Rural Training Center – Thailand (RTC-TH)

F CUS

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

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Basic
MEWS Weather Observing
Lesson B4:
Estimating Cloud Cover

2012 Ed

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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
Or visit www.neighborhoodlink.com/RTC-TH_Tech/pages

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MEWS is 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.

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The Rural Training Center-Thailand (RTC-TH)

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

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MEWS adapts weather lessons from two existing RTC-TH programs

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The Rural Training Center-Thailand was created to honor the life and memory of Mr. Tang Suttisan, a father, farmer and former custodian of Ban Na Fa Elementary School who appreciated and valued education.

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Clouds can restrict visual flight operations. Reporting the local sky conditions is helpful to flight crews.

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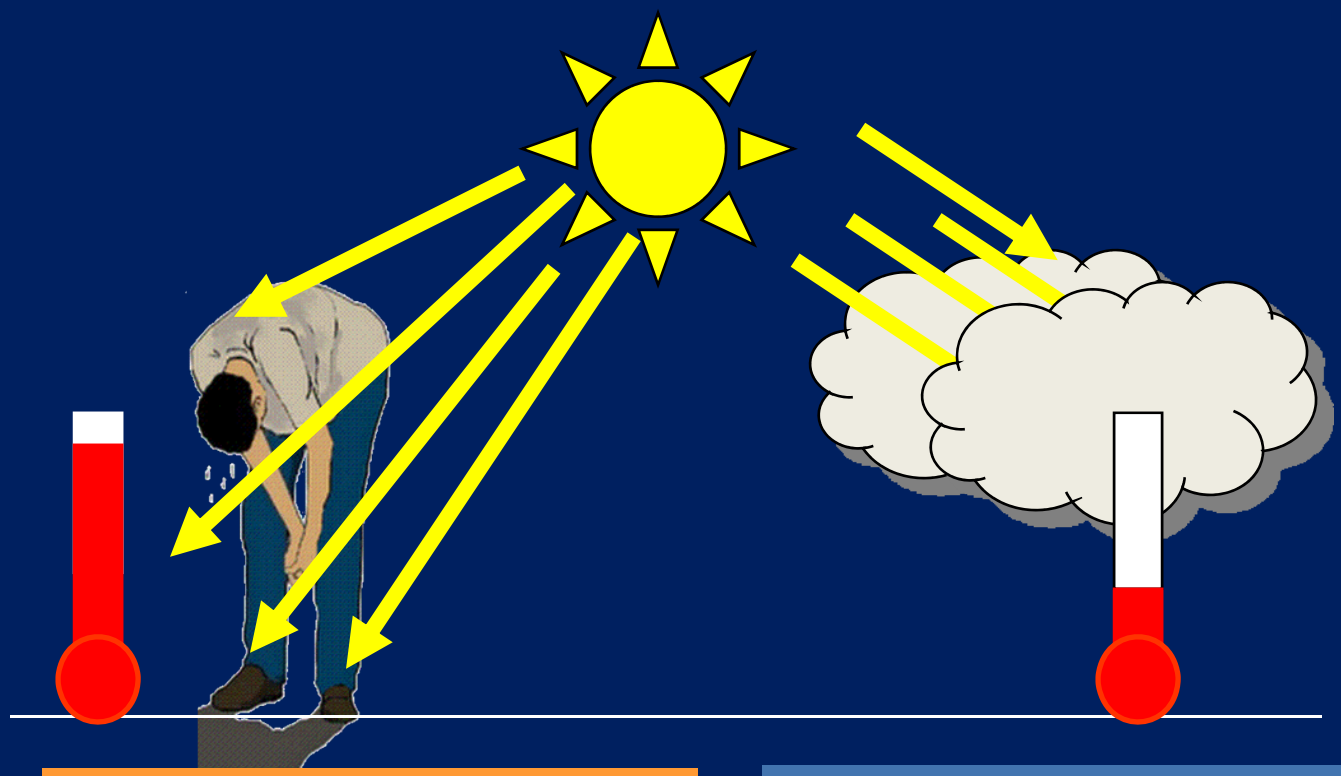
Clouds can reduce the daytime surface temperature.



Clear skies, hotter; survivors need more water and shelter

Cloudy skies, cooler; survivors may need less water and shelter (but depends on humidity)

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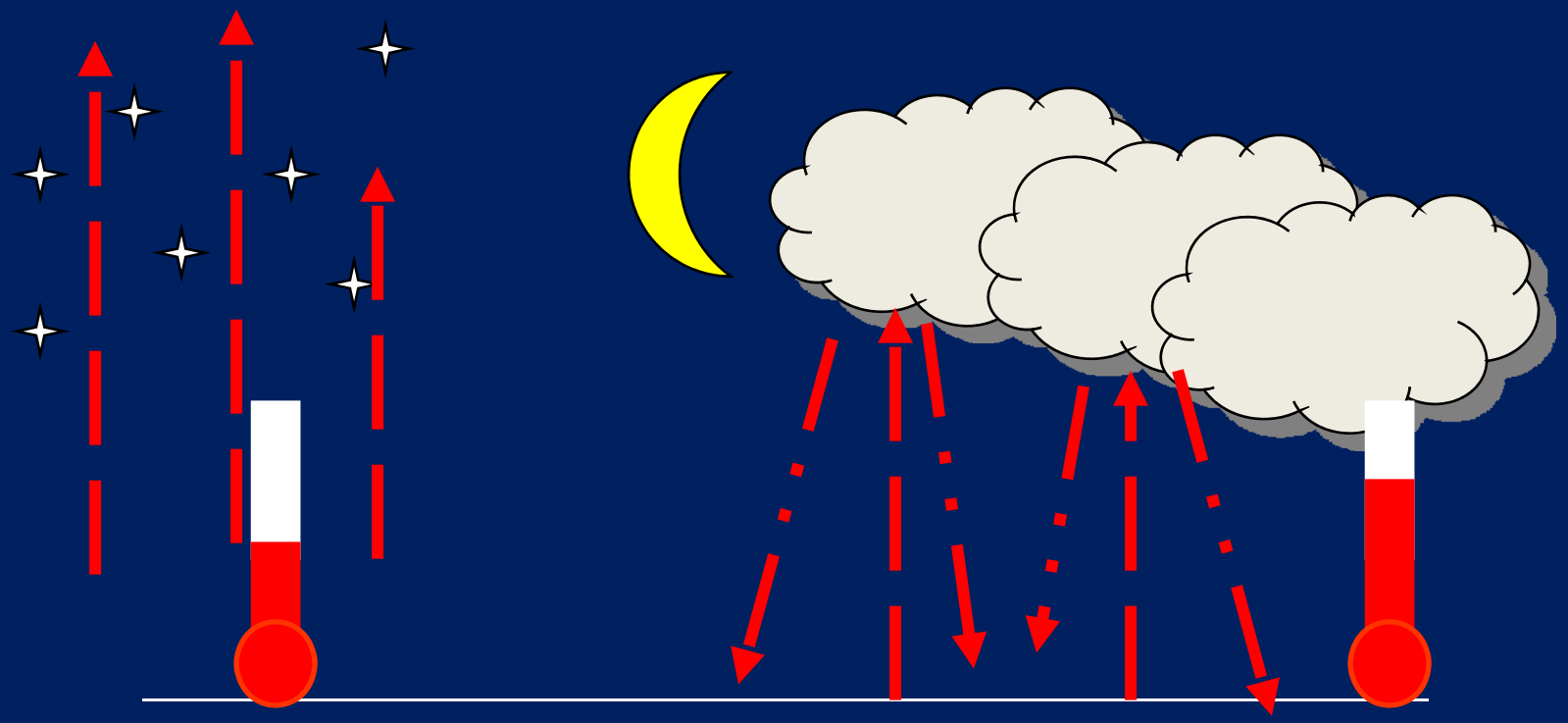
Clouds can increase the surface temperature at night.



Clear skies, cooler nights; survivors may need more clothing, fuel and shelter; morning dew possible

Cloudy skies, warmer nights; survivors may need less clothing, fuel, and shelter (depends on humidity)

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Temperature & Relative Humidity

"Sensible" temperature is how you feel. Humidity affects sensible temperature this way.

	High Temp	Low Temp
High Humidity	**Very uncomfortably hot**	**Very uncomfortably cold**
Low Humidity	**Hot**	**Cold**

Relative Humidity is covered in Advanced MEWS lesson A1

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The MEWS Weather Observation Log Form

Cloud Cover is recorded in Section 4.1

4.1	Cloud Cover	Use Definitions in Cloud Cover Table	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken

Refer to the Cloud Cover Table for examples.

Brief instructions are on the front of the Log form.

Additional notes are on the back of the form. Full instructions and the Cloud Cover reference table are in the MEWS Weather Observer Handbook.

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The MEWS Weather Observation Log Form

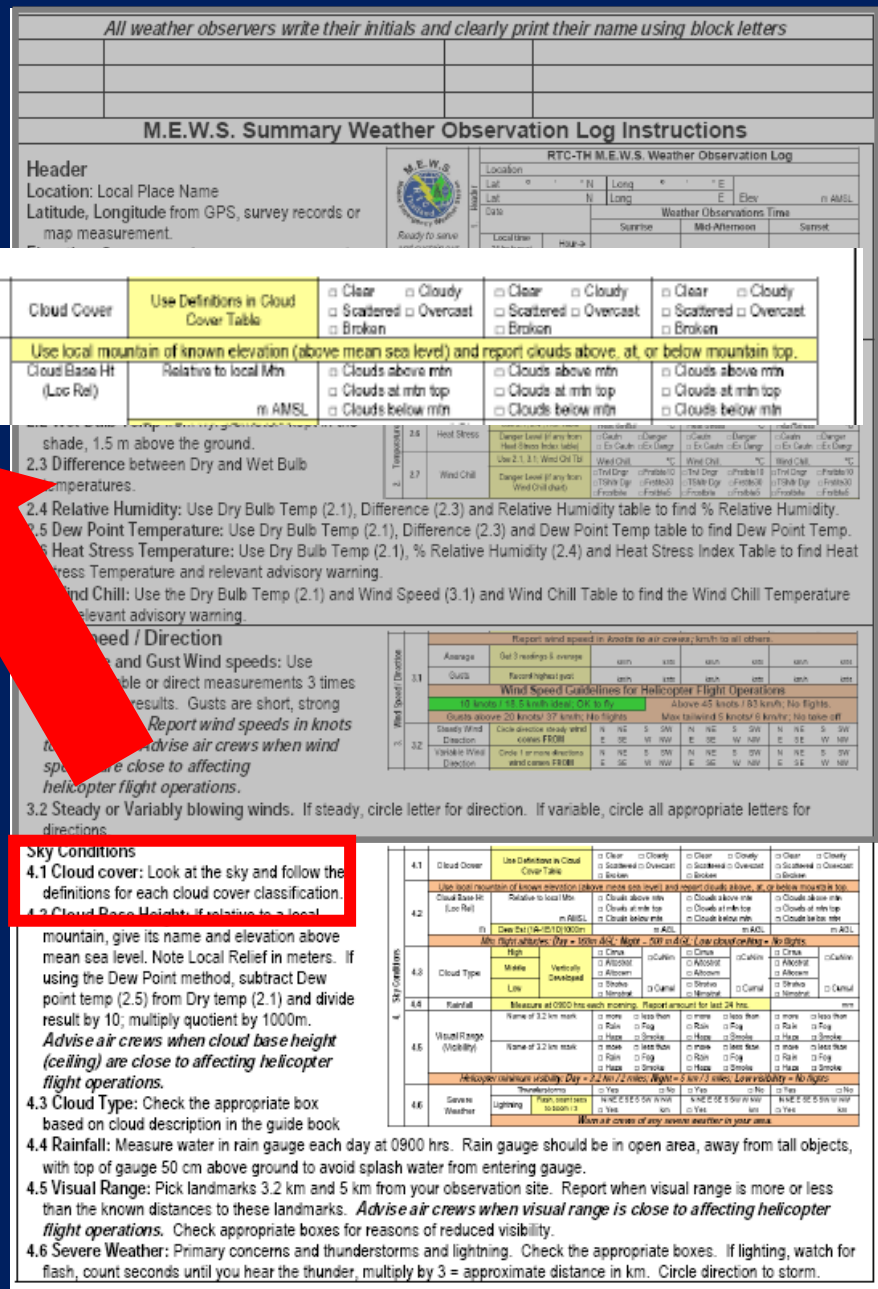
More notes are on the back of the form.

Sky Conditions

4.1 Cloud cover: Look at the sky and follow the definitions for each cloud cover classification.

Additional notes are on the back of the form. Full instructions and Cloud Cover reference table are in the MEWS Weather Observer Handbook.

See Handbook: 4.1 Cloud Cover, p. 22



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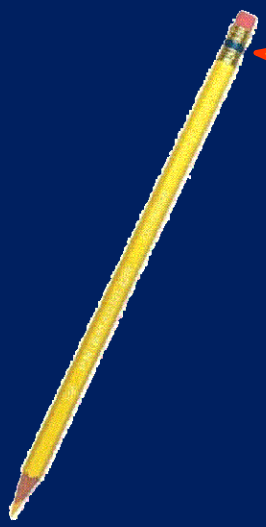
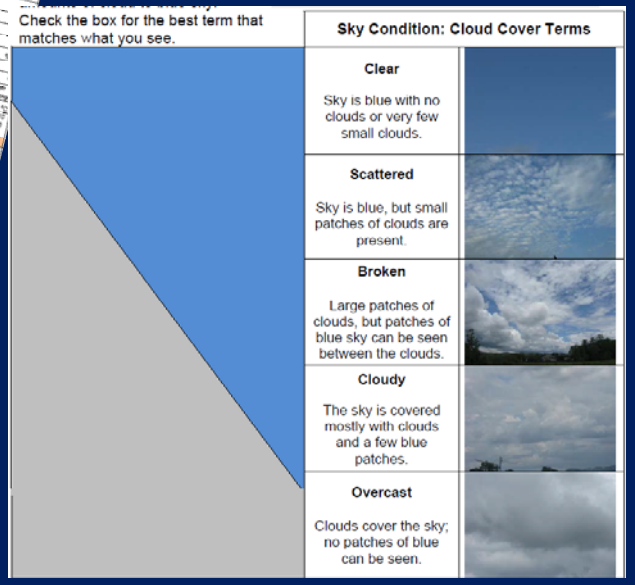
What you need to make Basic Estimates of Cloud Cover

2012 Ed





Check the box for the best term that matches what you see.

Sky Condition: Cloud Cover Terms	
Clear Sky is blue with no clouds or very few small clouds.	
Scattered Sky is blue, but small patches of clouds are present.	
Broken Large patches of clouds, but patches of blue sky can be seen between the clouds.	
Cloudy The sky is covered mostly with clouds and a few blue patches.	
Overcast Clouds cover the sky; no patches of blue can be seen.	

See Handbook: 4.1 Cloud Cover Reference Table, p. 22

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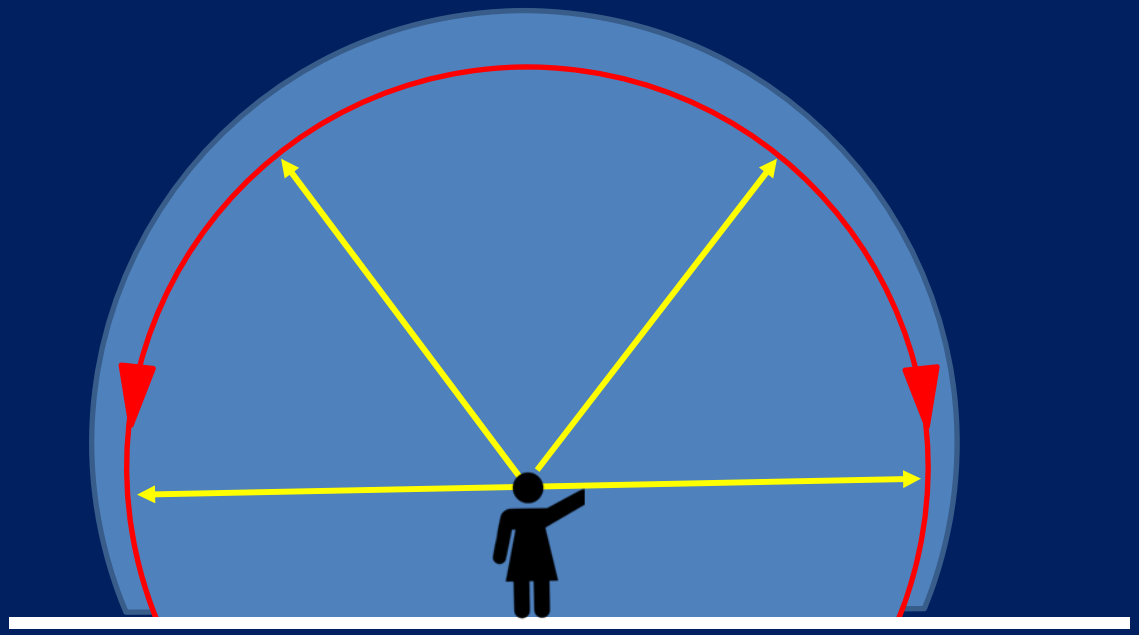
To estimate the cloud cover...



You should look at the sky “from horizon to horizon” in all directions.

It is best if you can make a minimum of 3 observations / day.

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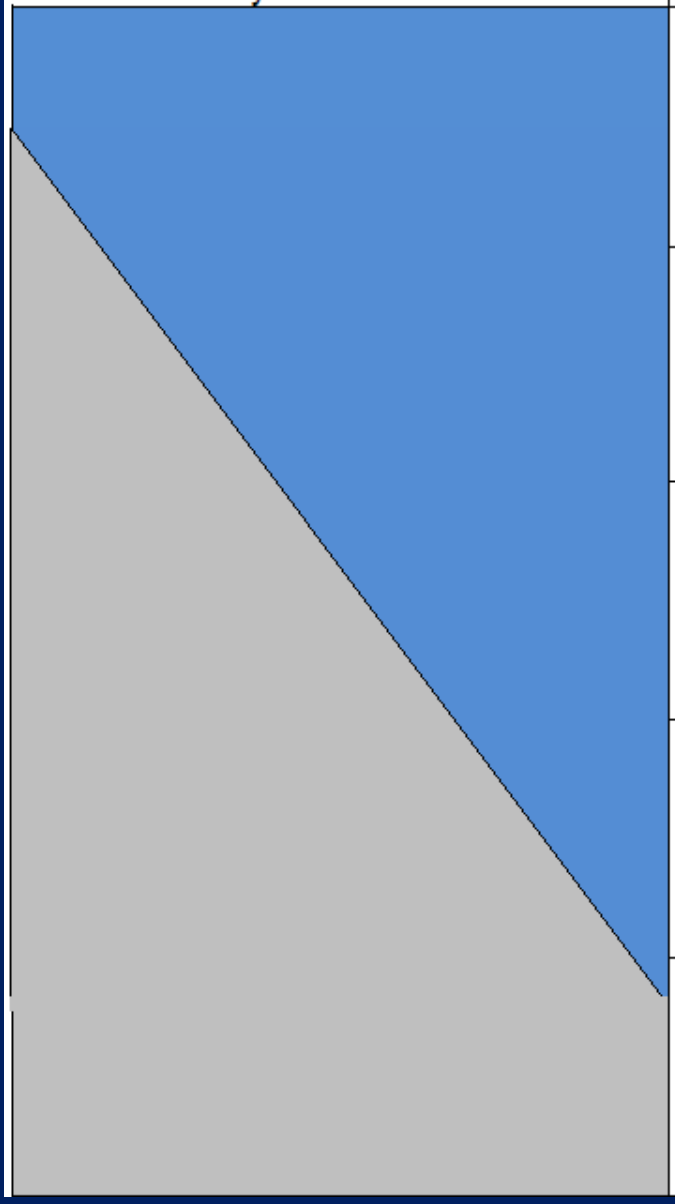
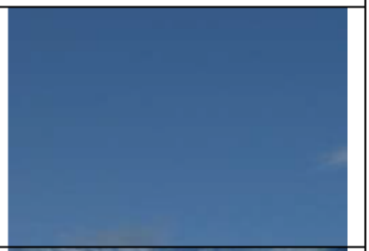
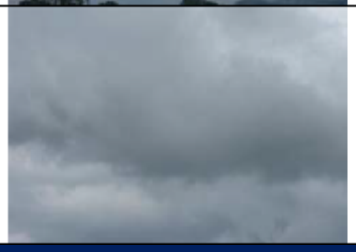
Just find the description that best fits what you see

Check the box for the best term that matches what you see.



Sky Condition: Cloud Cover Terms	
Clear Sky is blue with no clouds or very few small clouds.	
Scattered Sky is blue, but small patches of clouds are present.	
Broken Large patches of clouds, but patches of blue sky can be seen between the clouds.	
Cloudy The sky is covered mostly with clouds and a few blue patches.	
Overcast Clouds cover the sky; no patches of blue can be seen.	

See Handbook: 4.1 Cloud Cover Reference Table, p. 22

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Basic Cloud Cover Terms

This is a simple way to describe cloud cover using 5 cloud cover terms.

Cloud cover term	Amount of blue	Amount of cloud	
Clear	Nearly all blue	Little or no clouds	
Scattered clouds	Mostly blue	Some clouds	
Broken clouds	Big blue patches	Mostly clouds	
Cloudy	Some blue	Mostly clouds	
Overcast	Little or no blue	Nearly all clouds	

This simple classification system is based on comparing / contrasting the amount of blue sky to cloud in the sky over your operating position

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Look at the sky and record the cloud cover in Section 4.1 of the form.

Cloud cover term	Amount of blue	Amount of cloud	
Clear	Nearly all blue	Little or no clouds	
Scattered clouds	Mostly blue	Some clouds	
Broken clouds	Big blue patches	Mostly clouds	
Cloudy	Some blue	Mostly clouds	
Overcast	Little or no blue	Nearly all clouds	

	4.1	Cloud Cover	Use Definitions in Cloud Cover Table	☐ Clear ☑ Cloudy ☐ Scattered ☐ Overcast ☐ Broken		☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken		☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken	

Check the appropriate box

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Cloud Cover: Clear

Sky is blue with no clouds or very few clouds.

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Cloud Cover: Scattered

Sky is blue, but small patches of clouds are present.

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Cloud Cover: Broken Clouds

Large patches of clouds, but patches of blue sky can be seen between the clouds.

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Cloud Cover: Cloudy

The sky is covered mostly with clouds an a few blue patches.

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Cloud Cover: Overcast

Clouds cover the sky; no patches of blue can be seen.

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Important Note

Normally MEWS observations are made 3 times a day. However, if flight operations are in progress, try to provide flight crews with weather updated prior to landings and take-offs for flight safety.

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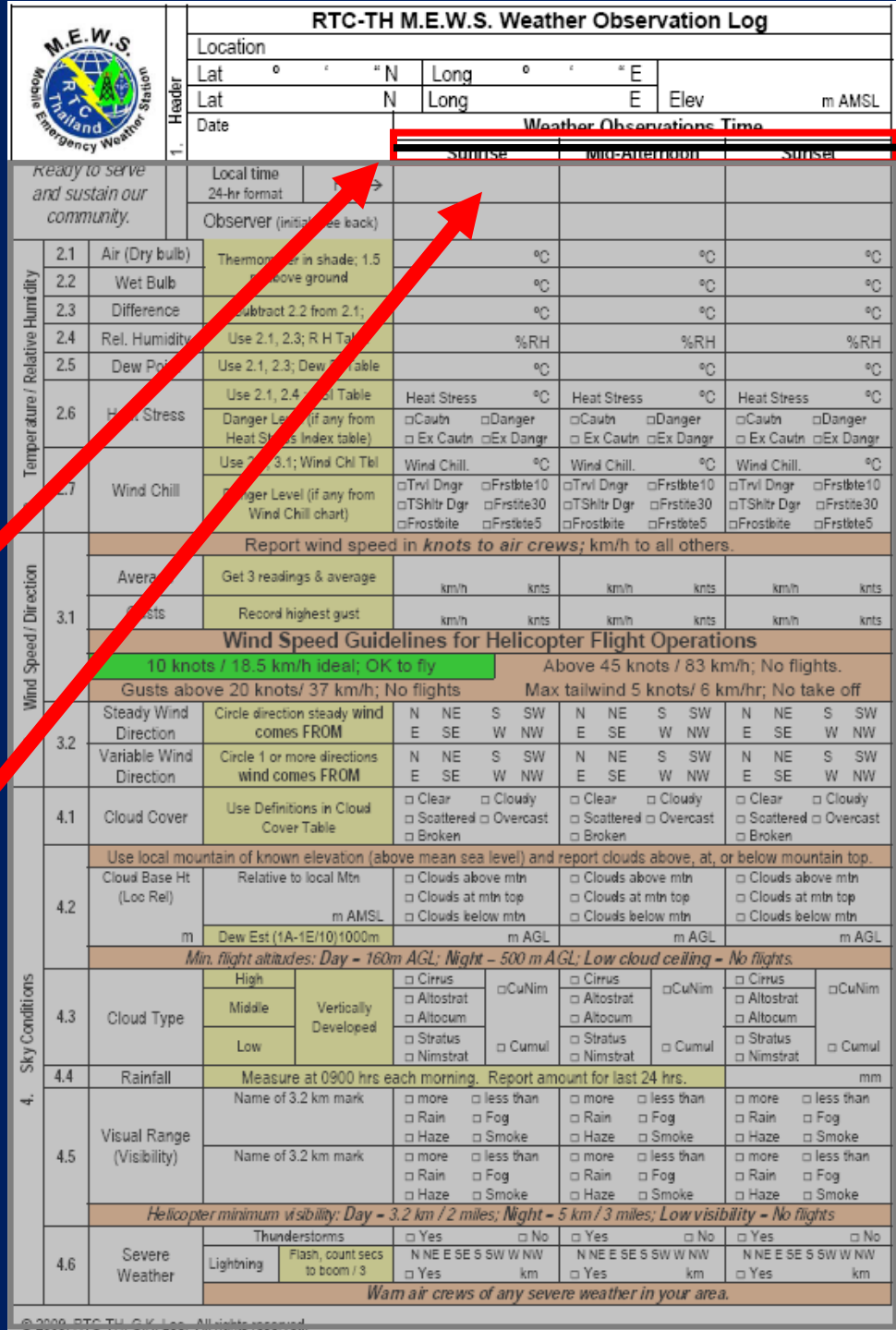
If more frequent observations are done to support flight operations...

…cross out the headings "Sunrise", etc. and record the time of the observations in the space provided.



RTC-TH M.E.W.S. Weather Observation Log

1. Header	Location				
	Lat ° ' " N	Long ° ' " E			
	Lat N	Long E	Elev m AMSL		
	Date	Weather Observations Time			
		Sunrise	Mid-Afternoon	Sunset	
Ready to serve and sustain our community.	Local time 24-hr format				
	Observer (initials see back)				
Temperature / Relative Humidity	2.1 Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
	2.2 Wet Bulb		°C	°C	°C
	2.3 Difference	Subtract 2.2 from 2.1;	°C	°C	°C
	2.4 Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
	2.5 Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
	2.6 Heat Stress	Use 2.1, 2.4 Heat Stress Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
		Danger Level (if any from Heat Stress Index table)	☐Cautn ☐Danger ☐ Ex Cautn ☐Ex Dangr	☐Cautn ☐Danger ☐ Ex Cautn ☐Ex Dangr	☐Cautn ☐Danger ☐ Ex Cautn ☐Ex Dangr
	2.7 Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
		Danger Level (if any from Wind Chill chart)	☐Trvl Dngr ☐Frstbite10 ☐TShltr Dgr ☐Frstite30 ☐Frostbite ☐Frstbite5	☐Trvl Dngr ☐Frstbite10 ☐TShltr Dgr ☐Frstite30 ☐Frostbite ☐Frstbite5	☐Trvl Dngr ☐Frstbite10 ☐TShltr Dgr ☐Frstite30 ☐Frostbite ☐Frstbite5
Wind Speed / Direction	Report wind speed in *knots to air crews;* km/h to all others.				
	3.1 Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
	3.1 Gusts	Record highest gust	km/h knts	km/h knts	km/h knts
	Wind Speed Guidelines for Helicopter Flight Operations				
	10 knots / 18.5 km/h ideal; OK to fly		Above 45 knots / 83 km/h; No flights.		
	Gusts above 20 knots/ 37 km/h; No flights		Max tailwind 5 knots/ 6 km/hr; No take off		
	3.2 Steady Wind Direction	Circle direction steady wind comes FROM	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
	3.2 Variable Wind Direction	Circle 1 or more directions wind comes FROM	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
4. Sky Conditions	4.1 Cloud Cover	Use Definitions in Cloud Cover Table	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken
	Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.				
	4.2 Cloud Base Ht (Loc Rel)	Relative to local Mtn m AMSL	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn
	m	Dew Est (1A-1E/10)1000m	m AGL	m AGL	m AGL
	Min. flight altitudes: Day – 160m AGL; Night – 500 m AGL; Low cloud ceiling – No flights.				
	4.3 Cloud Type	High / Middle / Low; Vertically Developed	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐CuNim ☐ Cumul	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐CuNim ☐ Cumul	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐CuNim ☐ Cumul
	4.4 Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
	4.5 Visual Range (Visibility)	Name of 3.2 km mark	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke
		Name of 3.2 km mark	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke
	Helicopter minimum visibility: Day – 3.2 km / 2 miles; Night – 5 km / 3 miles; Low visibility – No flights				
	4.6 Severe Weather	Thunderstorms	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
		Lightning: Flash, count secs to boom / 3	N NE E SE S SW W NW ☐ Yes km	N NE E SE S SW W NW ☐ Yes km	N NE E SE S SW W NW ☐ Yes km
	Warn air crews of any severe weather in your area.				

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For flight operations, make and report observations to flight crews before landings and take-offs

Cross out the headings for Sunrise, Mid-Afternoon, Sunset

Record the specific local time of your observations

	Weather Observations Time		
	~~Sunrise~~	~~Mid-Afternoon~~	~~Sunset~~
Hour→	1430		
al; see back)	HSØZHM		
shade; 1.5	°C	°C	°C
ground	°C	°C	°C
from 2.1;	°C	°C	°C

If a HAM, print your call sign (or name if no call sign)

Record the Cloud Cover in Section 4.1

Weather observations to support flight operations are critical for safety of flight crew and LZ area.

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Altitude Advisory Notes for Helicopters

There are no specific flight advisories based on Cloud Cover. However, Cloud Base Height and Visibility could be related to Cloud Cover.

Cloud Base Height is the topic of Basic MEWS Lesson B5.
Visibility is the topic of Basic MEWS Lesson B7.

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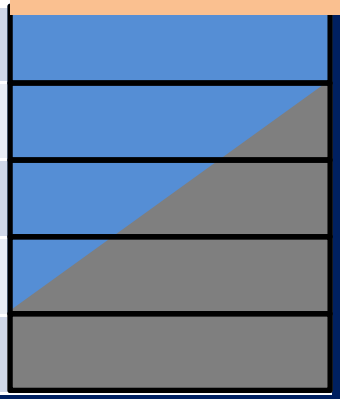
Some Practice

You will see some photos of the sky. Try to pick the Cloud Cover term to best describe the photo.

The photos cannot show the whole sky so they are a limited form of practice.

Cloud cover term	Amount of blue	Amount of cloud
Clear	Nearly all blue	Little or no clouds
Scattered clouds	Mostly blue	Some clouds
Broken clouds	Big blue patches	Mostly clouds
Cloudy	Some blue	Mostly clouds
Overcast	Little or no blue	Nearly all clouds



Remember to look at the amount of blue sky to cloud.

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What cloud cover term best describes this photo?

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The sky is covered with Broken Clouds. The sky is mostly clouds with big patches of blue.

Cloud cover term	Amount of blue	Amount of cloud	
Clear	Nearly all blue	Little or no clouds	
Scattered clouds	Mostly blue	Some clouds	
Broken clouds	Big blue patches	Mostly clouds	
Cloudy	Some blue	Mostly clouds	
Overcast	Little or no blue	Nearly all clouds	

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What cloud cover term best describes this photo?

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This is an overcast sky. It is almost all cloud with little or no blue.

Cloud cover term	Amount of blue	Amount of cloud	
Clear	Nearly all blue	Little or no clouds	
Scattered clouds	Mostly blue	Some clouds	
Broken clouds	Big blue patches	Mostly clouds	
Cloudy	Some blue	Mostly clouds	
Overcast	Little or no blue	Nearly all clouds	

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What cloud cover term best describes this photo?

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This is condition is Scattered Clouds. It is mostly blue with some clouds.

Cloud cover term	Amount of blue	Amount of cloud	
Clear	Nearly all blue	Little or no clouds	
Scattered clouds	Mostly blue	Some clouds	
Broken clouds	Big blue patches	Mostly clouds	
Cloudy	Some blue	Mostly clouds	
Overcast	Little or no blue	Nearly all clouds	

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What cloud cover term best describes this photo?

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This is sky is Cloudy. It is mostly clouds with some blue.

Cloud cover term	Amount of blue	Amount of cloud	
Clear	Nearly all blue	Little or no clouds	
Scattered clouds	Mostly blue	Some clouds	
Broken clouds	Big blue patches	Mostly clouds	
Cloudy	Some blue	Mostly clouds	
Overcast	Little or no blue	Nearly all clouds	

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What cloud cover term best describes this photo?

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This is a Clear sky. It is almost all blue will little or no clouds.

Cloud cover term	Amount of blue	Amount of cloud	
Clear	Nearly all blue	Little or no clouds	
Scattered clouds	Mostly blue	Some clouds	
Broken clouds	Big blue patches	Mostly clouds	
Cloudy	Some blue	Mostly clouds	
Overcast	Little or no blue	Nearly all clouds	

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What cloud cover term best describes this photo?

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This is condition is Scattered Clouds. It is mostly blue with some clouds.

Cloud cover term	Amount of blue	Amount of cloud	
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What cloud cover term best describes this photo?

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The sky is covered with Broken Clouds. The sky is mostly clouds with big patches of blue.

Cloud cover term	Amount of blue	Amount of cloud	
Clear	Nearly all blue	Little or no clouds	
Scattered clouds	Mostly blue	Some clouds	
Broken clouds	Big blue patches	Mostly clouds	
Cloudy	Some blue	Mostly clouds	
Overcast	Little or no blue	Nearly all clouds	

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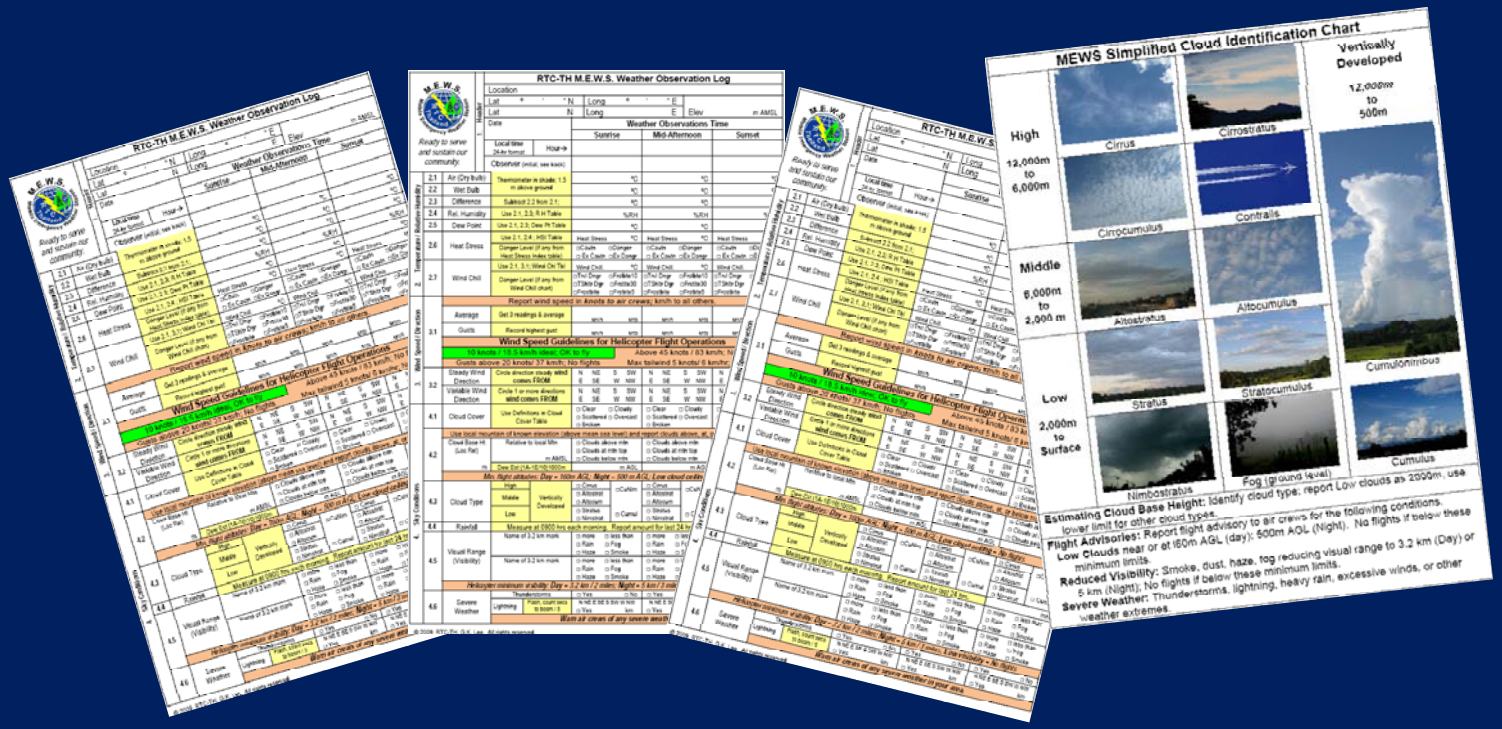
Basic Weather Forecasting by Cloud Observation

Weather forecasting is not always very precise. These simple methods do not replace the government weather service forecasts.



Looking at the Cloud Observations records for the past 2-3 days may allow you to predict some general weather conditions.

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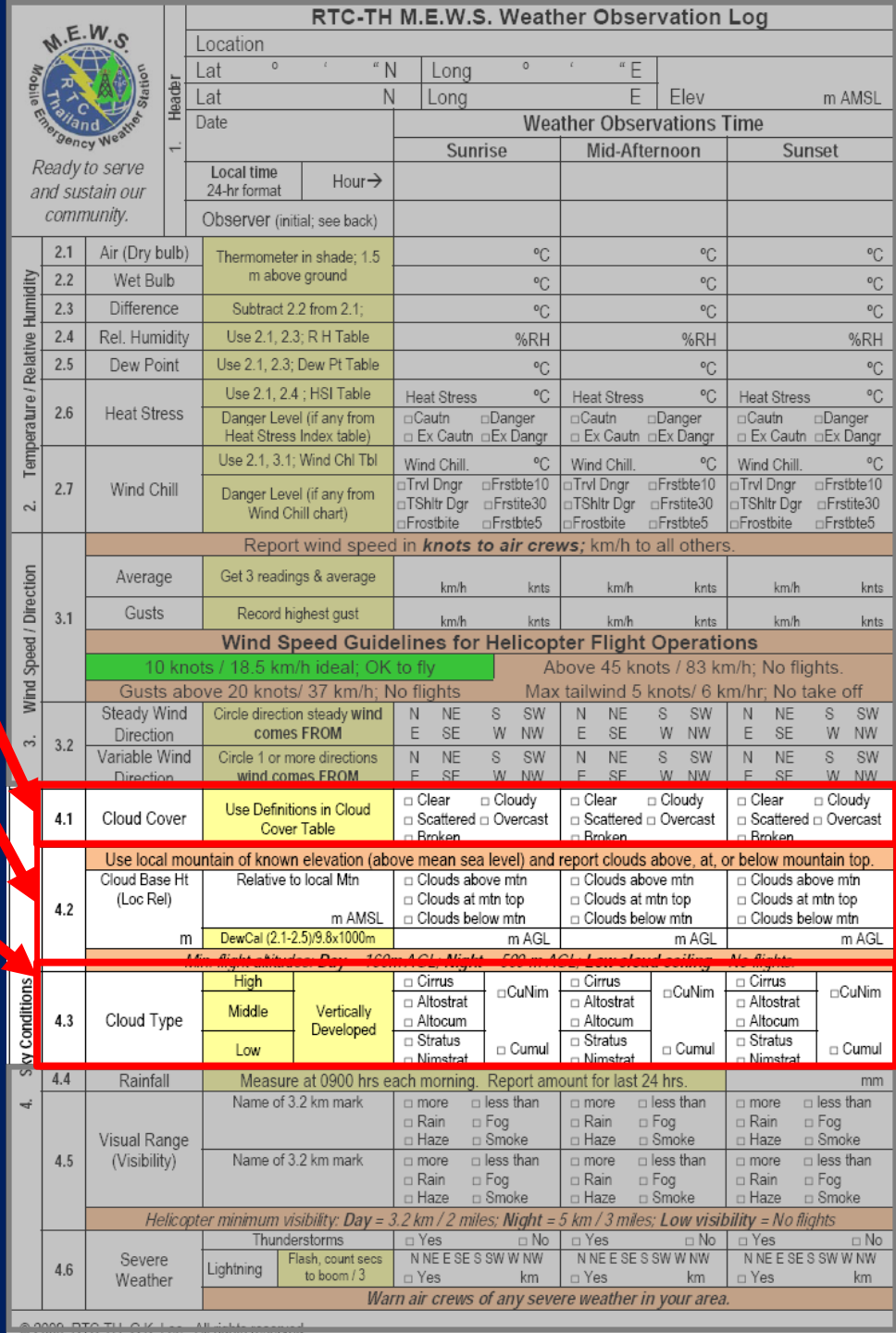
Start with completed log forms

It may be useful to get completed logs from the previous 3 days.

Look at the data on Cloud Cover (4.1), Cloud Base Height (4.2) and Cloud Type (4.3)

Watch for changes over time.

See Handbook: Appendix 2 Weather Forecasting, p. 32-35



RTC-TH M.E.W.S. Weather Observation Log

M.E.W.S. Mobile Emergency Weather Station — RTC Thailand

Ready to serve and sustain our community.

1. Header

Location

Lat ° ' " N | Long ° ' " E

Lat N | Long E | Elev m AMSL

Date | Weather Observations Time: Sunrise | Mid-Afternoon | Sunset

Local time 24-hr format | Hour→

Observer (initial; see back)

2. Temperature / Relative Humidity

2.1	Air (Dry bulb)	Thermometer in shade; 1.5 m above ground	°C	°C	°C
2.2	Wet Bulb		°C	°C	°C
2.3	Difference	Subtract 2.2 from 2.1;	°C	°C	°C
2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH	%RH	%RH
2.5	Dew Point	Use 2.1, 2.3; Dew Pt Table	°C	°C	°C
2.6	Heat Stress	Use 2.1, 2.4 ; HSI Table	Heat Stress °C	Heat Stress °C	Heat Stress °C
		Danger Level (if any from Heat Stress Index table)	☐Cautn ☐Danger ☐ Ex Cautn ☐Ex Dangr	☐Cautn ☐Danger ☐ Ex Cautn ☐Ex Dangr	☐Cautn ☐Danger ☐ Ex Cautn ☐Ex Dangr
2.7	Wind Chill	Use 2.1, 3.1; Wind Chl Tbl	Wind Chill. °C	Wind Chill. °C	Wind Chill. °C
		Danger Level (if any from Wind Chill chart)	☐Trvl Dngr ☐Frstbte10 ☐TShltr Dgr ☐Frstite30 ☐Frostbite ☐Frstbte5	☐Trvl Dngr ☐Frstbte10 ☐TShltr Dgr ☐Frstite30 ☐Frostbite ☐Frstbte5	☐Trvl Dngr ☐Frstbte10 ☐TShltr Dgr ☐Frstite30 ☐Frostbite ☐Frstbte5

3. Wind Speed / Direction

Report wind speed in ***knots to air crews;*** km/h to all others.

3.1	Average	Get 3 readings & average	km/h knts	km/h knts	km/h knts
	Gusts	Record highest gust	km/h knts	km/h knts	km/h knts

Wind Speed Guidelines for Helicopter Flight Operations

10 knots / 18.5 km/h ideal; OK to fly — Above 45 knots / 83 km/h; No flights.

Gusts above 20 knots/ 37 km/h; No flights — Max tailwind 5 knots/ 6 km/hr; No take off

3.2	Steady Wind Direction	Circle direction steady **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW
	Variable Wind Direction	Circle 1 or more directions **wind comes FROM**	N NE S SW E SE W NW	N NE S SW E SE W NW	N NE S SW E SE W NW

4. Sky Conditions

4.1	Cloud Cover	Use Definitions in Cloud Cover Table	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken	☐ Clear ☐ Cloudy ☐ Scattered ☐ Overcast ☐ Broken

Use local mountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top.

4.2	Cloud Base Ht (Loc Rel)	Relative to local Mtn m AMSL	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn	☐ Clouds above mtn ☐ Clouds at mtn top ☐ Clouds below mtn
	m	DewCal (2.1-2.5)/9.8x1000m	m AGL	m AGL	m AGL

*Min flight altitudes: **Day** = 160m AGL; **Night** = 500 m AGL; **Low cloud ceiling** = No flights.*

4.3	Cloud Type	High / Middle / Low — Vertically Developed	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐CuNim ☐ Cumul	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐CuNim ☐ Cumul	☐ Cirrus ☐ Altostrat ☐ Altocum ☐ Stratus ☐ Nimstrat ☐CuNim ☐ Cumul
4.4	Rainfall	Measure at 0900 hrs each morning. Report amount for last 24 hrs.			mm
4.5	Visual Range (Visibility)	Name of 3.2 km mark	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke
		Name of 3.2 km mark	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke	☐ more ☐ less than ☐ Rain ☐ Fog ☐ Haze ☐ Smoke

*Helicopter minimum visibility: **Day** = 3.2 km / 2 miles; **Night** = 5 km / 3 miles; **Low visibility** = No flights*

4.6	Severe Weather	Thunderstorms	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No
		Lightning — Flash, count secs to boom / 3	N NE E SE S SW W NW ☐ Yes km	N NE E SE S SW W NW ☐ Yes km	N NE E SE S SW W NW ☐ Yes km

Warn air crews of any severe weather in your area.

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Basic Weather Forecasting by Cloud Observation

Sometimes the changes in the amount of Cloud Cover can help you forecast weather changes in your area.

Cloud Feature	Clear / Fair	Changing	Stormy / Rainy
Cloud / Sky Cover	Decreasing cover		Increasing cover

MEWS is not intended weather forecasting, but it can be helpful to survivors and on-site relief officials to get a warning of possible bad weather approaching.

Basic weather forecasting using clouds is discussed further at the end of MEWS Basic Lesson 8: Severe Weather

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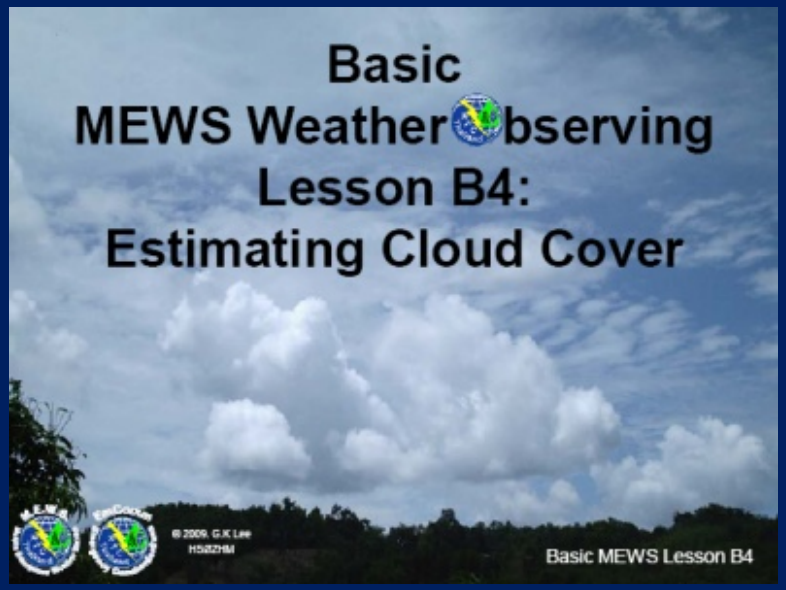
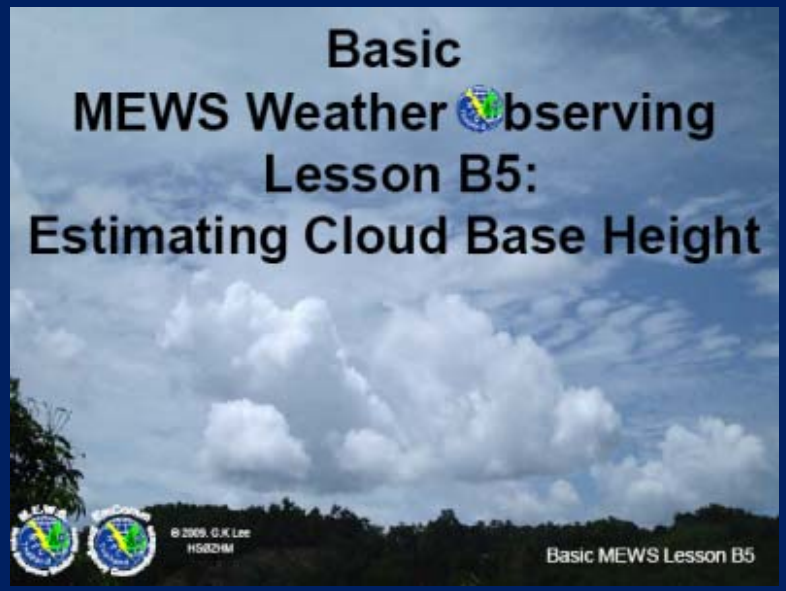
You can now make Basic Estimates of Cloud Cover





You are now ready for Basic MEWS Lesson B5: Estimating Cloud Base Height

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Free Self-Study Materials by Internet

- RTC-TH Weather Observer manual
- Illustrated PDF topical lessons

All of the lessons have been classroom and field proven.

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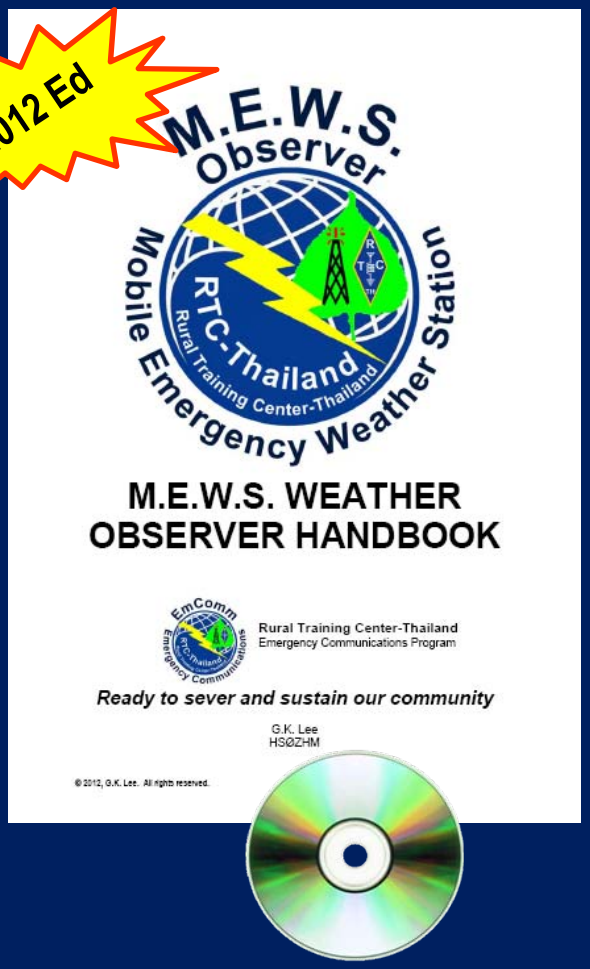

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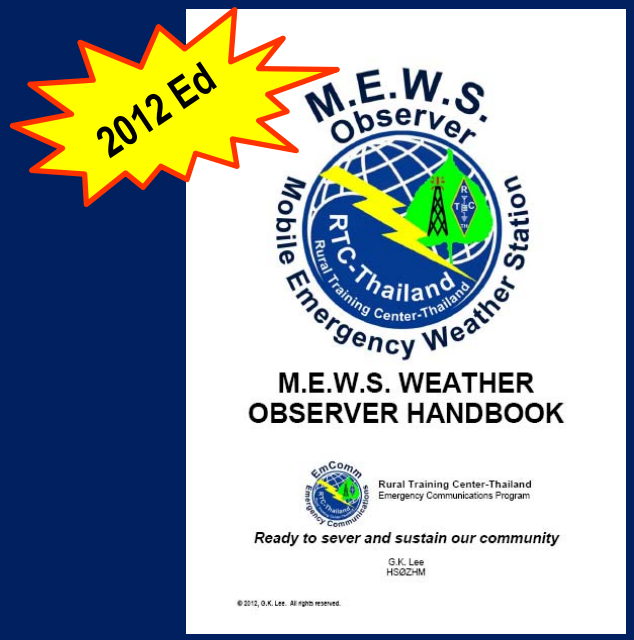
Questions or Comments

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:
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We are always trying to improve our lessons. Your comments and suggestions are welcomed.

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Basic MEWS PDF Lessons

B 1: Measuring Temperature
B 2: Estimating wind speed
B 3: Measuring Wind Direction
B 4: Estimating Cloud Cover
B 5: Estimating Cloud Base Height
B 6: Identifying Cloud Types
B 7: Estimating Visual Range
B 8: Severe Weather Conditions

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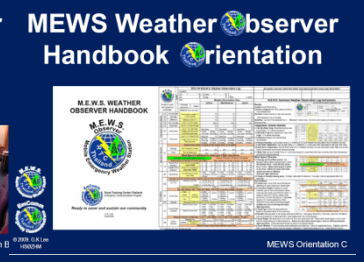

2012 Ed

3 Orientation and 8 Basic lessons.
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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

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Community-based Environmental Education for

Self-Sufficiency and Sustainability for Small Rural Family Farms

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The End

You may now go to Basic MEWS Lesson B5: Estimating Cloud Base Height

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