Rural Training Center – Thailand (RTC-TH)



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



www.neighborhoodlink.com/org/rtcth

E-mail: hsØzhm@gmail.com







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





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



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.

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

MEWS adapts weather lessons from two existing RTC-TH programs







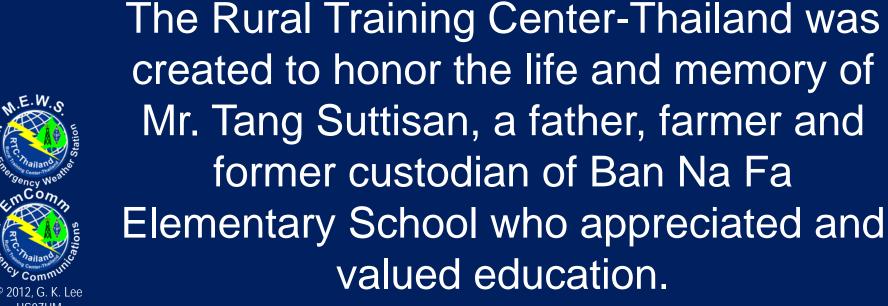
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Quick Start Basic MEWS Training Overview

- MEWS Weather Observation Log (Basic Sections / Subsections)
- Basic MEWS observation practicum
- Review and Critique
- Commitment / Completion
 Certificate



Meet the Trainer: Greg HSØZHM



I was inspired by the long ham tradition of EmComm and public service. I didn't have a lot of ham radio operating experience. So I created MEWS and offered it free to all hams in order to make a contribution to ham radio and EmComm.



- 12 years environmental consultant in private industry
- 29 years college / adult education
- Retired Geography Professor Emeritus
- Relatively new ham (since fall 2007, KI6GIG)
- Now living in a small rural northern Thai village (reciprocal Thai license HSØZHM since 2008)

General Set Up for Weather Observations

These guidelines apply to setting up all weather sensors to make observations / measurements.

They are "ideals". In the reality of an actual disaster, do the best you can for your circumstances.

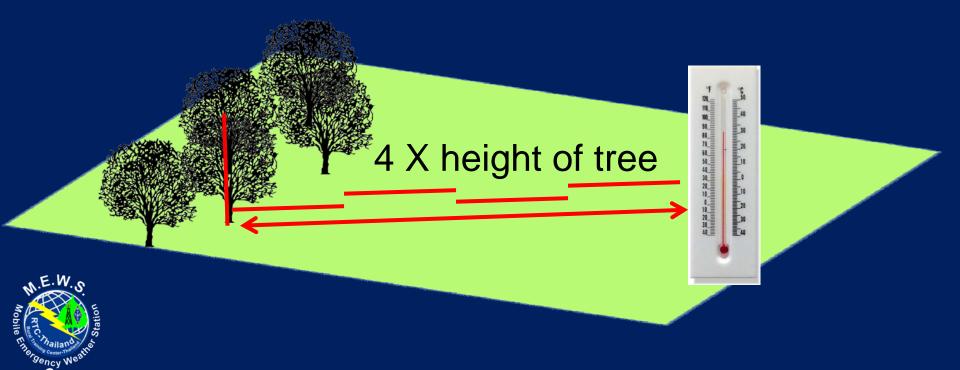


When a disaster strikes, you may be the only source of weather data. The lives and well-being of survivors and the safety of emergency relief flight crews may depend on your weather reports.

Find an open, level area.

Keep away from tall obstructions.

Stand off distance = 4X height of the obstacle.

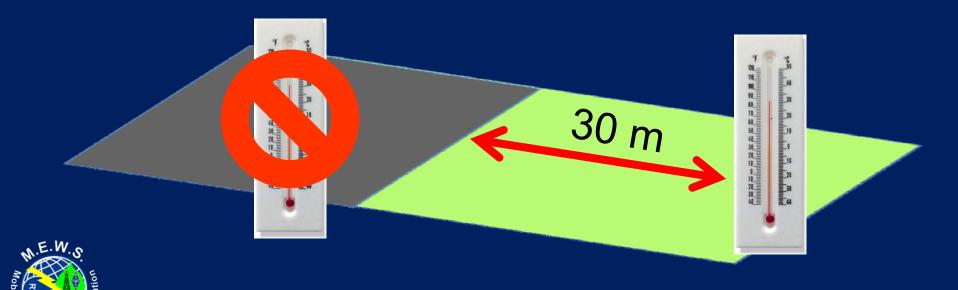


See the Addendum after the Lesson B-1 to learn how to use a sight ruler to estimate the height of tall objects.

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Avoid Large Paved Areas

Stay 30 m away from any large paved area

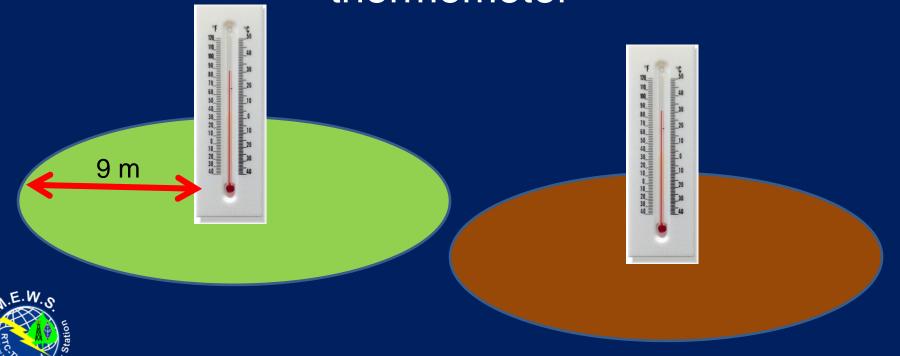


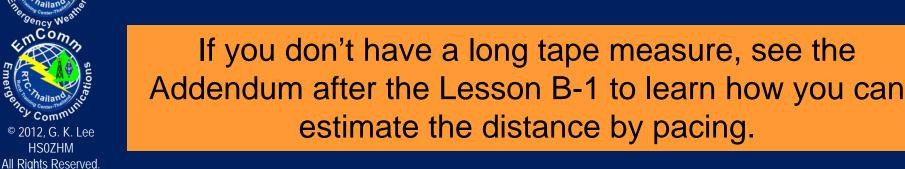
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If you don't have a long tape measure, see the Addendum after the Lesson B-1 to learn how you can estimate the distance by pacing.

The Optimum Surface Type

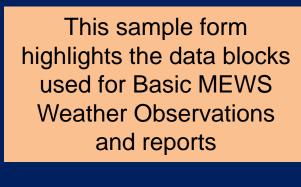
Low grass or bare soil for ~ 9 m radius from the thermometer





The MEWS Weather Observation Log

This is your guide to making systematic weather observations and reports.

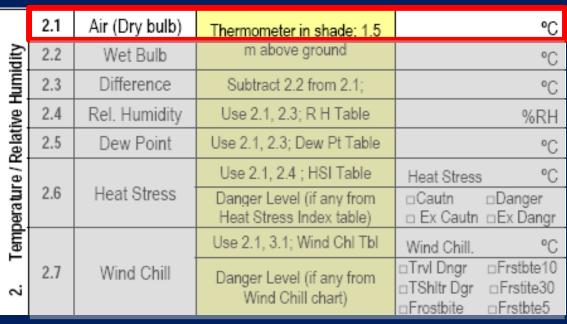


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See MEWS Lesson OC for a detailed orientation to the Weather Observation Log

	E	M.	RTC-TH M.E.W.S. Weather Observation Log									
	M.E.	S. S.		Location								
3	1	S A S	L	Lat °	" " N	Long	ı °	, u.E				
bii	一型	£ (40)	Header	Lat	N			F	Elev		m AMSL	
6	30112	300	훈	Date		Long		ather Obse		Timo	III / IIII O E	
	егдепс	d Weather		Dute		C						
		to serve	-	Local time		5u	nrise	IVIIQ-AI	ternoon	Sunset		
		stain our		24-hr format	Hour→							
"	comn				-if-losse bask)							
		iai ing i		Observer (ii	nitial; see back)							
	2.1	Air (Dry b	oulb)	Thermomet	er in shade: 1.5		°C		°C		°C	
₹	2.2	Wet Bu	ılb	m abo	ve ground		°C		°C		°C	
Ē	2.3	Differen	nce	Subtract	2.2 from 2.1;		°C		°C		°C	
불	2.4	Rel. Hum			2.3; R H Table		%RH		%RH		%RH	
ativ	2.5	Dew Po	-									
≥.	2.5	Dew Po	ını		3; Dew Pt Table		°C		°C		°C	
Temperature / Relative Humidity	26	Unat Ct.	000		2.4 ; HSI Table	Heat Stres		Heat Stress		Heat Stress		
rati	2.6	Heat Str	ess		vel (if any from	GCautn G Ex Court	Danger	Gautn Ex Courtn	Danger Ex Dangr	GCauth	Danger	
l gi				100000000000000000000000000000000000000	ss Index table)		n 🗆 Ex Dangr				Ex Dangr	
Ter				USB 2.1, 3.	1; Wind Chl Tbl	Wind Chill.	. °C	Wind Chill.	°C	Wind Chill.	°C	
2.	2.7	Wind C	hill		vel (if any from	□Trvl Dngr □TShltr Dgr	=Frstbte10	aTrvl Dngr aTShltr Dgr	aFrstite30	Trvl Dngr	=Frstbte10	
7				Wind (Chill chart)		□Frstbte5	Frostbite	pFrstbte5	Frostbite	□Frstbte5	
				Repo	rt wind speed			ws; km/h	o all other	S.		
둗		Averag	10	Got 3 road	ings & average							
cti		Avelag	,-	00101000	ingo a avorago	km/h	knts	km/h	knts	km/h	knts	
ä	3.1	Gusts	S	Record	highest gust	km/h	knts	km/h	knts	km/h	knts	
pa pa				Wind 9	Speed Guid			ter Fligh		ons		
Wind Speed / Direction		10) kn	ots / 18.5 kr	n/h ideal; OK	to fly	Α.	bove 45 ki	nots / 83 k	m/h; No fli	ghts.	
<u>i</u>		Gust	s ab	ove 20 kno	ts/ 37 km/h: N	lo fliahts	Ma	x tailwind 5	knots/6	km/hr: No t	ake off	
>		Steady \			ion steady wind	N NE	s sw	N NE	S SW	N NE	S SW	
က်	3.2	Direction			es FROM	E SE	W NW	E SE	W NW	E SE	W NW	
		Variable \			more directions	N NE	S SW	N NE	S SW	N NE	S SW	
		Direction	on	Wind co	mes FROM	E SE □ Clear	W NW □ Cloudy	E SE □ Clear	W NW □ Cloudy	E SE W NW		
	4.1	Cloud Co	over		itions in Cloud		☐ Cloudy d ☐ Overcast		□ Cloudy d □ Overcast	□ Scattered □ Overcast		
		0.044		Cov	er Table	n Broken	u iii o roiodact	□ Broken		□ Stattered □ Overcast □ Broken		
					vn elevation (ab							
		Cloud Bas		Relative	to local Mtn	□ Clouds a		□ Clouds a		□ Clouds a		
	4.2	(Loc Re	≘I)		m AMSL	□ Clouds a		□ Clouds a		□ Clouds at		
			m	DewCal (2.1	-2.5)/9.8x1000m	- Oldada k	m AGL	- Olouda D	m AGL	L Olouds b	m AGL	
			- /	Vin. flight altitu	des: Day = 160	m AGL: Nia	ht = 500 m /	GI: Low clo	oud ceilina =	No fliahts.		
us				High		□ Cirrus	CuNim	□ Cirrus	□ CuNim	□ Cirrus	□CuNim	
≗		O1 T		Middle	Vertically	□ Altostrat		□ Altostrat	Louisin	□ Altostrat	LOGITAIN.	
o o	4.3	Cloud T	ype		Developed	□ Altocum □ Stratus		□ Altocum □ Stratus	4	□ Altocum □ Stratus	-	
Sky Conditions		Low		n Nimetrat	□ Cumul	□ Mimstrat	□ Cumul	□ Nimetrat	□ Cumul			
S	4.4	Rainfa	all	Measu	re at 0900 hrs e	ach mornin	g Report an	nount for last	24 hrs		mm	
4				Name of	3.2 km mark	□ more	□ less than		□ less than		□ less than	
		Visual Range		□ Rain □ Haze	□ Fog □ Smoke		□ Fog □ Smoke		□ Fog □ Smoke			
	4.5		□ more	□ less than		□ omoke □ less than		less than				
	7.0	(41310111	·J/	1441110	1911 1-181111	□ Rain	□ Fog		□ Fog		Fog	
						n Haze	□ Smoke		□ Smoke		□ Smoke	
		He	elica		visibility: Dav = .							
		Sever	۵		derstorms Flash, count secs	□ Yes N NF F SF	□ No SSWWNW		S SW W NW	□ Yes N NF F SE	□ No SSWWNW	
	4.6	Weath	-	Lightning	to boom / 3	□ Yes	km	□ Yes	km	□ Yes	km	
		. routi										
					Wai	rn air crews	s of any sev	<i>ere weathe</i> r	ın your area	1.		

Notes on the form help you make observations with minimal training



The shaded areas are for Advanced MEWS measurements



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Brief instructions are on the back of the Log form.



The Back of the MEWS Weather Observation Log Form

has more notes to help observers in the field.



Full instructions and all needed reference tables are in the MEWS Weather Observer Handbook. Header
Location: Local Place Name
Latitude, Longitude from GPS, survey records or map measurement.

Elevation: Survey records or map measurement

(GPS elevations are not reliable).

Date/Hour: Use local Thai standard time in
24-hour format.

Temperature / Relative Humidity
2.1 Air (Dry Bulb) Temp: Read thermometer kept in the shade, 1.5 m above the ground.

2.2 Wet Bulb Temp from hydrogrometer kept in the

REACH to sense and sustain car.

| Cocalition | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Long | E | Elev | m AMS | Lo

All weather observers write their initials and clearly print their name using block letters

M.E.W.S. Summary Weather Observation Log Instructions

- 2.5 Dew Point Temperature: Use Dry Bulb Temp (2.1), Difference (2.3) and Dew Point Temp table to find Dew Point Temp.
- 2.6 Heat Stress Temperature: Use Dry Bulb Temp (2.1), % Relative Humidity (2.4) and Heat Stress Index Table to find Heat Stress Temperature and relevant advisory warning.
- 2.7 Wind Chill: Use the Dry Bulb Temp (2.1) and Wind Speed (3.1) and Wind Chill Table to find the Wind Chill Temperature and relevant advisory warning.

Wind Speed / Direction

shade, 1.5 m above the ground. 2.3 Difference between Dry and Wet Bulb

3.1 Average and Gust Wind speeds: Use Beaufort Table or direct measurements 3 times and average results. Gusts are short, strong blasts of wind. Report wind speeds in knots to air crews. Advise air crews when wind speeds are close to affecting helicopter flight operations.

.5	Average Get 3 readings & average				km/h		knts		lan/h		krits		kmh		krti
Direction	3.1	Guete	Record highest gust		km/h		knts		lan/h		kets		kmh		krt
È	1		Wind Speed Guidelines for Helicopter Flight Operations												
Wind Spood/	1	10 kno	ts / 18.5 km/h ideal; OK	to fit	7		Á	bove	45 kr	nots /	83 ki	m/h;	No fli	ghts.	
E	1	Gusts abo	ove 20 knots/ 37 km/h; N	lo flig	hts	_	Max	taily	rind 5	knot	s/Bk	m/hr	No t	ake (σĦ
3		Steady Wind	Circle direction steady wind	N	NE	3	SW	N	NE	9	3/4	N	NE	9	SW
ë	32	Direction	comes FROM	E	SE	W	NW	E	SE	W	NW	E	SE	W	NW
	32	Variable Wind	Circle 1 or more directions	N	NE	3	SW	N	NE	5	SW	N	NE	5	SW
		Direction	wind comes FROM	E	SE	W	NW	E	3 E	w	NW	E	SE	W	NW

3.2 Steady or Variably blowing winds. If steady, circle letter for direction. If variable, circle all appropriate letters for directions.

Sky Conditions

- 4.1 Cloud cover: Look at the sky and follow the definitions for each cloud cover classification.
- 4.2 Cloud Base Height: If relative to a local mountain, give its name and elevation above mean sea level. Note Local Relief in meters. If using the Dew Point method, subtract Dew point temp (2.5) from Dry temp (2.1) and divide result by 9.8; multiply quotient by 1000m. Advise air crews when cloud base height (ceiling) are close to affecting helicopter flight operations.
- 4.3 Cloud Type: Check the appropriate box based on cloud description in the guide book
- | Use local mauration at flower halfs | Globals | Global
- 4.4 Rainfall: Measure water in rain gauge each day at 0900 hrs. Rain gauge should be in open area, away from tall objects, with top of gauge 50 cm above ground to avoid splash water from entering gauge.
- 4.5 Visual Range: Pick landmarks 3.2 km and 5 km from your observation site. Report when visual range is more or less than the known distances to these landmarks. Advise air crews when visual range is close to affecting helicopter flight operations. Check appropriate boxes for reasons of reduced visibility.
- 4.6 Severe Weather: Primary concerns and thunderstorms and lightning. Check the appropriate boxes. If lighting, watch for flash, count seconds until you hear the thunder, divide by 3 = approximate distance in km. Circle direction to storm.

Section 1.0 Header: Location Name

- la.			RTC-TH	M.E.W.	S. Weat	ther (Obser	vation	Log	
W.E.W.S		Location								
3 A	_	Lat °	" " N	Long	0	E	« E			
	Header	Lat	N	Long			Е	Elev		m AMSL
Mand Ke	=	Date			We	ather	Observ	ations 1	Гime	
Pency Wester	÷			Sun	rise	N	lid-After	noon	į	Sunset
Ready to serve and sustain our		Local time 24-hr format	Hour→							
community.		Observer (initi	al; see back)							



For this training session, use the data given by the local training host group.

See Handbook: Location pp. 4-7; Date / Time p. 8; Observer p. 8

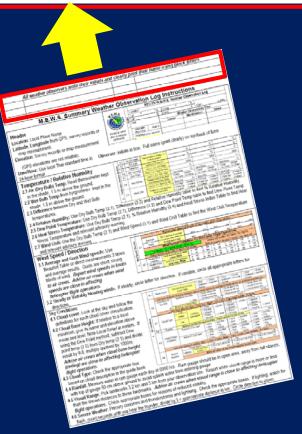
Additional space for observer ID is on the back of the form, top of the page

á	All weather observers wi	ite their initials and	d clearly pri	int their name using block letters
	K			

Observation time; observer ID



Print clearly. Observer ID is needed in case writing is not clear or when clarification is needed.



Handbook Table of Contents

The Section /
Subsection numbers
match the data blocks
on the Weather
Observation Log Form



The colored boxes indicate the PDF slide show lesson types and the sequence number

Table of Contents

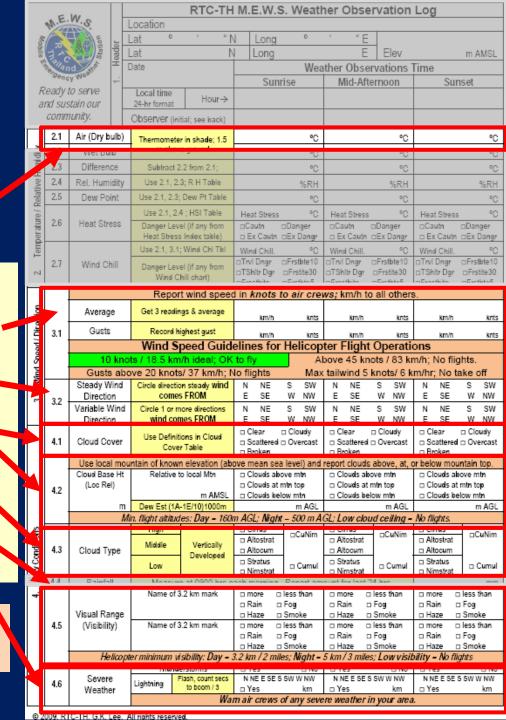
		able of Conte	#1112						
Section					Page				
	MEWS Lesso				iv-v				
		WS Lessons on the Web			V-Vİ				
	Introduction		OA 8	k OB	1-2				
		Form: MEWS Observation	Log		3 4-5				
1.0 Head	eader / Location								
1.1	Latitude / Lor	gitude			5-6				
1.2	Elevation	0	С	6-7					
1.3	Date / Time (8						
1.4	Observer								
2.0 Tem	mperature Basic 1								
2.1	Air (Dry Bulb)	Temp	Dasic I		9				
2.2	Wet Bulb Ten	np		Adv 1	9-10				
2.3	Difference								
2.4	Relative Hum	idity			10-12				
2.4		Chart: Relative Humidity T	able		11				
2.5	Dew Point Te	mp		Adv 3	12				
2.5	(Chart: Dew Point Temperatur	e Table		13				
2.6	Heat Stress 7	emp		Adv 1	14				
2.0	Chart: Heat Stress Index Chart								
2.7	Wind Chill Te	mp		Adv 2	15				
2.1			Wind 0	Chill Chart	16				
3.0 Wind	nd Speed and Direction								
	-	Average	Basic 2	Adv 2	17				
2.4	Mind one od	Gusts							
3.1	Wind speed	Chart: Modified Beaut	ort Wind C	hart	18				
		Chart: Dwyer Wind Gauge	e Conversion	n Chart	19				
3.2	Wind	Steady	Dania 2		20-21				
3.2	direction	Variable	Basic 3		20-21				
4.0	Sky Condition	n							
4.4	Cloud Cover		Basic 4		22				
4.1		Chart: Cloud Cover Cha	art						
4.2	Cloud Base H	leight	Basic 5	Adv 3	22				
4.2.1	Estimated by	Cloud Type or Relative to Lo	cal Mounta	ain	23				
4.2.2		ght Calculated by Dew Point Tempe		Adv 3	23-24				
4.0	Cloud Type	-	Basic 6		24				
4.3		Chart: Cloud Identification	Chart		25				
4.4	Rainfall			Adv 4	26-27				
4.5	Visual Range		Basic 7		28-29				
	Severe Weat		Basic 8	Adv 5	29-30				
4.6		Chart: "Flash to Boo	m" Referer	ice Chart	30				
App 1	Weather Obs	ervation Equipment			31				
App 2	Weather Fore		Basic 6	Adv 6	32-35				
Арр 3									
App 4									
		5 5			37				



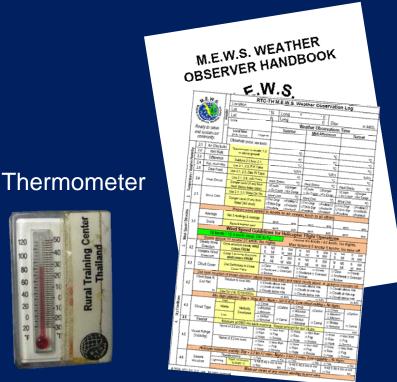
- Temperature
- Estimate Wind Speed
- Wind direction
- Cloud cover
- Estimate cloud height.
- Cloud Type
- Visibility
- Thunder / Lightning

Detailed instructions are in the MEWS manual





The Basic Weather Observer's kit



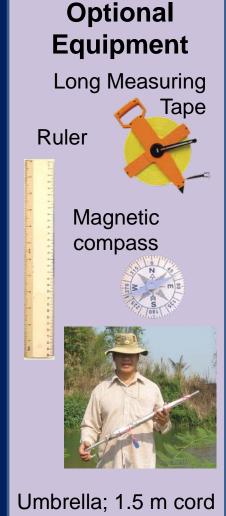
		High 12,000m to 8,000m		Cin	us		Cin	ostratus	Vertically Developed
.E.W.s	-	Beaufor							500m
	Descripti	veather observ ion and flag ref from the chart r	erences to e	otimat	e the wind	speed.		ition. Use the range of wind	
Descriptio		Flag	WMO	Mph	Km/hr	Knots	Force	Psu lbs/sq ft (Kg/sq m)	Addition 18
		, .og	term		Report win	d speed	in knots to	flight crews	
Calm; smoke vertically			Calm	<1.0	<1.5	<0.9	0	0.006266 (0.003059)	8
Smoke indicates v hangs limp, wind not move	vanes do	4	Light Air	1-3	1.5-6	1-3	1	0.02924 (.01428)	
Wind felt on face rustle, flag stirs		V	Light breeze	4-7	6-12	4-6	2	(0.6934)	
vanes mov		167		nots m	aximum ta	alwind fo	r helicopte	r take-off	
Leaves and tw constant motio occasionally ex	n; flag	Ma .	Gentle Breeze	8-12 Knot	12-20 deal for	7-10	3 er flicht co	0.3759 (1.835)	
Dust and paper f branches move; F		m	Mild Breeze	13-18	21-29	11-16	4	0.8145 (3.977)	loninibus
small leafy trees sway; white or wavelets appe	ested	1277	Fresh Breeze	19-24	30-39	17-21	5	1.504 (7.342)	100
lakes/ponds; Flag		B.A.	20 Kno	ts may	imum aust	s for ho	iconter fin	ht operations	
Large branches wires whistle: un	move;	June 1	Strong	25-31	T		1		
hard to use; Flac	snans	لنديا	Breeze	60.01		Nation of	Lightnio	g the bounderdap. jup 1 by:)/
Whole trees sway	r hard mat	eck the box for the tches what you see	best term that b.		Sky Cond	ition: Clo	ud Cover Te		
walk; Flag exte					Clear			vetu 70#Y	be in bookle. People
Twigs and small b broken; cars ve					Sky is blue w clouds or ver small cloud	y floor		and to all !	N. CLORES.
roads; Flag ta					Scattere	d	-	2-1	2.20 3.57 2.40
Slight structural occurs (roof shing					liky is blue, bu latches of clou	t small ids are			4.00 <u>2.50</u> 4.33 <u>2.50</u>
off) Trees broken or u	proch				present. Broken				4.67 3.00 3.20
considerable dar					Large patche	u of	No. 19		5.33+ 3.401
buildings					louds, but pail itue sky can b between the c	ches of e seen			5.00 3.00
Wide spread do caused					Cloudy The sky is co mostly with cl and a few b	ouds		19 20 TH and	6.33 6.67 4.04
HSCZHM assume r					Overcas	- 1	N	DY.	
					louds cover to no patches of can be see	blue	-	Scar	

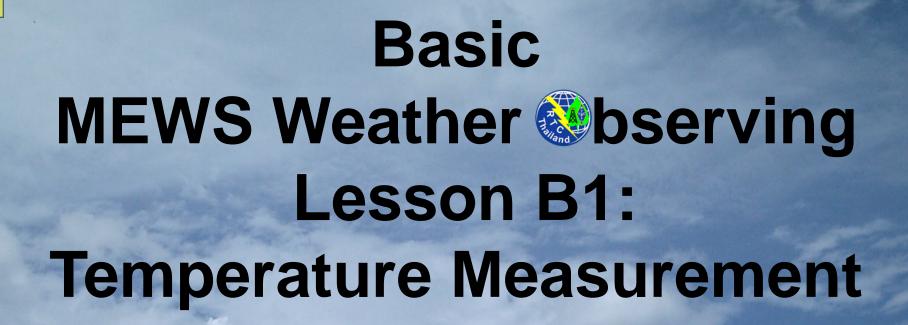


HSØZHM

MEWS Handbook, Basic Reference tables

A Basic MEWS Kit has very few items making start-up fairly easy and affordable.







Record the Air Temperature Section 2.1

	2.1	Air (Dry bulb)	Thermometer in shade; 1.5	°C
dj.	2.2	Wet Bulb	m above ground	°C
Ē	2.3	Difference	Subtract 2.2 from 2.1;	°C
Wel	2.4	Rel. Humidity	Use 2.1, 2.3; R H Table	%RH
-			·	

Mobile Ennoysency West Williams Suoje Common
It is best if you can make a minimum of 3 observations / day.

See Handbook: 2.1 Air (Dry Bulb) Temp, p. 9

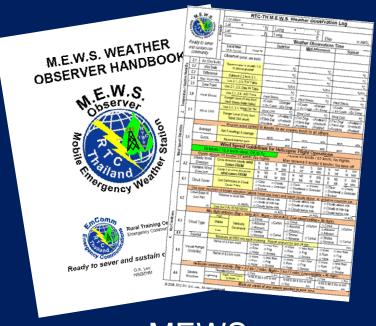
			144		RTC-TH M.E.W.S. Weather Observation Log								
	4	N.E.	W.S.		Location								
	3/	4	3 44		Lat °	: "]	l Long	a °	E	" E			
	bile	17	State State	Header	Lat	N				Е	Elev		m AMSL
	Em	allan	d Ka	脂	Date			V	eather O	bser	vations	Time	
	7	Denc	y Weather	-			Su	nrise			rnoon		nset
		ady i	to serve		Local time	Hour→							
			tain our	╽┟	24-hr format								
	С	:omn	iunity.		Observer (in	itial; see back)							
	L	2.1	Air (Dry b	ulb)	Thermomete	erin shade: 15			e .		°C		°C
4		2.2	Wet Bu	lb	m abov	ve ground			rc o		°C		°C
Librariedia		2.3	Differen	ce	Subtract :	2.2 from 2.1;			°C		°C		°C
9	9	2.4	Rel. Hum	iditv	Use 2.1.2	3: R H Table		0/ 0					%RH
ig	š	2.5	Dew Po	int	Use 2.1, 2.3	; Dew Pt Table			e l		°C		°C
	2				Use 2.1. 2	4 ; HSI Table	Heat Stre		C Heat St	hoce	°C	Heat Stress	
		-	Heat Str	ess		el (if any from	□Cautn	□Danger	0 110010		Danger	□Cautn	□Danger
	0(С				s Index table)		n 🗆 Ex Dan			Ex Dangr	□ Ex Cautn	
	_	<u> </u>			Use 2.1, 3.1	; Wind Chl Tbl	Wind Chill		C Wind C		°C	Wind Chill.	°C
	٥(С	Wind Cl	hill		el (if any from	□Trvl Dngr □TShltr Dq			-	Frstbte10 Frstite30	□Trvl Dngr □TShltr Dgr	□Frstbte10 □Frstite30
	_	-			Wind C	chill chart)	□ Frostbite	□ Frstite:			Frstbte5	□ Frostbite	□Frstlete5
	٥(Cl			Repo	rt wind speed							
			Averag	ie	Get 3 readi	ngs & average							
%	RI	Н∤					km/t	ı kı	nts ki	n/h	knts	km/h	knts
		···	Gusts			ighest gust	km/t			n/h	knts	km/h	knts
Mind Cood	lee.		4.0			peed Guid		or Helic					-1-1-
3	5			10 knots / 18.5 km/h ideal; Ok Gusts above 20 knots/ 37 km/h; I								m/h; No flig	
192	₽		Steady V			on steady Wind	N NE	S SI		E E	S SW	m/hr; No t	S SW
	ا	3.2	Direction			s FROM	E SE	W NV		E	W NW	E SE	W NW
		3.2	Variable V			nore directions	N NE	S SI		ΙE	S SW	N NE	S SW
н	+		Directio	on	wind co	mes FROM	E SE	W NV		E	W NW	E SE	W NW
		4.1	Cloud Co	over		tions in Cloud	□ Clear □ Scattere	□ Cloudy ed □ Overca			Cloudy Overcast	□ Clear □ Scattered	□ Cloudy □ Overcast
	L					er Table	□ Broken		□ Broke	en		□ Broken	
			Use loca Cloud Bas			n elevation (abo to local Mtn	ove mean s		nd report cle				
			(Loc Re		Kelative	to local Intri	□ Clouds		□ Cloud			□ Clouds at	
		4.2	,	,		m AMSL	□ Clouds	below mtn	□ Cloud		w mtn	□ Clouds be	elow mtn
				m		-1E/10)1000m	- ACL AL	m AC			m AGL	N- m-t	m AGL
				- /	<i>ilin, flight altitus</i> High	ies: Day = 160i	m AGL; Nig □ Cirrus		ca Cierus			/Wo flights. □ Cirrus	
Sky Conditions	5				Middle	Vertically	□ Altostra		m 🗆 Altost	trat	□CuNim	□ Altostrat	□CuNim
pao	5	4.3	Cloud Ty	уре	Minne	Developed	□ Altocum	_	□ Altoc	-		□ Altocum	-
C V	2				Low		□ Stratus □ Nimstra	: Cum	ul		□ Cumul	□ Stratus □ Nimstrat	□ Cumul
0	1	4.4	Rainfa			e at 0900 hrs e					hrs.		mm
1					Name of	3.2 km mark	□ more	□ less than			ess than		less than
			Visual Ra	inge			□ Rain □ Haze	□ Fog □ Smoke	□ Rain □ Haze		Fog Smoke		Fog Smoke
		4.5	(Visibilit			3.2 km mark	□ more	🗆 less than	□ more	اه	ess than	more c	less than
							□ Rain □ Haze	□ Fog □ Smoke	□ Rain □ Haze		Fog Smoke		Fog Smoke
			Не	lico	oter minimum v	isībīlīty: Day = :							
					Thund	erstorms	□ Yes	01	lo □ Yes		□ No	□ Yes	□ No
		4.6	Seven		Lightning	Flash, count secs to boom / 3	N NE E Si	E S SW W NV km		SE 5	5W W NW		5 SW W NW
			Weath	er					evere weat	her in	km vour area	□ Yes	km
						.,,,,	un urum	- c. any s			J 0100		

What you need to make a Basic Temperature reading

Pencil



Thermometer



MEWS
Handbook and
Log Form

Optional Equipment



Umbrella; 1.5 m cord





MEWS (PWIS)

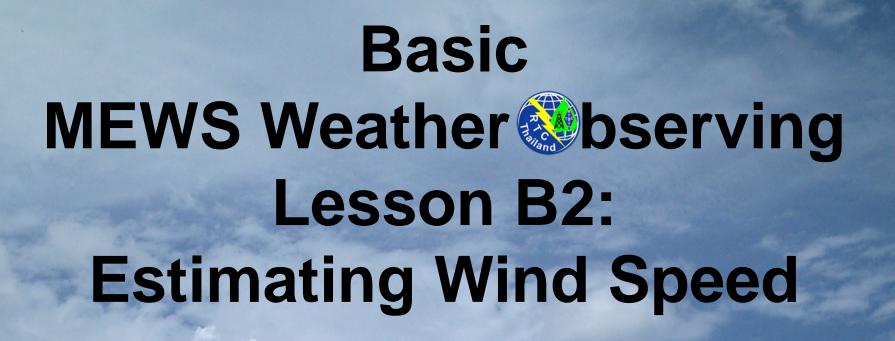
Portable Weather Instrument Shelter

Measure the temperature

- In the shade
- at least 1.5 m above the ground
- Clear of vertical obstructions
- 30 m away from large paved areas
- 9 m radius of uniform surface materials









Notes on the form help you estimate wind speed with minimal training

			Report wind speed	in knots to	air crew	s; km/h to a	II others.				
rection		Average	Get 3 readings & average	km/h	knts	km/h	knts	km/h	knts		
Dire	3.1	Gusts	Record highest gust	km/h	knts	km/h	knts	km/h	knts		
ed/			Wind Speed Guide	elines for F	lelicopte	er Flight O	peratio	ns			
Spe		10 kno	ts / 18.5 km/h ideal; OK	to fly	Above 45 knots / 83 km/h; No flights.						
Jind		Gusts abo	ove 20 knots/ 37 km/h; N	lo flights	Max tailwind 5 knots/ 6 km/hr; No take off						

Brief instructions are on the back of the Log form.

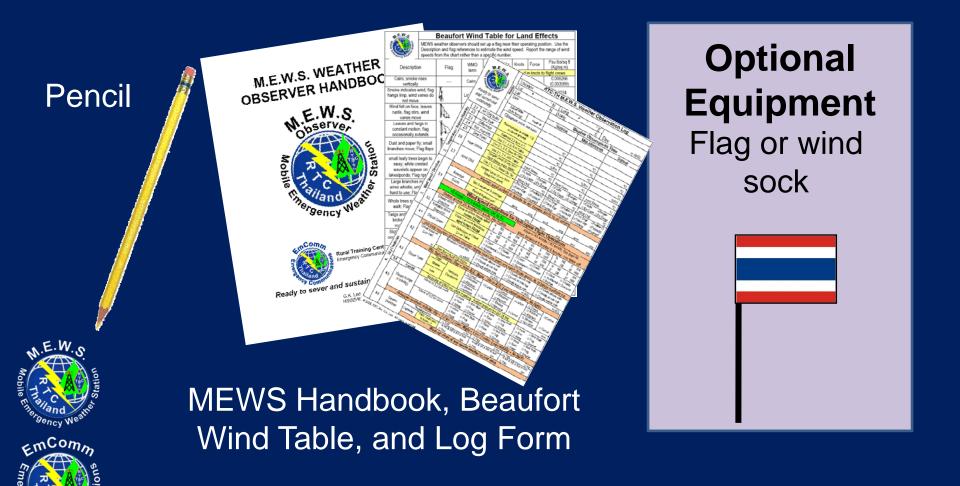
See Handbook: 3.1 Wind

Speed, p. 17

Full instructions and all needed reference tables are in the MEWS Weather Observer Handbook.



What you need to Estimate Wind Speed



See Handbook: Beaufort Wind Table for Land Effects, p. 18

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Two Ways to use this table

You can match the description to what you see around you.



You can use a nearby flag as a reference.



Beaufort Wind Table for Land Effects

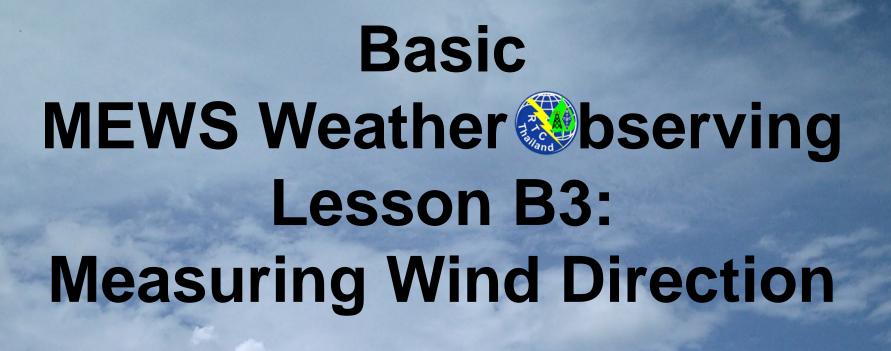
MEWS weather observers should set up a flag near their operating position. Use the Description and flag references to estimate the wind speed. Report the range of wind speeds from the chart rather than a specific number.

	speeds	nom me chan ra	unei unam a s	pecilic i	iuiiibei.			
	Description	Flag	WMO term	Mph	Km/ hr	Knots	Force	Psu lbs/sq ft (Kg/sq m)
	· I		term	F	Report win	id speed i	n knots to	flight crews
	Calm; smoke rises vertically		Calm	<1.0	<1.5	<0.9	0	0.006266 (0.003059)
	Smoke indicates wind; flag hangs limp, wind vanes do not move	T.	Light Air	1-3	1.5-6	1-3	1	0.02924 (.01428)
I	Wind felt on face, leaves rustle, flag stirs, wind vanes move	B	Light breeze	4-7	6-12	4-6	2	0.142 (0.6934)
I,				Knots ma	aximum ta	iliwina tor	nelicopte	
	Leaves and twigs in constant motion; flag		Gentle Breeze	8-12	12-20	7-10	3	0.3759 (1.835)
	occasionally extends	1 000	1	0 Knots	ideal for	helicopter	flight ope	erations
	Dust and paper fly; small branches move; Flag flaps	M	Mild Breeze	13-18	21-29	11-16	4	0.8145 (3.977)
	Small leafy trees begin to sway; white crested wavelets appear on		Fresh Breeze	19-24	30-39	17-21	5	1.504 (7.342)
ı	lakes/ponds; Flag ripples		20 Kn	ots maxi	mum gust	ts for helic	copter fligh	ht operations
	Large branches move; wires whistle; umbrellas hard to use; Flag snaps		Strong Breeze	25-31	40-50	22-27	6	2.485 (12.13)
	Whole trees sway; hard to walk; Flag extended		lear Gale	32-38	51-61	28-33	7	3.822 (18.66)
	Twigs and small branches broken; cars veer on roads; Flag tatters	The same	Gale	39-46	62-74	34-40	8	5.597 (27.33)
l	Slight structural damage occurs (roof shingles blow off)	A.E.	Strong Gale	47-54	75-87	41-47	9	7.769 (37.93)
		13-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	45 Kno	ots maxii	mum wind	ls for helic	copter flig	ht operations
	Trees broken or uprooted, considerable damage to buildings	W. Sec.	Storm	55-63	88-101	48-55	10	10.53 (51.39)
	Wide spread damage		Violent Storm	64-72	02-114	56-63	11	13.78 (67.3)
	caused		urricane	>73	>115	>63	12	>13.78 (>67.3)
	Disclaimer: Use of the pre	essure data to calc	ulate tower/ar	itenna wi	nd loads is	at your ov	wn risk. Th	ne RTC-TH and

Disclaimer: Use of the pressure data to calculate tower/antenna wind loads is at your own risk. The RTC-TH and HSØZHM assume no liability for the use of this data. Pressure values are the upper limits for a wind category.

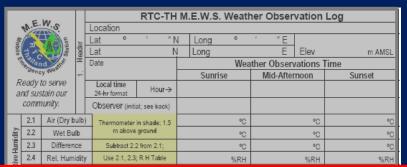


© 2009. G.K Lee HSØZHM The some common signs of wind are blowing dust, smoke plumes, or flags.



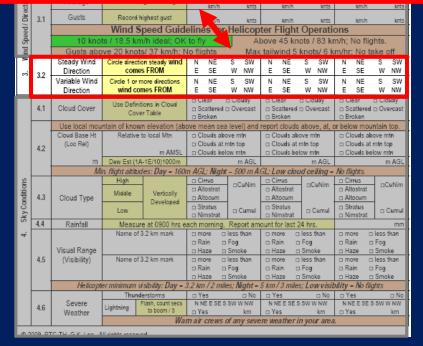


The MEWS Weather Observation Log Form



Basic Wind Direction is recorded in Section 3.2

3. W	2.2	Steady Wind Direction	Circle direction steady wind comes FROM	N E	NE SE	S SW W NW	N E	NE SE	S SW W NW	N E	NE SE	S W	SW NW
(,,	3.2	Variable Wind Direction	Circle 1 or more directions wind comes FROM	N E	NE SE	S SW W NW	N E	NE SE	S SW W NW	N E	NE SE	S W	SW NW



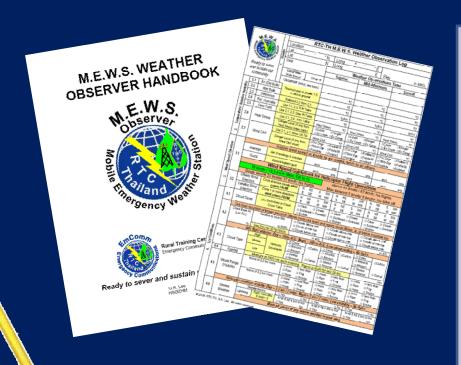
© 2012. G. K. Lee

HS0ZHM All Rights Reserved Wind directions are recorded for both steady winds and variable winds.

Avoid confusion and errors: report all azimuths are Magnetic (relative to Magnetic North)

See Handbook: 3.2 Wind Direction, p. 20-21

What you need to make a Basic Wind Direction Measurement



MEWS Handbook and Log Form





Pencil



You need to know the "cardinal" directions: N, S, E, W

- If you are familiar with the area, you may already know the directions.
- If you are in an unfamiliar area, a magnetic compass is useful.



Photo from the Internet; educational fair use clause

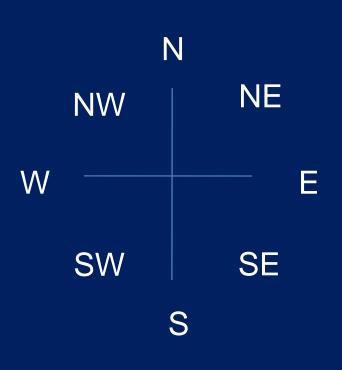


Casual observation vs. Measurement

You can call the wind by its directional name or by a measured azimuth (degree) number.

Just be sure you face directly into the wind.





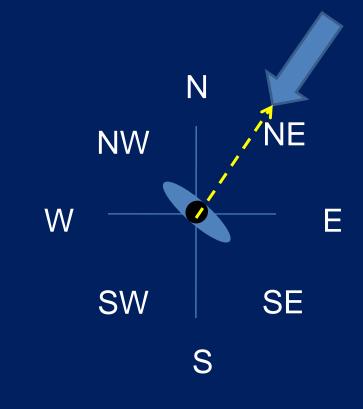
$N = 0^{\circ} \text{ or } 360^{\circ}$
NE = 45°
$E = 90^{\circ}$
$SE = 135^{\circ}$
$S = 180^{\circ}$
$SW = 225^{\circ}$
$W = 270^{\circ}$

Casual observation

You can call the wind by its directional name.

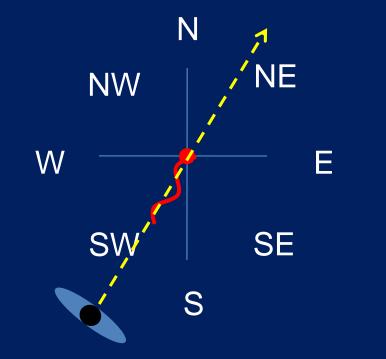
Just be sure you face directly into the wind.

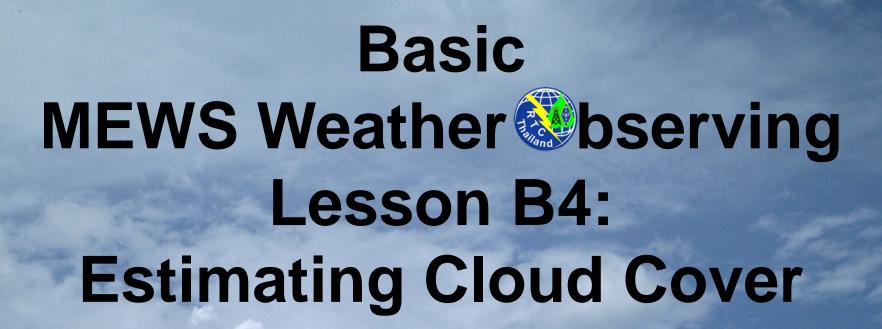
Remember, the wind direction is named by the direction it comes **FROM**.



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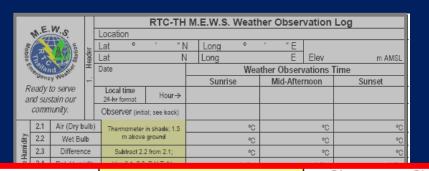
If you have a flag, you can use it.







The MEWS Weather Observation Log Form

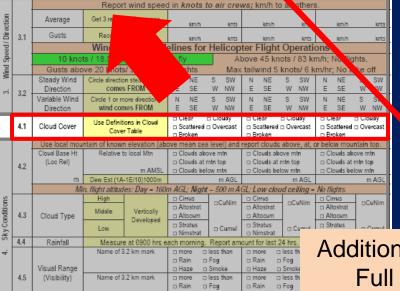


Wind Chill chart)

Cloud Cover is recorded in Section 4.1

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

aTShitr Dgr == Frstite30 == TShitr Dg == Frstite30 == TShitr Dgr == Frstite30



Helicopter minimum visibility: Day = 3.2 km / 2 miles; Night = 5 km / 3 miles; Low

Warn air crews of any severe weather in you

Severe

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HS0ZHM All Rights Reserved 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.

The MEWS Weather Observation Log Form

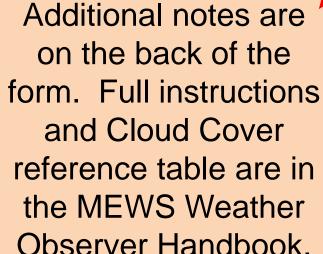
More notes are on the back of the form.

Sky Conditions

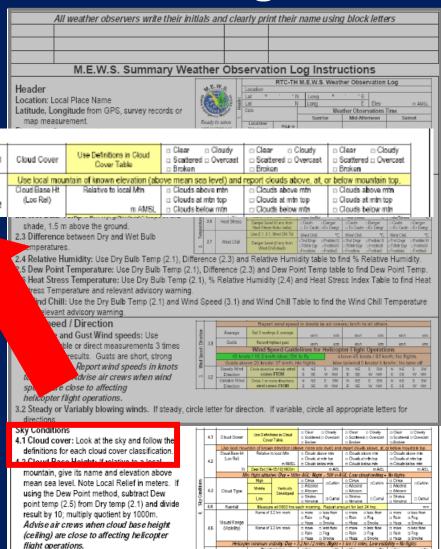
- 4.1 Cloud cover: Look at the sky and follow the definitions for each cloud cover classification.

on the back of the and Cloud Cover the MEWS Weather Observer Handbook.

See Handbook: 4.1 Cloud Cover, p. 22







4.4 Rainfall: Measure water in rain gauge each day at 0900 hrs. Rain gauge should be in open area, away from tall objects

4.5 Visual Range: Pick landmarks 3.2 km and 5 km from your observation site. Report when visual range is more or less

than the known distances to these landmarks. Advise air crews when visual range is close to affecting helicopter

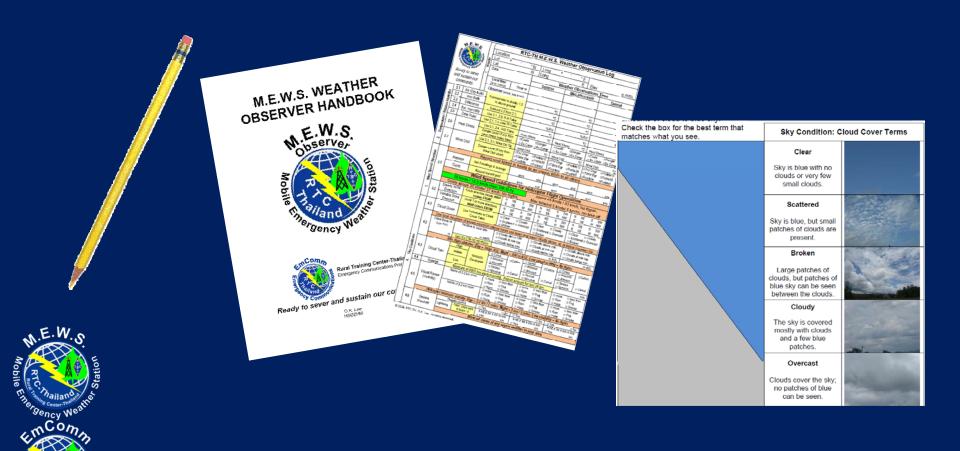
4.6 Severe Weather: Primary concerns and thunderstorms and lightning. Check the appropriate boxes. If lighting, watch for flash, count seconds until you hear the thunder, multiply by 3 = approximate distance in km. Circle direction to storm

with top of gauge 50 cm above ground to avoid splash water from entering gauge.

flight operations. Check appropriate boxes for reasons of reduced visibility.

4.3 Cloud Type: Check the appropriate box based on cloud description in the guide book

What you need to make Basic Estimates of Cloud Cover

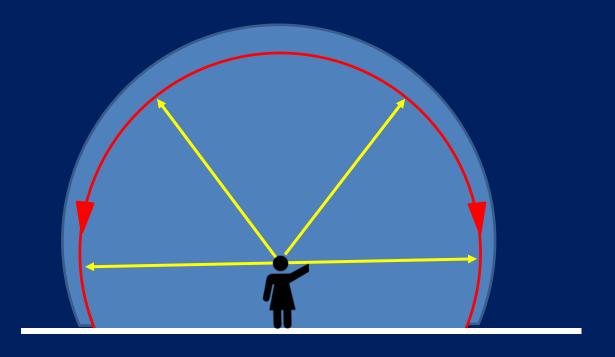


See Handbook: 4.1 Cloud Cover Reference Table, p. 22

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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.



Basic Cloud Cover Terms

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

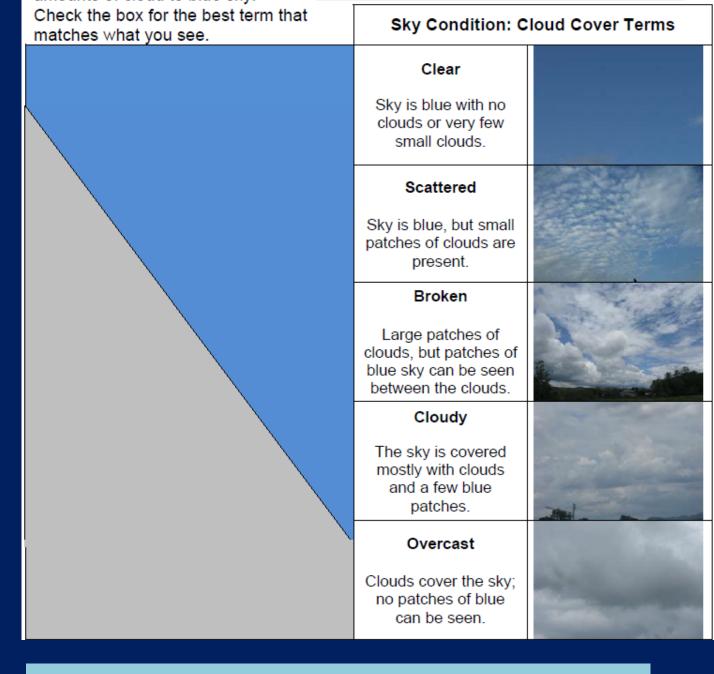
Cloud cover term	Amount of blue	Amount of cloud	
Clear	Nearly all blue	Little or no clouds	
Scattered clouds	Mostly blue	Some clouds	
Broken clouds	Big blue patches	Mostly clouds	
Cloudy	Some blue	Mostly clouds	
Overcast	Little or no blue	Nearly all clouds	



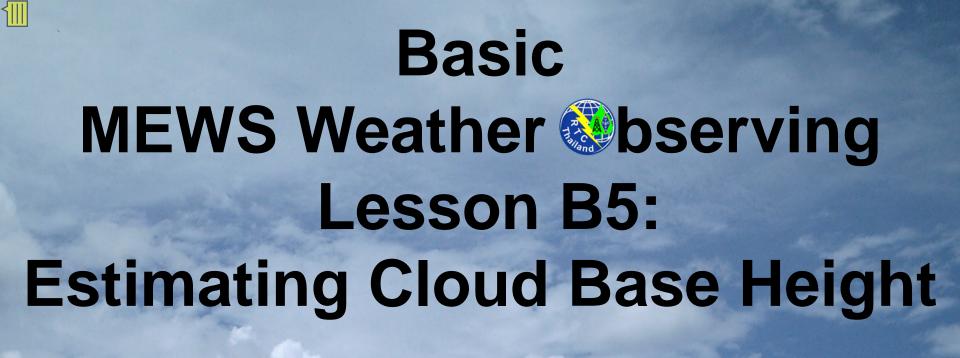
This simple classification system is based on comparing / contrasting the amount of blue sky to cloud in the sky over your operating position

Just find the description that best fits what you see



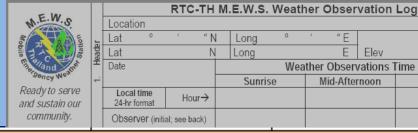


See Handbook: 4.1 Cloud Cover Reference Table, p. 22





Cloud Chart Estimate



	Use local m
	Cloud Base H
4.2	(Loc Rel)
4.2	Cloud Chart
	estímate

nountain of known elevation (above mean sea level) and report clouds above, at, or below mountain top, □ Clouds above mtn Relative to local Mtn. □ Clouds at mtn top □ Clouds below mtn

 Clouds above mtn Clouds at mtn top □ Clouds below mtn m AGI

m AGI

Clouds below mtn m AGL

Elev

Sunset

Mid-Afternoon

Clouds above mtn

Clouds at mtn top

Min. flight altitudes: Day = 160m AGL; Night

DewCal (2.1-2.5)/9.8x1000m

Make a note "Cloud Chart Estimate" on Line 4.2 The write the estimated cloud base height for the lowest type cloud formation

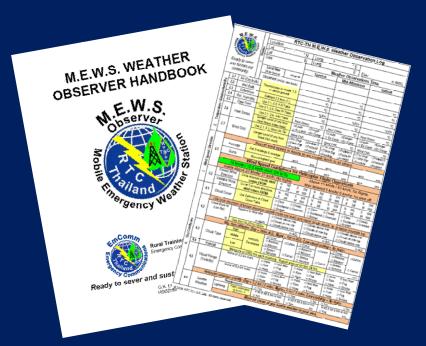
See Handbook: 4.2 Cloud Base Height (Ceiling), p. 23 500 m AGL; Low cloud ceiling = No flights. ort wind speed in knots to air crews; km/h to all other Avera Guidelines for Helicopter Flight Operations Steady Wind Direction Variable Wind Direction Cloud Cover (Loc Rel) □CuNim Altostrat Middle Cloud Type Rainfall Measure at 0900 hrs each morning Visual Range (Visibility) Weather



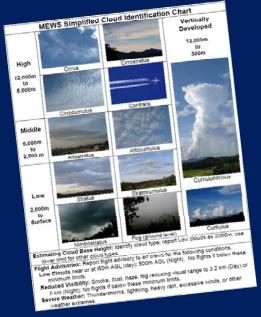
What you need to make estimate cloud base height for the Quick Start Basic MEWS







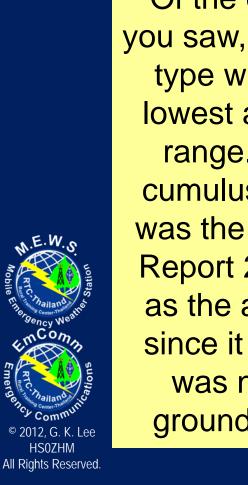
MEWS Handbook, Cloud Identification Chart, and Log Form

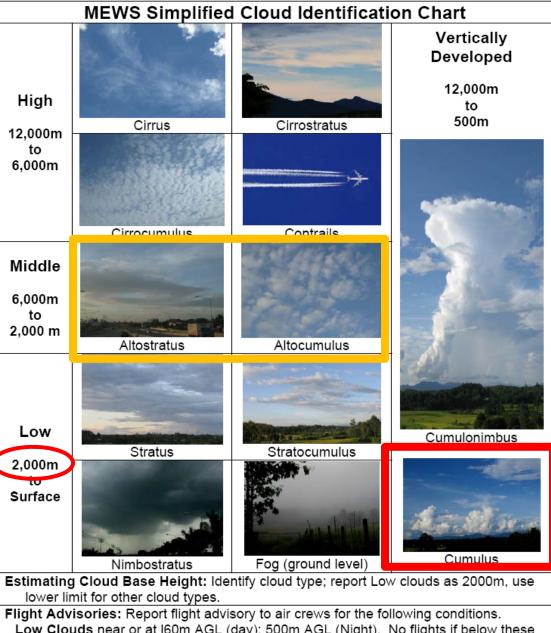


Cloud Identification
Chart

Use the Cloud Identification Chart in the MEWS Weather Observer Handbook.

Of the clouds you saw, pick the type with the lowest altitude range. The cumulus cloud was the lowest. Report 2,000m as the altitude since it clearly was not at ground level.





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.

Flight Advisory

Report a Flight Advisory any time cloud base height is near to, at, or less than the warning limits listed on the Log Form.



MEWS Simplified Cloud Identification Chart Vertically Developed 12,000m High to 500m Cirrus Cirrostratus 12,000m to 6,000m Cirrocumulus Contrails Middle 6.000m to 2,000 m Altostratus Altocumulus Low Cumulonimbus Stratus Stratocumulus 2,000m to Surface Cumulus Nimbostratus Fog (ground level)

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

Low Clouds near or at I60m AGL (day); 500m AGL (Night). No flights if below these minimum limits.

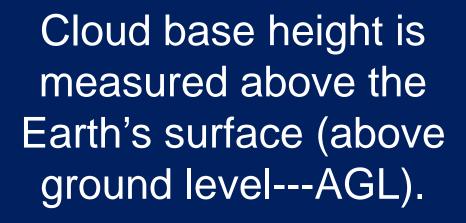
Reduced Visibility: Smoke, dust, haze, fog reducing visual range to 3.2 km (Day) or

5 km (Night); No flights if below these minimum limits. Severe Weather: Thunderstorms, lightning, heavy rain, excessive winds, or other weather extremes.

Height of the Cloud Base

There may be different types of clouds forming at different altitudes above the ground.

Always report the height of the lowest cloud base for the area.





This method is very general. When combined with the cloud identification in Section 4.3, experience air crews get useful data.

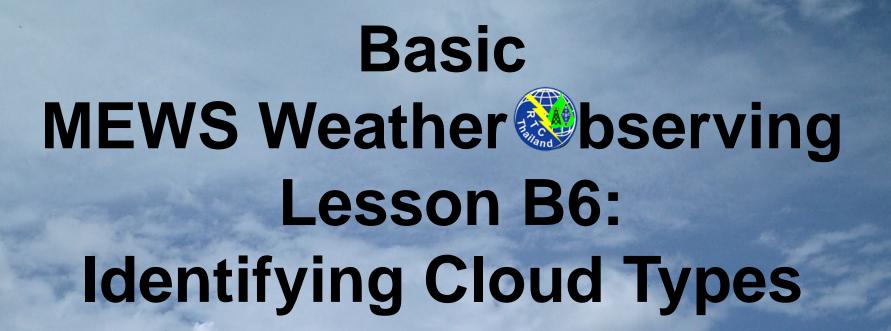
Observe the clouds on a local mountain





This is better than estimates from the cloud chart; But only if you have nearby mountains of known elevation.

See Handbook: 4.2.1 (Cloud Base Height Ceiling) Relative to a local mountain of known elevation, p. 22





Record the cloud types in Line 4.3 using the basic classification by type.

High Middle Vertically 4.3 Cloud Type Developed Low

Altostrat Altocum Stratus □ Nimstrat

△ Cirrus

Sunrise Mid-Afternoon Sunset Local time Hour→ Observer (initial; see back) Air (Dry bulb) Thermometer in shade; 1.5 m above ground Wet Bulb Difference Subtract 2.2 from 2.1: Rel. Humidity %RH %RH Dew Point Use 2.1, 2.3: Dew Pt Table Heat Stress Heat Stress Heat Stress Heat Stress Danger Level (if any from Danger □CuNim □CuNim □CuNim Frstbte10 Frstite30 Frstbte5

Long

Location Lat Lat

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

Elev

Weather Observations Time

m AMSL

°C

%RH



Conditions

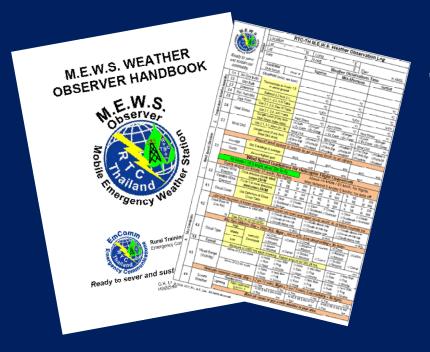
Notice the check box choices follow the layout of the yellow reminder notes based on cloud height; Low, Middle, High, and Vertically Developed.

Remember the cloud base height (Line 4.2) is for the lowest cloud type you see.

				AITOCL	allii.					1 M	toc	um	ш.					
	4.0	Cumul	□ S	Stratu	IS	-	Cui	mul	-	ı St	tratı	JS		₋ 0	Sum	nd		knts
		Julliul		Vimst	trat		Oui	Hull	10	ı Ni	ims	trat		п.	Jun	IUI		knts
			_		peea (2111012	STO		_	_	_		erani	ons			MILS
900		10			m/h idea				11011	_			_	/ 83 kr		No flic	hts	
Mind		Gusts			te/ 37 kn				_					ts/6 k				
1 5		Steady W	1		on steady	_	N	NE		SW	N	NE	S	SW	N	NE NE	S	SW
~		Direction			es FROM	WIII CO	E	SE	_	NW	E	SE	W	NW	E	SE	W	NW
	3.2	Variable		,	ore direct	tions	N	NE	S	SW	N	NE	S	SW	N	NE	S	SW
		Director			es FROM	М	Е	SE	W	NW	Е	SE	W	NW	Е	SE	W	NW
ш					in Clo	oud	□ Cle		□ Clou		□ CI		□ Clo		□ CI		□ Clo	
	4.1	Cloud Cov	rer		le le	Jua			□ Over	cast		attered	□ Ov	ercast		attered	□ Ov	ercast
		Hee least	mountain		10	on /alor	□ Bro		a lovel	l and	□ Br		a a la co	un nt e		oken	mt-nim	ton
		Use local Cloud Base		<u> </u>	, T	on (abo			a level)			ouds al				ouds ak		
		(Loc Rel)				Y	□ Clouds at mtn top			□ Clouds at mtn top			□ Clouds at mtn top					
	4.2	(200110)				SL					□ Clouds below mtn			□ Clouds below mtn				
			m De	ew Est	All	00m			F10	AGL			-	n AGL				4.01
			111 04	CH FOLL	بالالاس	700111			1111	NOL				IIAGL			- 1	n AGL
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onditions	4.3	Cloud Typ	Min. fli	ight altitu nign Middle	des: Day	= 160r	□ Alt	rus ostrat ocum	ot = 500 □Cu) m A	□ Al	rrus tostrat tocum	ud ce	eiling = CuNim	□ Alt	tostrat tocum	00	CuNim
cy Conditions	4.3	Cloud Typ	Min. fli	ight altitu	des: Day Vertic	= 160r	□ Alt	rus ostrat ocum	xt - 500) m A	□ Alt	rrus tostrat tocum	ud ce	eiling =	□ Alt	tostrat tocum	00	
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What you need to make a Basic Cloud Type Identification

Pencil



High

22,000m

5,000m

Cirrosumulus

Cirrosumulus

Cirrosumulus

Cirrosumulus

Contrait

Nimbostratus

Cumulus

Stratocumulus

Cumulonimicus

Cumulonimicus

Stratocumulus

Cumulonimicus

Cumulonimicus

Stratocumulus

Cumulonimicus

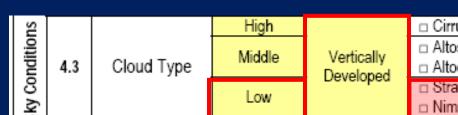
MEWS Handbook and Log Form

Cloud Identification Chart



See Handbook: 4.3 Cloud Type p. 24-26 MEWS Simplified Cloud Identification Chart, p. 25

The main concern are Low and Vertically Developed Clouds



Low clouds can limit flight altitude and visibility.
Vertically Developed clouds can mean turbulence or severe weather.

Reporting this information helps increase flight safety.

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st	rat		CUIVIII	□ Al	tostrat		MIAII	"	ΠА	ltost	rat		/UINI	111	9r °C 10
Сί	ım			□ Al	tocum				ΠА	ltocu	ım				10
itu	IS		□ Cumul	□ St	ratus	_ C	Luna	. [□ S	tratu	S		Cum	u d	5
st	rat		- Cumui	□ Ni	mstrat		um	AII	□ N	imst	rat		Julii	IUI	г
	Wind Speed / Dired	3,1	Gusts	Record h	nighest gust	km	/h	knts		km/h	knt	,	km/h		_nts knts
	9			Wind S	peed Guid				oter F				Minis		MING
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		4.1	Cloud Cover		□ Clear □ Cloudy □ Scattered □ Overcast					□ Cloudy □ Overcast		□ Clear □ Cloudy □ Scattered □ Overcast			
		4.1	9		\e	e Scattered Overcast Scattered Broken Broken					_ Overcasi	: □ Sc		- OW	ercast
	ı				tion (abo	tion (above mean sea level) and report clouds above					above, at			ntain	top.
			Cloud Base Ht	R	tn	□ Clouds				ouds abo			□ Clouds above mtn □ Clouds at mtn top		
		4.2	(Loc Rel)		GI.	☐ Clouds				ouds at r ouds bel			ouds at ouds be		
			m	Dew Est	J1000m	LI CIDAG	zeiow	m AGL	0.01	owns wer	m AGI	_	June Ne		n AGL
			Mii	n. flight altitud	ies: Day = 160i	n AGL; N	ight –	500 m A	IGL; Lo	ow clou	d ceiling	- No file	ghts.		
Ī	ξĺ			nign		□ Cirrus	-4	CuNim	U CI	rrus tostrat	CuNim	LI CIP	rus ostrat	_C	CuNim
	ry Condition	4.3	Cloud Type	Middle	Vertically	□ Altostr □ Altocu				tostrat tocum		□ Alt			
	8	4.0	Olouu Type	Leur	Developed	□ Stratus		- C	□ St		□ Cumui	- Ch		۱.	C
	5			Low		□ Nimstr	at l	Cumul		mstrat		n Nir	nstrat	0.0	Cumul
		4.4	Rainfall		e at 0900 hrs e 3.2 km mark			eport an			4 hrs. less than		-	less	mm
	4.			Name of	3.∠ KM mark	□ more □ Rain	□ Fo		o mo		Fog	□ mo		less i Foa	inan
			Visual Range			□ Haze		noke	□ Ha		Smoke	□ Ha		Smo	ke
		4.5	(Visibility)	Name of	3.2 km mark	□ more		s than	□ mo		less than	□ mo		less	than
						□ Rain □ Haze	□ Fo	ig noke	o Ra		Fog Smoke	□ Ra		Fog Smo	ko
			Heliconte	erminimum v										ne.	
					lerstorms	□ Yes		□ No	□ Ye		□ No			,	□ No
		4.6	Severe	Lightning	Flash, count secs to boom / 3	N NE E	SE S SV				SW W NW		E E SE S	5 SW V	
		1.0	Weather	-5	1103 km 0.103 km						km				
			Warn air crews of any severe weather in your area.												
- 12		100 DT	TO THE OWNER A	II sinhte sacan	~ 4										

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

%RH

Elev

%RH

Weather Observations Time

Mid-Afternoon

m AMSL

°C

°C

%RH

Sunset

Long

Sunrise

Long

Hour→

Location Lat

Local time

Observer (initial; see back)

Thermometer in shade; 1.5

m above ground

Subtract 2.2 from 2.1:

Use 2.1, 2.3; R H Table

Use 2.1, 2.3; Dew Pt Table

Lat

Air (Dry bulb)

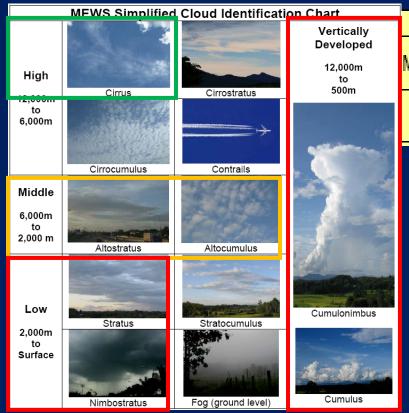
Wet Bulb Difference

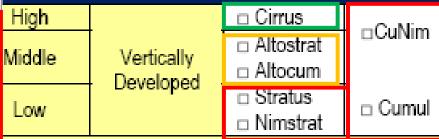
Rel. Humidity

Dew Point



Notice the layout of the selected cloud types follows the layout of the Cloud ID Chart





Due to space limitations on the form, not all cloud types are listed with check boxes.



The selected cloud types listed enable MEWS Observers to characterize sky conditions sufficiently to provide meaningful weather data to support emergency flight operations.

Basic Cloud Forms

Cirroform (curly)

Stratiform (flat)

Cumuloform (lumpy)



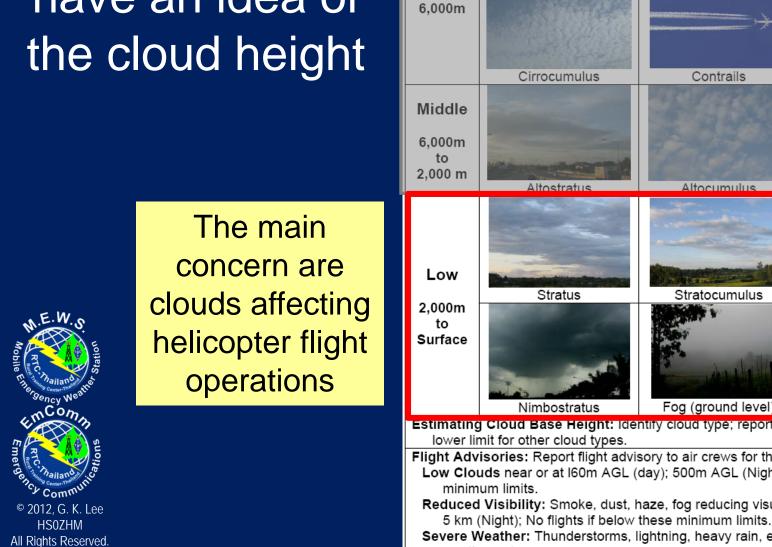


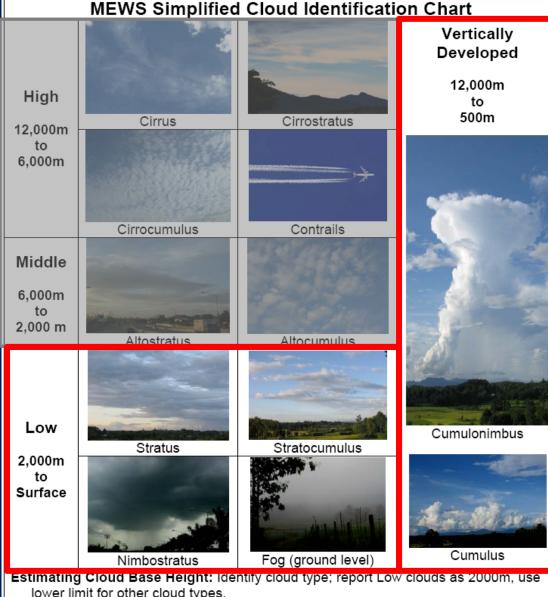


The cloud shape is a clue to its height and type.



If you know the cloud type you have an idea of





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

Reduced Visibility: Smoke, dust, haze, fog reducing visual range to 3.2 km (Day) or

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



Basic MEWS Weather bserving Lesson B7: Estimating Visual Range

Depending on your local area, this could be the most challenging item on the Basic MEWS observation list.



Critical Ranges for MEWS

3.2 km in Daylight 5 km at Night

Advise flight crews
when visibility is below
these limits.
We do not control
flight operations. We
provide updated
weather reports to aid
flight operations.

See Handbook: 4.5 Visual Range (Visibility), p. 28-29



	_	la.			RTC-TH	M.E.W.	S. Weath	ner Obse	rvation	Log							
	M.E.	W.S.		Location													
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_	~	tain our		24-hr format	Hour→												
	comm	unity.		Observer (initi	ial: see back)												
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E E	2.2	Wet Bu	b	m above	ground		°C		°C		°C						
Į	2.3	Differen	ce	Subtract 2.2 from 2.1;			°C		°C		°C						
ve H	2.4	Rel. Humi	idity	Use 2.1, 2.3; R H Table			%RH		%RH		%RH						
ati	2.5	Dew Poi	int	Use 2.1, 2.3; (Dew Pt Table		°C		°C		°C						
Temperature / Relative Humidity				Use 2.1, 2.4		Hant Ctu		Heat Street		Heat Ctre							
Inte	2.6	Heat Stress		Heat Stress		Heat Stress		Heat Stres		Danger Level	*	Heat Stress □Cautn	□Danger	Heat Stress	□Danger	Heat Stress □Cautn	□Danger
era				Heat Stress			□Ex Dangr	□ Ex Cautn		□ Ex Cautn							
dua				Use 2.1, 3.1;		Wind Chill.	°C	Wind Chill.	°C	Wind Chill.	°C						
Ĕ	2.7	Wind Ok	ill			□Trvl Dngr	□Frstbte10	□Trvl Dngr	□Frstbte10	□Trvl Dngr	□Frstbte10						
7	2.7	Wind Chil		Danger Level Wind Ch		□TShltr Dgr	□Frstite30	□TShltr Dgr	□Frstite30	□TShltr Dgr	□Frstite30						
					-	□Frostbite	□Frstbte5	□Frostbite	□Frstbte5	□Frostkite	□Frstbte5						
				Report	wind speed	in knots	to air crev	ws; km/h to	all others	3.							
ig.	3.1	Average		Get 3 readings & average		lean the	bake	lean In	bate	lens in	bate						
l se		Gusts		Daniel III	about most	km/h	knts	km/h	knts	km/h	knts						
Ö		Gusts		Record hig		km/h	knts	km/h	knts	km/h	knts						
Wind Speed / Direction					eed Guide												
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ಣ	3.2	Variable V				N NE	S SW	N NE	S SW	N NE	S SW						
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						□ Clear	□ Cloudy	□ Clear	□ Cloudy	□ Clear	□ Cloudy						
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		Harde	Ler			□ Broken	a lauri au t	Broken	a a la aura a a d	□ Broken	manin to a						
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		Loc Rei		Netative to	Journal Will	☐ Clouds at		□ Clouds at		□ Clouds at							
	4.2				m AMSL	□ Clouds be		□ Clouds be		□ Clouds be							
			m				m AGL		m AGL		m AGL						
			_ /	Min. flight altitude	es: Day = 160n		t - 500 m A		ud ceiling =								
Sky Conditions			1	High		☐ Cirrus ☐ Altostrat	□CuNim	☐ Cirrus ☐ Altostrat	CuNim -	☐ Cirrus ☐ Altostrat	□CuNim						
iji ji	4.3	Cloud Ty	De.	Middle	Vertically	☐ Altocum		□ Altocum		□ Altocum							
S		J.J.W. 1 3	in a	Low	Developed	□ Stratus	□ Cumul	□ Stratus	□ Cumul	□ Stratus	□ Cumul						
l Š						□ Nimstrat		□ Nimstrat		□ Nimstrat	Li Cumui						
	4.4	Rainfal		Measure	at 0900 hrs e	ach morning	. Report am	ount for last 2	24 hrs.		mm						
4				the or s.	2 Kiff Mark	□ Rain (□ Foot	□ Rain □	jiessunan ⊒ Foot	□ Rain □	Fog						
		Visual Ra	nge				□ Smoke		Smoke		Smoke						
	4.5	(Visibilit	y)	Name	2 km mark		less than		less than		less than						
							□ Fogi □ Smoke		Fog		Fog						
	-	Но	lico	pterminimum vis	iihilihu: Day -				Smoke		Smoke						
		110			rstorms	□ Yes	nes, rwyrn = . □ No	□ Yes	□ No	□ Yes	unio □ No						
	4.6	Severe	,	FI	ash, count secs	N NE E SE	5 SW W NW	N NE E SE S	S SW W NW	N NE E SE							
		Weather Lightning to boom / 3			□ Yes	km	□ Yes	km	□ Yes	km							
	4.0	vveatne	el .														
	4.0	vveatne	el .				of any seve										

Record the Visual Range in Section 4.5

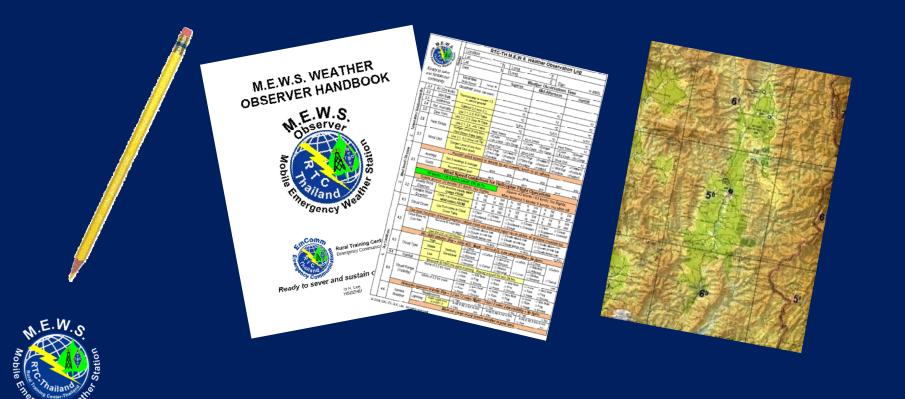
ŕ			Name of 3.2 km mark	□ more	□ less than
				□ Rain	□ Fog
		Visual Range		□ Haze	□ Smoke
	4.5	(Visibility)	Name of 3.2 km mark	□ more	□ less than
				□ Rain	□ Fog
				□ Haze	□ Smoke
		Helicopto	er minimum visibility: Day = 3	3.2 km / 2	miles; Night
4					
					ei -

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

		_	RTC-TH M.E.W.S. Weather Observation Log								
		W.E	W.S	Location							
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	No.	った		Lat	N			F	Elev		m AMSL
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		-	stain our	24-hr format	Hour→						
			nunity.	Observer (init	fial: con kank)						
				T	iidi, see wackj						
		2.1	Air (Dry bulb)		r in shade; 1.5	°C			°C		°C
	₿.	2.2	Wet Bulb	m abov	e ground		°C		°C		°C
	Ē	2.3	Difference	Subtract 2.2 from 2.1;			°C		°C		°C
	Ve H	2.4	Rel. Humidity	Use 2.1, 2.3	3; R H Table		%RH		%RH		%RH
	Relative Humi dity	2.5	Dew Point	Use 2.1. 2.3:	Dew Pt Table		°C		°C		°C
					4 ; HSI Table	Heat Stress	°C	Heat Stress	°C	Unat Ctares	
	ature/	2.6	Heat Stress		el (if any from		Danger		Danger	Heat Stress □Cautn	□Danger
	pera				Index table)	□ Ex Cautn		□ Ex Cautn		□ Ex Cautn	
				Use 2.1, 3.1;	Wind Chl Tbl	Wind Chill.	°C	Wind Chill.	°C	Wind Chill.	°C
is t	har	1	Wind Chill	Danger Levi	el (if any from		□Frstkte10		□Frstbte10	□Trvl Dngr	□Frstbte10
g					hill chart)		□Frstite30	□TShitr Dgr		□TShltr Dgr	□Frstite30
nol	۵,			Papar	t wind speed		□Frstbte5		=Frstbte5	□Frostbite	□Frstbte5
						i iii kiiota i	o all crei	vo, Killini to	all outers	3.	
is t	har	n	Average	Get 3 readin	gs & average	km/h	knts	km/h	knts	km/h	knts
g			Gusts		ighest gust	km/h	knts	km/h	knts	km/h	knts
noł	(e				peed Guide						
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IVI	gn	ıt =			/ 37 km/h; N			tailwind 5			
			Chamalar Minal	Circle direction steady wind			S SW	N NE	S SW		
		Steady Win				N NE				N NE	S SW
	%	3.2	Direction	comes	FROM	E SE	W NW	E SE	W NW	E SE	W NW
	3.	3.2	Direction Variable Wind	Circle 1 or m							
	3.		Direction Variable Wind Direction	Circle 1 or m wind con	FROM ore directions nes FROM	E SE N NE E SE	W NW S SW	E SE N NE E SE	W NW S SW	E SE N NE	W NW S SW
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To make a Visual Range observation and report you can use local knowledge or a local topographic map

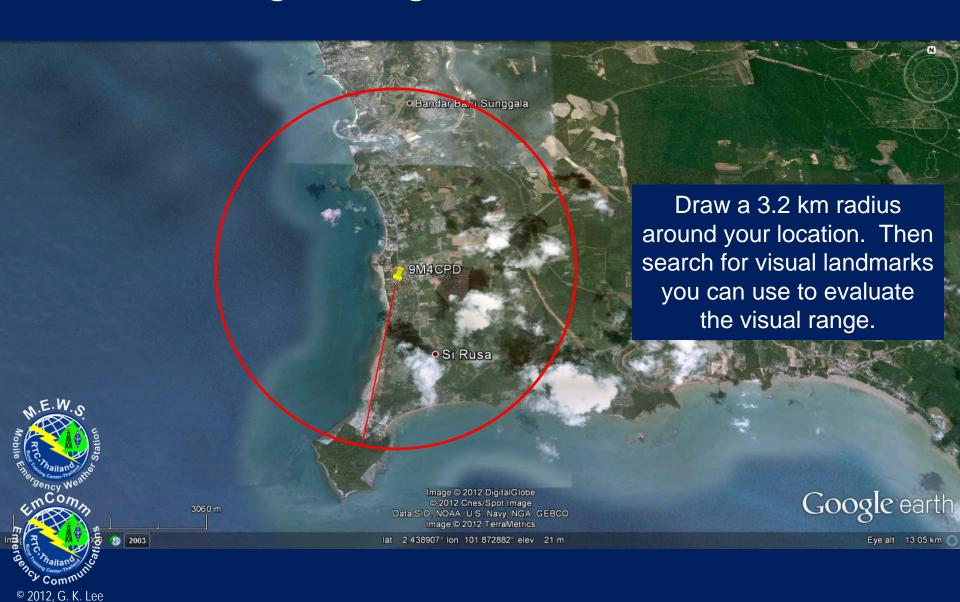


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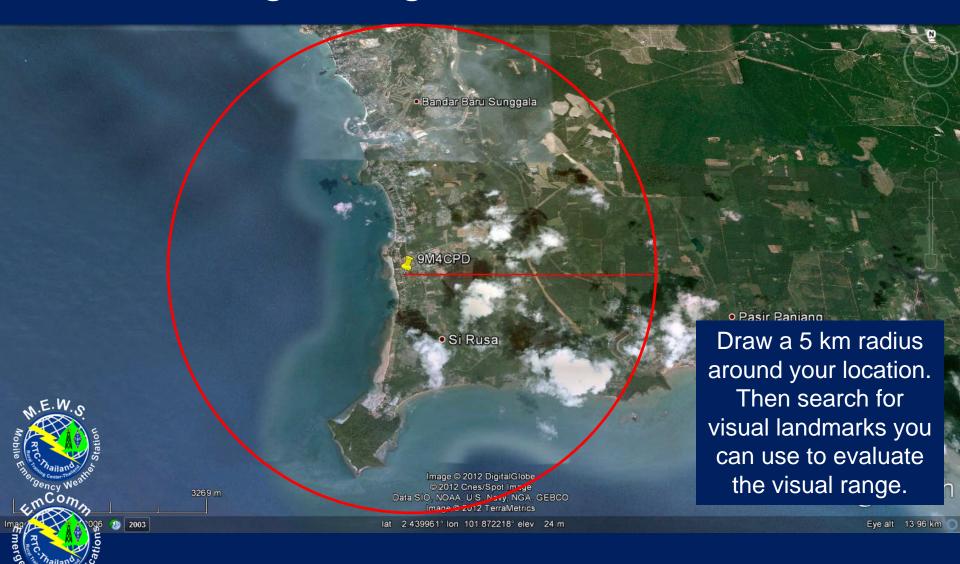
Find easily seen landmarks 3.2 km and 5 km away from your observation post.

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3 Km Range Ring for Thistle Port Resort



5 km Range Ring for Thistle Port Resort



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Severe storm wind conditions, cloud type, visibility and rain are reported in other parts of the MEWS form

Report Thunderstorms & Lightning hazards in Section 4.6

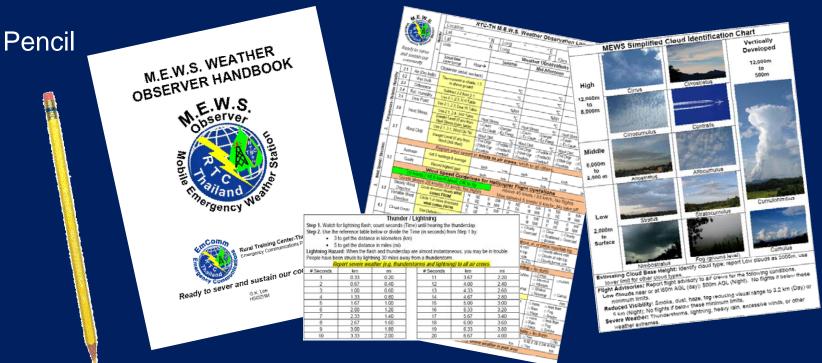
Section 4.6 is specifically for Thunderstorms and Lightning.

See Handbook: 4.6 Severe Weather, p. 29-30

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What you need to have to report severe weather conditions



MEWS Handbook, Log form, Flash-boom reference card

Cloud Identification
Chart

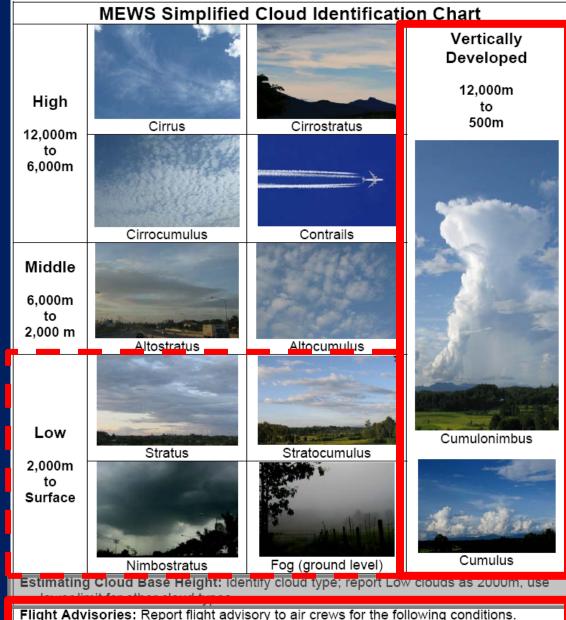
A current MEWS Log form is your primary resource to report severe weather conditions.



The main concern are clouds affecting helicopter flight operations (low and thunderstorm clouds)



Severe weather is often associated with Cumulonimbus cloud formations.



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.



Lightning: Distance to Storm Estimation /4



You can use the "Flash to Boom" method to estimate thunderstorm distance to your station.

1 one thousand...



2 one thousand... 3 one thousand.... BOOM

3/3 = 1 km

- 1. See the lightning "Flash"
- 2. Count number of seconds until you hear the thunder "Boom" of the.
- 3. Divide the number of seconds by 3 = theestimated distance in km.



Report to flight crews the estimated distance and direction of lightning / thunderstorms to your station.

Seek safety any time you see lightning.

Wait 30 min after hearing the last thunder before resuming work outdoors.



Record the flash / boom results

In Section 4.6 and circle the letter(s) for the direction of the storm relative to your location.

					S	TO KHOG	s / To.5 kill/ill lucal	i, OK to ily	Whose 42 M	HOLS / OS KI	11/11, 140	ligints.
					밀	Gusts abov	e 20 knots/ 37 kn	n/h: No fliahts	Max tailwind:	5 knots/ 6 k	m/hr; No	take off
		Ihu	nderstorms	□ Yes	□ No	□ Yes	□ No	□ Yes	□ No	S SW	N NE	S SW
	Severe		Flash, count secs	NINE E SE :	5 SW W NW	NINE EISE:	5 SW W NW	NINE E SE	5 SW W NW	W NW	E SE	W NW
4.6	Weather	Lightning	to boom / 3	□ Yes	km	□ Yes	km	□ Yes	km	S SW W NW	N NE E SE	S SW W NW
			Wai	m air crews	of any seve	re weather i	in your area			□ Cloudy □ Overcast	□ Clear	□ Cloudy red □ Overcast
							Cover rable	□ Broken	□ Broken		□ Broker	
						Use local moun	tain of known elevation	n (above mean sea	level) and report doug	ls above, at.	r below m	ountain top



If lightning is present, check "Yes" and indicate distance and direction from your position.

See Handbook: 4.6 Severe Weather (Flash / Boom method) p. 30

γ.	se	ven	e weatner	ın you	r area.				□ Cloudy □ Overcast	Clear Scatten	ed Overcast	
ī				- 00	er rapie	□ Broken		□ Broken	D Overous:	□ Broken	ew D Overcost	
ı	Ī		Use local mou	ntain of know	wn elevation (abo	ove mean se	a level) and	report cloud	ds above, at, o	or below me	ountain top.	
4			oud Base Ht	Relative	to local Mtn	☐ Clouds ak	ove mtn	□ Clouds a	above mtn	□ Clouds above mtn		
ı		4.2	oc Rel)			□ Clouds at	mtn top	□ Clouds a	at mtn top	□ Clouds at mtn top		
П		4.2			m AMSL	☐ Clouds be	elow mth	☐ Clouds k	elow mtn	□ Clouds	below mtn	
ı			m		A-1E/10)1000m		m AGL		m AGL		m AGL	
ı			Mi		ides: Day = 160r		t - 500 m A		oud ceiling =			
4	S			High	_	□ Cirrus	CuNim	□ Cirrus	CuNim -	□ Cirrus	. □CuNim	
П	≝I			Middle	Vertically	□ Altostrat		□ Altostrat		□ Altostra	t	
П	8	4.3	Cloud Type		Developed	□ Altocum	4	□ Altocum		□ Altocum	<u> </u>	
П	Sky Conditions			9W		□ Stratus □ Nimstrat	□ Cumul	□ Stratus □ Nimstrat	□ Cumul	□ Stratus □ Nimstra	. □ Cumul	
П	š	4.4	Rainfall	A.C. CO.	ire at 0900 hrs e		Popost am			LI NIIIIStra	mm	
П		7.7	Namiali		3.2 km mark		less than	more	□ less than	□ more	□ less than	
п	4.			Name	3.2 KIII IIIairk		Fog	□ Rain	□ Fog	□ Rain	□ Fog	
п			Visual Range				: Smoke	□ Haze	□ Smoke	□ Haze	□ Smoke	
П		4.5	(Visibility)	Name o	f 3.2 k mark		less than	□ more	□ less than	□ more	□ less than	
ı		7.0	(violenty)	Trum'c o	O.E II.		Fog	□ Rain	□ Foq	D Rain	□ Fog	
П							Smoke	□ Haze	□ Smoke	□ Haze	□ Smoke	
ı			Helicopti	e <i>r minimum</i>	visibility: Day - 3	3.2 km / 2 mi	les; Night -	5 km / 3 mi	les; Low visit	oility - No		
Ī				Thun	derstorms	□ Yes	□ No	□ Yes	□ No	□ Yes	□ No	
		4.6	Severe	Lightning	Flash, count secs		5 SW W NW	ı	S SW W NW	1	E 5 SW W NW	
		4.0	Weather	Ligitaling	to boom / 3	□ Yes	km	□ Yes	km	□ Yes	km	
					Wai	Warn air crews of any severe weather in your area.						
				0.2.14								

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

Long

Heat Stress

□Danger

□Cautn

Wind Speed Guidelines for Helicopter Flight

Hour→

Sunrise

Elev

%RH

Danger

Weather Observations Time

Mid-Afternoon

Heat Stress

o Cauth

m AMSL

°C.

Sunset

Heat Stress

□Cautn

Location

Local time

24-hr format

Observer (initial; see back)

Thermometer in shade; 1.5 m above ground

Subtract 2.2 from 2.1:

Use 2.1. 2.3: R.H.Table

Use 2.1, 2.3; Dew Pt Table
Use 2.1, 2.4; HSI Table

Danger Level (if any from

Heat Stress Index table)
Use 2.1, 3.1; Wind Chl Tbl

Danger Level (if any from

Get 3 readings & average

Record highest gust

<u>Lat</u> Lat

and sustain our

Air (Dry bulb)

Wet Bulb Difference

Rel. Humidity

Dew Point

Heat Stress

Wind Chill

Average

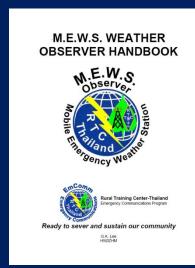
Gusts

Free Self-Study Materials by Internet

- RTC-TH Weather Observer Handbook
- Illustrated PDF topical lessons www.neighborhoodlink.com/RTC-TH_Tech/pages

All of the lessons have been classroom and field proven.

Send e-mail to
HSØZHM@gmail.com to
request free training materials
for non-commercial use only.



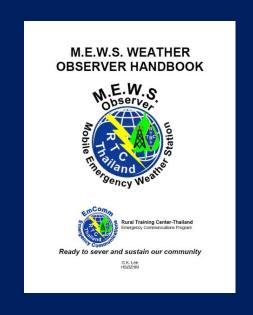




These materials are in English. Volunteer assistance for translation to other languages is welcomed and will be acknowledged and cited.

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

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**



Basic MEWS PDF Lessons







3 Orientation and 8 Basic lessons.

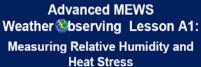
Some show how to build your own weather equipment.

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











Advanced MEWS
Weather Observing Lesson A4:
Measuring Rainfall





Advanced MEWS
Weather bserving Lesson A6:
Weather Forecasting





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

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



Contact Greg, HSØZHM MEWS Creator / Mentor







Via E-mail hsØzhm@gmail.com



Via Skype video conference call: rtc_th



When you're at the end of your rope, it's too late to start EmComm planning!

Start today and prepare before it is too late.



Community-based Environmental Education for





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The End

Continue to see the Addenda on Basic Weather Forecasting

www.neighborhoodlink.com/RTC-TH_Tech/pages E-mail: hsØzhm@gmail.com

Something Extra (if you are interested) Quick look at weather forecasting

This topic is covered in more detail in Lesson A6





Basic Weather Forecasting by Cloud Observation

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



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

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) and Cloud Type (4.3)



Watch for changes over time.

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

П	_	- 101		RTC-TH M.E.W.S. Weather Observation Log							
	M.E.	E.W.s		Location							
M _o		5 A S	_	Lat °	" " N	l Lon	g °	"Е			
bile	37	Stat	Header	Lat	١	Long]	Е	Elev		m AMSL
L.	Mar	d Weather	<u> </u>	Date			We	ather Obse	rvations	Time	
			-			Sı	ınrise	Mid-Afte	ernoon	Sun	iset
Ready to				Local time	Hour→						
aı	na sus comn	stain our		24-hr format							
Щ,	COIIII	iuriity.		Observer (initial; see back)							
dity	2.1	Air (Dry b	ulb)		eter in shade; 1.5		°C		°C		°C
	2.2	Wet Bulb		m above ground			°C		°C		°C
를	2.3	3 Difference		Subtract 2.2 from 2.1;			°C		°C		°C
ive	2.4	Rel. Humidity		Use 2.1, 2	2.3; R H Table		%RH		%RH		%RH
elat	2.5	Dew Point		Use 2.1, 2.3	3; Dew Pt Table		°C		°C		°C
Temperature / Relative Humidity				Use 2.1, 2	2.4 ; HSI Table	Heat Stre	ss °C	Heat Stress	°C	Heat Stress	°C
atur	2.6	Heat Stre	ess		vel (if any from	□Cautn	□Danger	□Cautn	□Danger	□Cautn	□Danger
nper					ss Index table)		tn □Ex Dangr	□ Ex Cautn		□ Ex Cautn	
Terr		Wind Chill		Use 2.1, 3.	1; Wind Chl Tbl	Wind Chil		Wind Chill.	°C	Wind Chill.	°C
2.	2.7				vel (if any from	□Trvl Dngr □TShltr Dg			□Frstbte10 □Frstite30		□Frstbte10 □Frstite30
					Chill chart)	□Frostbite	□Frstbte5	□Frostbite	□Frstbte5	□Frostbite	□Frstbte5
				Repo	ort wind speed	in <i>knot</i>	s to air cre	ws; km/h to	all other	S.	
tion		Averag	e	Get 3 read	lings & average	km/l	n knts	km/h	knts	km/h	knts
irec		Gusts		Record	highest gust						
d / b	3.1	Custs				km/h		km/h	Operati	km/h	knts
Wind Speed / Direction		Wind Speed Guid 10 knots / 18.5 km/h ideal; OK						bove 45 kn			ıhts
nd S		Gusts above 20 knots/ 37 km/h; t					x tailwind 5				
8		Steady Wind		Circle direct	tion steady wind	N NE	S SW	N NE	S SW	N NE	S SW
3.	3.2	Direction			es FROM	E SE	W NW	E SE	W NW	E SE	W NW
		Variable V			more directions omes FROM	N NE E SE	S SW W NW	N NE F SF	S SW W NW	N NE F SF	S SW W NW
						□ Clear	□ Cloudy		□ Cloudy		□ Cloudy
	4.1	Cloud Cover Use Definitions in Cover Table Use local mountain of known eleva		Use Definitions in Cloud		□ Scattere	ed 🗆 Overcast	□ Scattered		□ Scattered	
					Broken	ena lovol\ and	Rroken	ahovo at	or holow mou	ntain ton	
		Cloud Base Ht (Loc Rel)			to local Mtn		above mtn	□ Clouds abo		Clouds ab	
	4.2					□ Clouds	at mtn top	□ Clouds at r	mtn top	□ Clouds at	mtn top
	7.2			DawCal (2.1	m AMSL 1-2.5)/9.8x1000m	□ Clouds	below mtn m AGL	□ Clouds bel	ow mtn m AGL	□ Clouds be	low mtn m AGL
			- 11	Min dink - kik	-/ Poss 100	A C.L. NI:	FAO	101.1	III AGL	Ma Gialeta	III AGL
ns	4.3			High		□ Cirrus	CuNim	□ Cirrus	CuNim	□ Cirrus	□CuNim
ditio		Cloud Type	Middle	Vertically	□ Altostra □ Altocum	t	□ Altostrat	Louiviiii	□ Altostrat	Louiviiii	
y Conditions				Developed	□ Stratus	_	□ Altocum □ Stratus		□ Altocum □ Stratus	- 01	
S				Low		n Nimstra		□ Nimstrat	□ Cumul	□ Nimstrat	□ Cumul
Ĭ.	4.4	Rainfa			ire at 0900 hrs e	ach mornir	ng. Report an □ less than	nount for last 2	4 hrs. less than	nore =	mm less than
4.			Name of 3.2 km mark		□ Rain	□ Fog		Fog		Fog	
		Visual Ra				□ Haze	□ Smoke		Smoke	□ Haze □	Smoke
		(Visibility)		y) Name of 3.2 km mark		□ more □ Rain	□ less than □ Fog		less than Fog		less than Fog
						□ Haze	□ Smoke		Smoke		Smoke
		Не	elica		visibility: Day = 3						
		Severe	٩		derstorms Flash, count secs	□ Yes N NE E S	□ No ESSWWNW	□ Yes N NE E SE S	□ No SW W NW	☐ Yes N NE E SE S	□ No S SW W NW
	4.6		Weather	Lightning	to boom / 3	□ Yes	km	□ Yes	km	□ Yes	km
					Wai	rn air crew	s of any sev	ere weather ii	n your area	1.	

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		Increasing cover

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



See Handbook: Appendix 2.

pp. 32-34 (Forecasting with clouds)

pp. 34-35 (Advanced Forecasting)

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

Weather Forecasting is Advanced MEWS Lesson A6

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



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

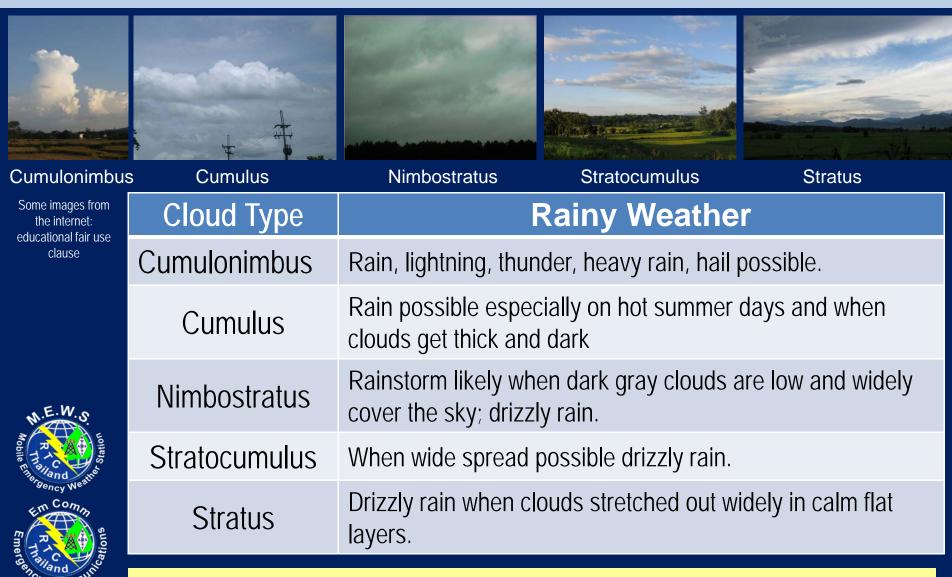


Altocumulus clouds



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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I EmComm, therefore I am.

I didn't, therefore I am not







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