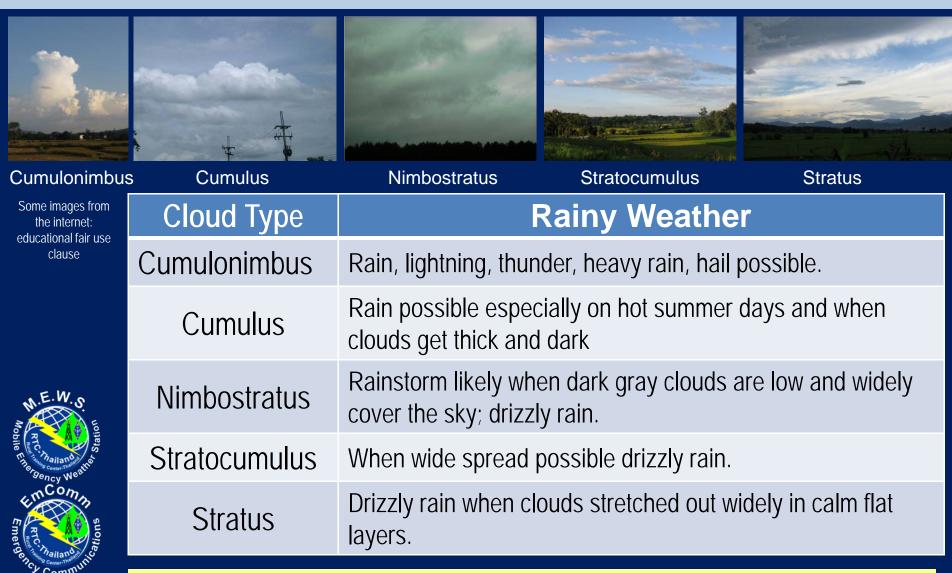


Altocumulus clouds



Cloud Type	Fair Weather
Cumulus	When small and widely scattered
Altocumulus	Settled weather conditions

Rainy Weather Clouds

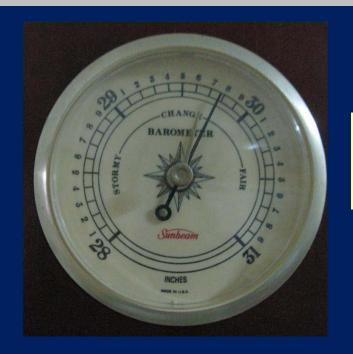


Darker clouds are thicker and block more sunlight. Thicker clouds mean more vertical development which could mean more turbulence, rain, lightning, thunder.

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Weather Forecasting by Barometric Pressure Change

Generally, low pressures = foul weather



Generally, high pressures = fair weather



Pressure	Clear / Fair	Changing	Stormy / Rainy
Trend	Weather	Weather	Weather
Rising	Fair weather ahead		
Steady		No change from present weather	
Falling			Cloudy/rainy weather ahead

Rate of Barometric Pressure Change

The following terms are used to describe the pressure trend. For example, if the barometric pressure is "rising", the rate of rising is described by adding the proper adjective: Fast, Moderately, Slowly.



Pressure Change	Descriptive Details
Fast	More than 6 mb change in 3 hours
Moderately	3-6 mb change in 3 hours
Slowly	Less than 3 mb change in 3 hours
Steady	Little or no change

Optional Equipment: A Barometer

Barometers come in two basic types: Analog or Digital











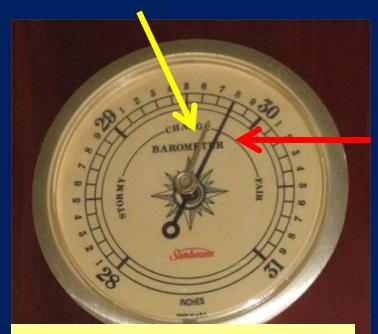
Cost and convenience drives the decision for most people.

Analog Barometers

The RTC-TH EmComm practice is to use the reference needle to monitor relative pressure changes without keeping written records.



At the start of the day, set the Index needle (yellow arrow) to match the barometer needle (red arrow).



Later, look at the barometer and notice the change relative to the Index needle. In this case, the pressure went up.



Digital Weather Station



Digital weather stations come in a wide array of choices as to what measurements they make. Most will have temperature, pressure, date, time, and a graphic icons for forecasts.



Many digital systems need about 24 hours to stabilize if the unit is moved 45 km or so from one location to another. Be sure you have spare batteries.

Digital Weather Station

This digital unit uses an arrow to indicate the pressure change trend.

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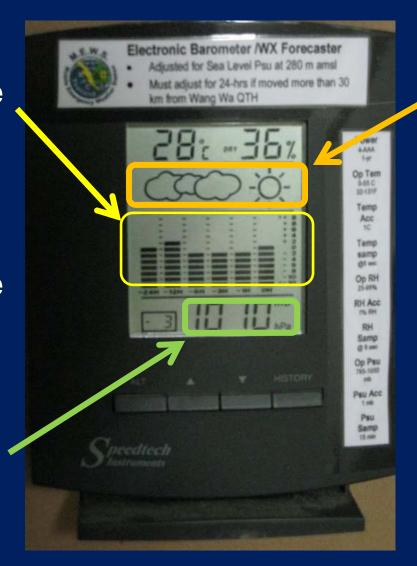
A graphic icon shows the weather forecast. In this case, "sunny".

Digital Weather station

This digital barometer tracks the measured pressure changes 0, 1, 3, 6, 12, 24 hours ago. The graphic display lets you describe the rate of pressure change.

Actual current pressure units is displayed

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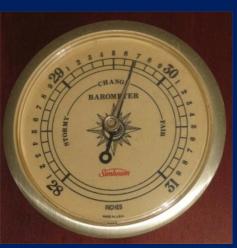
Weather forecast icon is showing "partly sunny"

This forecasting method requires you to have past wind direction data (Section 3.2 from the MEWS log form) and a barometer or barometric altimeter.

You also need to be able to know the pressure trend and the rate of pressure change.

Use the following tables to make your forecast.





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Psu (mb)	Psu Trend	Wind Change	Forecast
	Steady		Fair for 1-2 days
	Rising Fast		Fair; warmer temps and rain in 2 days
1020- 1024	Falling Slowly	SW to NW	Warmer with rain 24-36 hrs
	Falling Fast		Warmer with rain 18-24 hrs
1024+	Steady		Continued fair
1024+	Falling Slowly		Slow temp increase; fair for 2 days



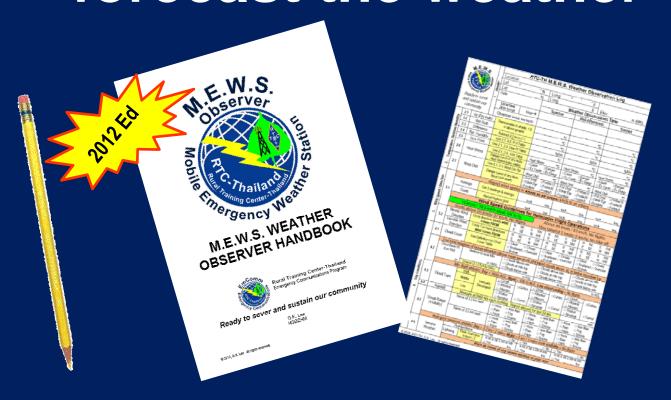
Psu (mb)	Psu Trend	Wind Change	Forecast
1020- 1024	Falling Slowly	S to SE	Rain in 24 hrs
	Falling Fast		Increasing winds; rain in 12-24 hrs.
	Falling Slowly	SE to NE	Rain in 18-24 hrs.
	Falling Fast		Increasing winds; rain in 12 hrs
1020 +	Falling Slowly	E to NE	Summer: light wind, no rain for several days. Winter: rain in 24 hrs
	Falling Fast		Summer: rain in 12-24 hrs. Winter: rain; increasing winds from NE



Psu (mb)	Psu Trend	Wind Change	Forecast
1019 or less	Falling Slowly	SE to NE	Rain continues 1-2 days
	Falling Fast		Rain, high winds; clearing in 24 hrs
	Rising Slowly	S to SW	Clearing in a few hrs; continues several days
1009 or less	Falling Fast	S to E	Severe storm; clearing in 24 hrs
	Falling Fast	E to N	Severe storm; cooler temperatures follow
	Rising Fast	Going to W	Clearing; colder temperatures



Now you know how to try to forecast the weather

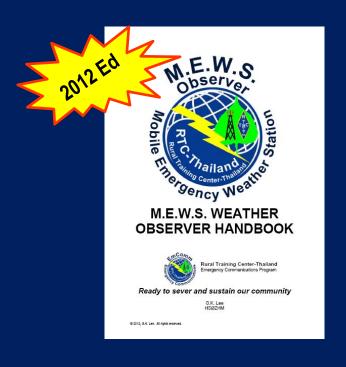




You have completed the Advanced MEWS Lessons. If you want to learn more about Emergency Preparedness, consider getting those lessons. See details later in this lesson.

Questions or Comments

Refer to the MEWS
Weather Observer
Handbook for more
details on any of the
procedures in this lesson.





You may also contact us by e-mail: hsØzhm@gmail.com
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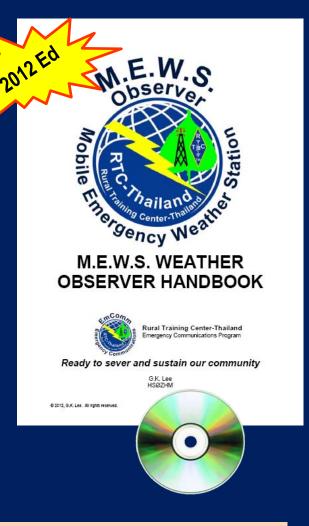
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RTC-TH Weather Observer manual

Illustrated PDF topical lessons

All of the lessons have been classroom and field proven.

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These materials are in English. Volunteer assistance for Thai translation to is welcome and will be acknowledged and cited.

Advanced MEWS PDF Lessons

- A 1: Measuring Relative Humidity and Heat Stress
- A 2: Measuring Wind Speed and Wind Chill
- A 3: Using Dew Point Temperature to Calculate Cloud Base Height
- A 4: Measuring Rainfall
- A 5: Reporting Severe Weather
- A 6: Weather Forecasting



Advanced MEWS PDF Lessons





Six slide show lessons;
Some show how to build your own weather equipment

The EP Lesson Series





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For More Information about M.E.W.S.



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