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METEOROLOGY FOR AUSTRALIA

**CHAPTER 29 – WEATHER SERVICES, FORECASTS AND
REPORTS**

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CONTENTS	PAGE
METEOROLOGICAL SERVICES – DEFINITIONS AND REGULATIONS	5
INTRODUCTION	5
AUSTRALIAN GOVERNMENT BUREAU OF METEOROLOGY AVIATION PRODUCTS	5
SIGNIFICANT FORECAST AND REPORT ABBREVIATIONS AND TERMS	6
CLOUD COVER	6
CUMULONIMBUS CLOUD	9
CLOUD HEIGHT DATUM	10
CHANGE GROUPS	11
TEMPO	11
INTER	12
FROM	13
UNTIL	15
BECOMING	16
PROBABILITIES	18
VISIBILITY	20
FORECAST REQUIREMENTS	20
ALTERNATE REQUIREMENTS DUE TO WEATHER CONDITIONS (ATC AU 303).....	22
APPLICATION WITH A TAF	22
APPLICATION WITH A TTF	23
INTER	27
ROUTINE METEOROLOGICAL AERODROME REPORT (METAR) AND SPECIAL SELECTED REPORT (SPECI)	28
INTRODUCTION	28
METAR	28
SPECI	28
FORMAT	29
DECIPHERING THE METAR	29
CAVOK	36
METEOROLOGICAL ADVICES – SIGMET AND AIRMET	44
INTRODUCTION	44
SIGMET	44
AIRMET	45
SIGMET VS AIRMET	46
RESPONSIBILITY FOR PUBLISHING SIGMET/AIRMET	46
DECIPHERING SIGMET/AIRMET ADVICES	47
METEOROLOGICAL ADVICES – VOLCANIC ASH ADVISORY	52
INTRODUCTION	52
DECIPHERING VOLCANIC ASH ADVISORIES	52
TERMINAL AERODROME FORECAST (TAF)	58

INTRODUCTION 58

TAF SERVICE PROVISION 58

FORMAT.....	59
DECIPHERING A TAF	59
IDENTIFIER	59
LOCATIONS	60
TIME	61
VALIDITY PERIOD	61
WIND	61
DIRECTION AND SPEED	61
VARIABLE WIND	62
GUSTING WIND	62
CALM CONDITIONS	62
VISIBILITY	63
HORIZONTAL VISIBILITY	63
CAVOK.....	63
WEATHER	63
WEATHER	64
CLOUDS	66
AMOUNTS	66
HEIGHTS	66
CLOUD LAYERS	66
CLOUD TYPES	67
CLEAR SKIES	67
OBSCURED SKIES	67
CHANGE GROUPS	68
REMARK	69
TEMPERATURE	69
ATMOSPHERIC PRESSURE (QNH).....	70
ADDITIONAL INFORMATION	70
 TREND FORECAST (TTF)	71
INTRODUCTION	71
VALIDITY PERIOD	71
PRECEDENCE	71
AVAILABILITY	71
FORMAT.....	72
DECIPHERING THE TTF	72
NOSIG	72
FM	73
INTER AND TEMPO	73
TURBULENCE 74	
 AREA FORECAST (ARFOR)	75
INTRODUCTION.....	75
AVAILABILITY	75

VALIDITY PERIOD	76
FORMAT	76
DECIPHERING AN ARFOR.....	77
MESSAGE IDENTIFIER.....	77
VALIDITY PERIOD.....	77
AREA NUMBER	77
OVERVIEW	77
SUBDIVISIONS.....	79
WINDS AND TEMPERATURES	80
CLOUD	80
WEATHER.....	81
VISIBILITY.....	82
FREEZING LEVEL	83
ICING	83
TURBULENCE	84
CRITICAL LOCATIONS	85
REMARKS	85
FIXED TIME PROGNOSTIC UPPER WIND AND TEMPERATURE CHARTS	86
INTRODUCTION	86
ROUTE SECTOR WINDS (RSWT)	86
GRID POINT FORECASTS	87
WIND AND TEMPERATURE CHARTS	88
SIGNIFICANT WEATHER CHARTS (SIGWX)	91
INTRODUCTION	91
PUBLISHING INFORMATION	91
CHART VALIDITY AND PUBLISHING INFORMATION.....	91
CHART SYMBOLS AND USAGE	92

METEOROLOGICAL SERVICES – DEFINITIONS AND REGULATIONS

INTRODUCTION

The Bureau of Meteorology is Australia's national weather, climate and water agency. Through regular forecasts, warnings, monitoring and advice spanning the Australian region and Antarctic territory, the Bureau provides one of the most widely used services of government.

The forecasting and reporting formats in use are derived from the World Meteorological Organization (WMO) formats and the aviation specific reports and forecasts also adhere to ICAO prescripts.



AUSTRALIAN GOVERNMENT BUREAU OF METEOROLOGY AVIATION PRODUCTS

The following are products and services that the Bureau of Meteorology supplies to the aviation environment:

- Aviation Warnings and Advises
 - Australian and International SIGMET
 - Volcanic Ash SIGMET and Advisories.
- Aviation Forecasts
 - Terminal Trend Type Forecasts (TTF)
 - Aerodrome Forecast (TAF)
 - Area Forecast (ARFOR)
 - Area QNH
 - Significant Weather Charts (SIGWX)
 - Grid Point Winds
 - Wind and Temperature Charts
 - Route Sector Winds and Temperatures
- International Forecasts
 - International Terminal Aerodrome Forecast (TAF)
 - International Significant Weather Charts (SIGWX)
 - East Timor Forecast

- Aviation Weather Observations
 - METAR and SPECI
- General Weather Observations
 - All latest weather per state and territory
 - Weather Watch Radar Network
 - Satellite Imagery
- National Weather Charts
 - Current and Forecast Mean Sea Level Pressure (MSLP)
 - Upper Level Analysis

SIGNIFICANT FORECAST AND REPORT ABBREVIATIONS AND TERMS

CLOUD COVER

Cloud cover is given in reports, forecasts and low level area forecasts. It gives the amount of the sky covered with cloud in increments of eights (OKTAS). The type of cloud will not be reported or forecasted with the exception of CB's and Towering Cumulus Clouds (TCU) The following abbreviations are used:

CAVOK – Ceiling and Visibility OK

CAVOK is used when:

- Visibility greater than 10km
- No cloud below 5000ft or below the highest sector altitude (whichever is greater) and no CBs
- No precipitation, thunderstorms, shallow fog, low drifting snow or dust devils



Whenever a total of BKN middle or low cloud cover at or above 5000 ft is present and CAVOK was used, the cloud amount and bases are given.



SKC – Sky Clear

Sky clear is used in reports during cloudless conditions when CAVOK (see below) cannot be used.



NSC – No Significant Cloud

NSC is used when either CAVOK or SKC is not appropriate.

The difference between CAVOK, SKC and NSC can be summarised with the following table which indicated the weather conditions that should be adhered to for any of these codes to be used

Weather Condition	CAVOK	SKC (Not used in the USA)	NSC (Not used in the USA)
Visibility	> 10 km	No limit	No limit
Cloud below 5000ft (or the highest MSA if greater than 5000ft)	Nil	Nil	Only minor cloud formation allowed
Cloud above 5000ft (or the highest MSA if greater than 5000ft)	Can be present with the exception of CB or TCU	Nil	Can be present with the exception of CB or TCU
CB's and/or TCU's	No CB's or TCU's	Nil	Nil
Significant Weather Conditions	Nil	Can be present	Can be present

FEW - Few clouds

FEW is used when 1 to 2 OKTAS (eights) of the sky is covered with clouds



SCT - Scattered clouds

SCT is used when 3 or 4 OKTAS (eights) of the sky is covered with clouds

BKN - Broken clouds

BKN is used when 5 or 7 OKTAS (eights) of the sky is covered with clouds



OVC - Overcast

BVC is used when 8 OKTAS (eights) i.e. the entire sky is covered with clouds.



NCD – No Cloud Detected

NCD is used with automatic weather station reports when the

automatic weather station did not detect any clouds. It also does not give any indication of CB (Cumulonimbus) or TCU (Towering Cumulus)

When there is no cloud vertically above the sensor the station may report no clouds present even if there is other cloud in the area. Pilots should take note AUTO report can be misleading in this regard

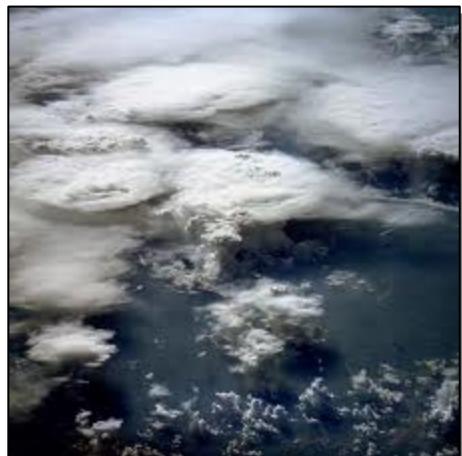
CUMULONIMBUS CLOUD

Forecasting coverage of CB's the following codes could be used:



ISOL – ISOLATED used for individual CB's.

OCNL – OCCASIONAL used for well-separated CB's



FRQ – FREQUENT used when CB's have little or no separation between them.



OBSC – OBSCURED used when the CB's are not readily visible due to haze, smoke or low cloud.



SQL – SQUALL LINE used for a broken or continuous line of thunderstorms with little or no separation (e.g. ahead of a cold front or along the ITCZ).

CLOUD HEIGHT DATUM

- Height above ground (AGL) is used for Aerodrome reports, forecasts and trend type forecasts.
- Flight Level or AMSL is used area forecast and route forecasts

CHANGE GROUPS

TEMPO

TEMPO indicates significant temporary variations from the previously given means conditions expected during a period given in TAF's or TTF's.

Each TEMPO changes will last for more than 30 but less than 60 minutes.



TAF Format: In TAF's the time period during which the temporary changes are expected is given in the format ddhh/ddhh (day and hour / day and hour)

TAF Example:

TAF YCOM 011753Z 0118/0218
18015KT 9999 FEW005 BKN020
TEMPO 0123/0202 2000 -SHSN BKN005 SCT020
RMK
T 03 00 M02 M04 Q 1008 1007 1006 1006

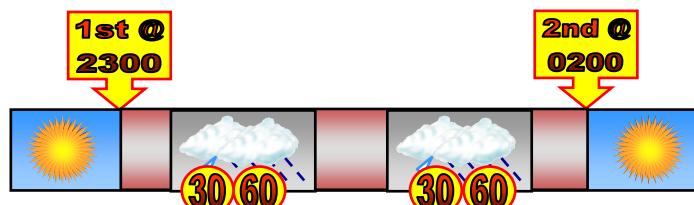
TEMPO indicates the beginning of the TEMPO change group.

0123 indicates the start of the period where **01** is the day and **23** the hour of day.

0202 indicates the end of the period where **02** is the day and **02** the hour of day.

2000 A description of what the weather condition will be during the temporary changes.

In the example the period between which the temporary changes are expected is from the 1st at 2300 hours to the 2nd at 0200 hours.



TTF Format: In TTF's the time period during which the temporary changes are expected is given in the format hhmm/hhmm (hour and minutes / hour and minutes)

TTF Example:

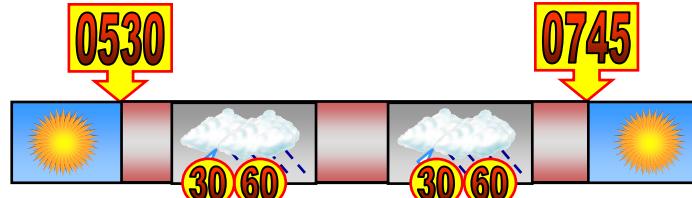
```

YSSY Tuesday, 04-May-2010 05:04:51 GMT
TTF METAR YSSY 040500Z 04012KT CAVOK 25/15 Q1015
RMK RF00.0/000.0
TEMPO 0530/0745 03015KT 9999 -SHRA SCT030
RMK TS 35NM TO NW MOV SE AT 12KT

```

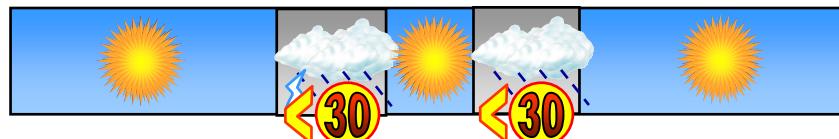
- TEMPO** indicates the beginning of the TEMPO change group.
- 0530** indicates the start of the period where **05** is the hour and **30** the minutes.
- 0745** indicates the end of the period where **07** is the hour and **45** the minutes.
- 03015KT**. A description of what the weather condition will be during the temporary changes.

In the example the period between which the temporary changes are expected is from 0600 hours to 0745 hours.



INTER

- INTER indicates significant interim variations from the previously given means conditions expected during a period given in TAF's or TTF's.
- Each INTER changes will last for less than 30 minutes.



TAF Format: In TAF's the time period during which the interim changes are expected is given in the format ddhh/ddhh (day and hour / day and hour)

Example:

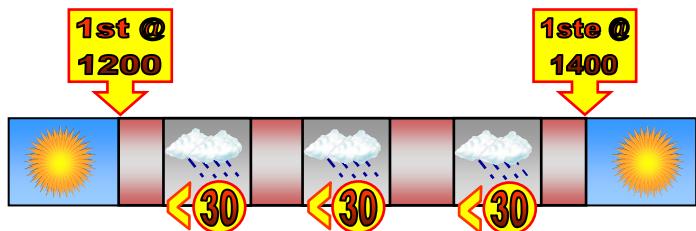
```

TAF YCOM 011753Z 0118/0218
18015KT 9999 FEW005 BKN020
INTER 0112/0114 2000 -SHSN BKN005 SCT020
RMK
T 03 00 M02 M04 Q 1008 1007 1006 1006

```

- INTER** indicates the beginning of the INTER change group.
- 0112** indicates the start of the period where **01** is the day and **12** the hour of day.
- 0114** indicates the end of the where **01** is the day and **14** the hour of day.
- 2000** A description of what the weather condition will be during the temporary changes.

In the example the period between which the interim changes are expected is from the 1st at 1200 hours to the 1st at 1400 hours.



TTF Format: In TTF's the time period during which the interim changes are expected is given in the format hhmm/hhmm (hour and minutes / hour and minutes)

Example:

```

YSSY Tuesday, 04-May-2010 05:04:51 GMT
TTF METAR YSSY 040500Z 04012KT CAVOK 25/15 Q1015
RMK RF00.0/000.0
INTER 0600/0730 03015KT 9999 -SHRA SCT030
RMK TS 35NM TO NW MOV SE AT 12KT

```

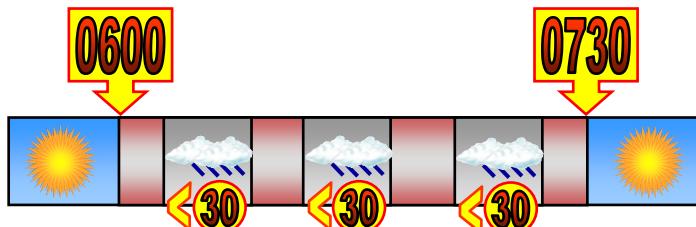
INTER indicates the beginning of the INTER change group.

0600 indicates the start of the period where 06 is the hour and 00 the minutes.

0730 indicates the end of the period where 07 is the hour and 30 the minutes.

03015KT. A description of what the weather condition will be during the interim changes.

In the example the period between which the temporary changes are expected is from 0600 hours to 0745 hours.



FROM

- The change group FM (and BECMG) are used to specify significant changes (improving and deteriorating) from the preceding information that is more lasting in nature.
- From is used to indicate the rapid development of a change is expected at the specified time.



TAF Format: In a TAF the time is specified in the format FMddhhmm (day, hour and minutes)

Example:

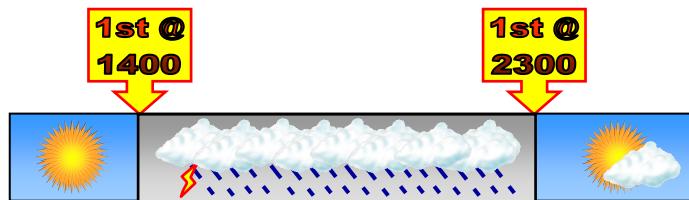
```

TAF YSSY 010435Z 0106/0206
31005KT CAVOK
FM011400 16015KT 8000 SHRA BKN008 SCT030
FM012300 23010KT 9999 NO SIG WX SCT030
RMK
T 25 21 18 15 Q 1012 1013 1014 1014

```

- FM indicates the beginning of the FROM change group.
- 01 indicates the day on which the change will occur.
- 14 (23) indicates the hour at which the change will occur.
- 00 indicates the minutes past the hour that the change will occur
- 16015KT . A description of what the weather condition will be during the interim changes.

In the example the weather will change at 1400 UTC on the 1st and then again at 2300 UTC on the 1st.



TTF Format: In a TTF the time is specified in the format FMhhmm (hour and minutes)

Example

```

YSSY Tuesday, 04-May-2010 05:04:51 GMT
TTF METAR YSSY 040500Z 04012KT CAVOK 25/15 Q1015
RMK RF00.0/000.0
FM0615 03015KT 9999 -SHRA SCT030
RMK TS 35NM TO NW MOV SE AT 12KT

```

- FM indicates the beginning of the FROM change group.
- 06 indicates the hour at which the change will occur.
- 15 indicates the minutes past the hour that the change will occur
- 03015KT . A description of what the weather condition will be during the interim changes.

In the example the weather will change at 0615 UTC on the 4th (date can be obtained from the date of the report).



UNTIL

TILL (Until) is used in conjunction with FM to indicate the beginning and end times for turbulence.

TAF Format: In a TAF the time is specified in the format FMddhhmm (day, hour and minutes), followed by the description of the turbulence, ending with TILLddhhmm (day, hour and minutes) to indicate the end of the period.

Example:

```

TAF YSSY 010435Z 0106/0206 31005KT CAVOK
FM011400 16015KT 8000 SHRA BKN008 SCT030
FM012300 23010KT 9999 NO SIG WX SCT030
RMK
FM011400 MOD TURB BLW 5000FT TILL012100
T 25 21 18 15 Q 1012 1013 1014 1014

```

FM indicates the beginning of the FROM - UNTIL change group.

01 indicates the day on which the change will occur.

14 indicates the hour at which the change will occur.

00 indicates the minutes past the hour that the change will occur

MOD... A description of intensity and vertical extent of the turbulence

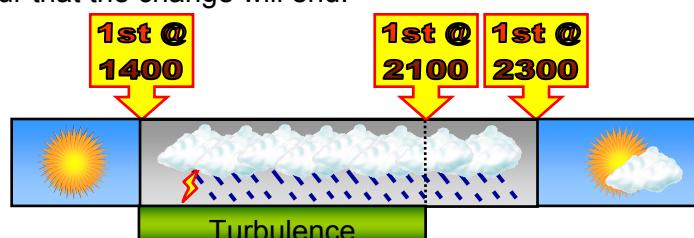
TILL indicates the end of the FROM – UNTIL change group

01 indicates the day on which the change will end.

21 indicates the hour at which the change will end.

00 indicates the minutes past the hour that the change will end.

In the example moderate turbulence below 5000 feet could be experienced between 1400 UTC on the 1st until 2100 UTC on the 1st.



TTF Format: In a TTF the time is specified in the format FMhhmm (hour and minutes), followed by the description of the turbulence, ending with TILLhhmm (hour and minutes) to indicate the end of the period.

Example

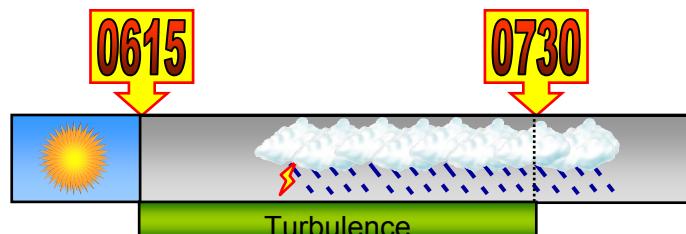
```

YSSY Tuesday, 04-May-2010 05:04:51 GMT
TTF METAR YSSY 040500Z 04012KT CAVOK 25/15 Q1015
RMK RF00.0/000.0
FM0615 03015KT 9999 -SHRA SCT030
FM0615 MOD TURB BLW 5000FT TILL0730

```

- FM** indicates the beginning of the FROM - UNTIL change group.
- 14** indicates the hour at which the change will occur.
- 15** indicates the minutes past the hour that the change will occur
- MOD...** A description of what the weather condition will be during the interim changes.
- TILL** indicates the end of the FROM – UNTIL change group
- 07** indicates the hour at which the change will end.
- 30** indicates the minutes past the hour that the change will end.

In the example the weather will change at 0615 UTC on the 4th (date can be obtained from the date of the report).

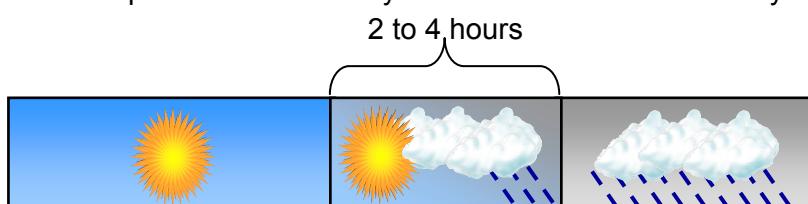


BECOMING

The change group BECMG (and FM) are used to specify significant changes (improving and deteriorating) from the preceding information that is more lasting in nature.

BECMG is used to indicate a change at a regular or irregular rate over a specified period of time.

The period shall normally not exceed 2 hour and in any case shall not exceed 4 hours.



The weather conditions during the change are a combination of what exist before and the weather that will be present after the change. For this reason the duration of the BECMG group will kept as short as possible.

TAF Format: In a TAF the time is specified in the format BECMGddhh/ddhh (day and hour / day and hour)

Example:

```
TAF YSSY 010435Z 0106/0206 31005KT CAVOK
BECMG0123/0201 16015KT 8000 SHRA BKN008 SCT030
RMK
T 25 21 18 15 Q 1012 1013 1014 1014
```

- BECMG indicates the beginning of the BECMG change group.
- 0123 indicates the day and hour on which the change will begin, where 01 is the day and 23 the hour of the day.
- 0201 indicates the day and hour at which the change will be completed and the new weather condition will occur. The 02 indicate the day and the 01 the hour of the day.
- 16015KT . A description of what the weather condition will be after the change is completed.

In the example the weather start to change at 2300 UTC on the 1st and the change will be complete at 0100 UTC on the 2nd.

1st @ 2300 2nd @ 0100



TTF Format: In a TTF the time is specified in the format BEMCGhhmm/hhmm (hour and minutes / hour and minutes)

Example

```
YSSY Tuesday, 04-May-2010 05:04:51 GMT
TTF METAR YSSY 040500Z 04012KT CAVOK 25/15 Q1015
RMK RF00.0/000.0
BECMG0545/0630 03015KT 9999 -SHRA SCT030
RMK TS 35NM TO NW MOV SE AT 12KT
```

- BECMG indicates the beginning of the BECMG change group.
- 0545 indicates the hour and minute on which the change will begin, where 05 is the hour and 45 the minutes.
- 0630 indicates the hour and minutes at which the change will be completed and the new weather condition will occur. The 06 indicate the hour and the 30 the minutes.
- 03015KT . A description of what the weather condition will be after the change is completed.

In the example the weather start to change at 0545 UTC on the 4th and the change will be complete at 0630 UTC on the 4th (the date is obtained from the report date).

0545 0630



PROBABILITIES

- PROB% is used to indicate an expected 30% or 40% probability of occurrences.
- Probabilities can be used by themselves or in conjunction with TEMPO and INTER change groups.
- Probabilities is never used with FM and BECMG change groups.

TAF Format: In a TAF the time is specified in the format PROB% ddhh/ddhh (day and hour / day and hour)

```
TAF YSSY 010435Z 0106/0206
31005KT CAVOK
PROB40 0123/0201 3000 FU
RMK
T 25 21 18 15 Q 1012 1013 1014 1014
```

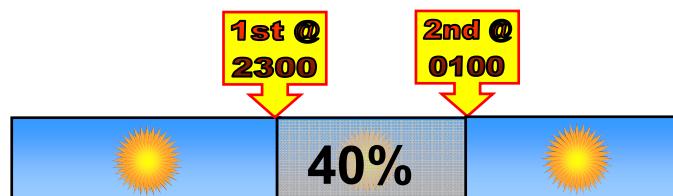
PROB40 indicates a 40% probability of an occurrence.

0123 indicates the day and hour for the start of the change, where **01** is the day and **23** the hour of the day.

0201 indicates the day and hour for the end of the change, where **02** indicate the day and the **01** the hour of the day.

3000 FU . A description of the weather condition.

In the example the visibility has a 40% probability to reduce to 3000 m in smoke during the period 2300 UTC on the 1st to 0100 UTC on the 2nd.



```
TAF YSSY 010435Z 0106/0206
31005KT 9000 FU SCT015
PROB40 INTER 0123/0201 -TS
RMK
T 25 21 18 15 Q 1012 1013 1014 1014
```

PROB40 indicates a 40% probability of an occurrence.

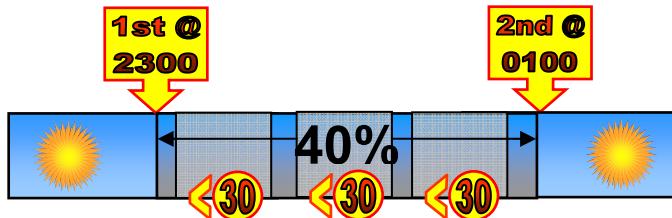
INTER indicates that the occurrence will be interim of nature (refer INTER above)

0123 indicates the day and hour for the start of the change, where **01** is the day and **23** the hour of the day.

0201 indicates the day and hour for the end of the change, where **02** indicate the day and the **01** the hour of the day.

-TS A description of the weather condition.

In the example a 40% probability of light thunderstorms are forecasted to last for no more than 30 minutes between 2300 UTC on the 1st to 0100 UTC on the 2nd.



TTF Format: In a TTF the time is specified in the format PROB% hmm/hhmm (hour and minutes / hour and minutes)

Example

```

YSSY Tuesday, 04-May-2010 05:04:51 GMT
TTF METAR YSSY 040500Z 04012KT CAVOK 25/15 Q1015
RMK RF00.0/000.0
PROB30 0545/0630 4000 -SHRA
RMK TS 35NM TO NW MOV SE AT 12KT

```

PROB30 indicates a 30% probability of an occurrence.

0545 indicates the hour and minute for the start of the change, where **05** is the hour and **45** the minutes.

0630 indicates the hour and minutes for the end of the change, where **06** indicate the hour and the **30** the minutes.

4000..... A description of what the weather condition will be during the change.

In the example the visibility has a 30% probability to reduce to 4000 m in light showers of rain during the period 0545 UTC and 0630 UTC on the 4th (date obtained from the report's date).



Example

```

YSSY Tuesday, 04-May-2010 05:04:51 GMT
TTF METAR YSSY 040500Z 04012KT OVC008 25/15 Q1015
RMK RF00.0/000.0
PROB30 TEMPO 0545/0800 4000 DZ
RMK TS 35NM TO NW MOV SE AT 12KT

```

PROB30 indicates a 30% probability of an occurrence.

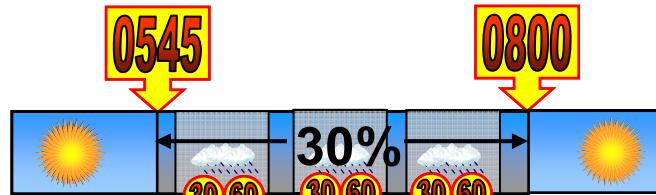
TEMPO indicates that the occurrence will be temporary of nature (refer TEMPO above)

0545 indicates the hour and minute for the start of the change, where **05** is the hour and **45** the minutes.

0800 indicates the hour and minutes for the end of the change, where 08 indicate the hour and the 00 the minutes.

4000..... A description of what the weather condition will be during the change.

In the example there is a 30% probability for drizzle that could reduce the visibility to 4000 m for periods between 30 and 60 minutes between 0545 UTC and 0800 UTC on the 4th (date obtained from the report's date).



VISIBILITY

- GOOD - used in low level area forecasts for visibility greater than 10km
- CAVOK
 - Visibility greater than 10km
 - No cloud below 5000ft or below the highest sector altitude (whichever is greater and no CBs)
 - No precipitation, thunderstorms, shallow fog, low drifting snow or dust devils
 - Whenever a total of BKN middle or low cloud cover at or above 5000 ft is present and CAVOK was used, the cloud amount and bases are given.

FORECAST REQUIREMENTS

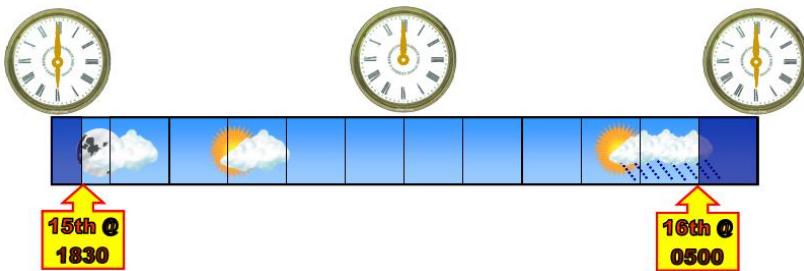
- Weather forecasts are needed for flights
 - Away from the *vicinity* of the aerodrome,
 - Flights over water, and
 - All IFR flight.
- The forecasts that are needed:
 - Must be flight or area forecast for the route, and
 - An aerodrome forecast for the destination and alternate (where needed).
- Forecast must be valid for 30 minutes before and 60 minutes after the planned ETA.

Vicinity is defined as within 10nm from an non-towered aerodrome at a height that can conflict with operations at that aerodrome.

Example:

```
TAF YEML 151642Z 1518/1606 10008KT 9999 BKN012
FM152200 12010KT 9999 SCT025
PROB30 INTER 1603/1606 2000 TSRA BKN012 FEW030CB
RMK
T 21 22 28 31 Q 1013 1014 1014 1011
```

In this example the TAF is valid from 1800 UTC on the 15th to 0600 UTC on the 16th and can be used as landing forecast for flights with an ETA between 1830 UTC on the 15th to 0500 UTC on the 16th.



- Where pre-flight briefing is obtained more than one hour before ETD, the pilots should obtain an update before each departure to ensure that the latest information available is used for the flight.
- If a forecast is needed but cannot be obtained:
 - The flight can continue only if the pilot is satisfied that a safe return to the departure aerodrome can be made within 1 hour of departure, and
 - That a weather forecast for the destination can be obtained within 30 minutes of departure.
- In the event where the only available forecast is a "provisional" forecast the flight may continue only if a suitable alternate adhering to all the "Alternate Aerodrome" requirement is provided.
- Charter, Airwork and Private operations under VFR at night must only be conducted in VMC at no less than 1000 ft above the highest obstacle within 10 nm either side of the track.

Provisional Forecast are forecasts prepared by a forecasting office for an area not under its authority and is therefore considered deficient in accuracy.

ALTERNATE REQUIREMENTS DUE TO WEATHER CONDITIONS (ATC AU 303)

Weather deteriorating to below Alternate Minima causing Operational Requirements to become effective

Except when within 50 nm of the point of departure (day VFR), an alternate is needed when the ETA is during or within 30 minutes prior to the commencement of:

- Clouds – more than SCT below *alternate minimum*.



- FEW and FEW = SCT
- FEW and SCT = BKN
- SCT + SCT = BKN or OVC

Alternate minima for VFR flights:

- Minimum ceiling 1500ft
- Visibility 8km.

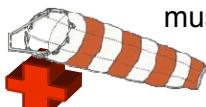
- Visibility



- Less than alternate minimum; or

Greater than alternate minimum but have been endorsed with a percentage probability of fog, mist, dust or any other phenomenon restricting visibility below the alternate minimum

- Wind – Crosswind or Downwind component more than the aircraft maximum (wind gusts must be considered).



APPLICATION WITH A TAF

Example:

TAF	AMD	YSBK	151639Z	1518/1612
VRB03KT	9999	FEW010	SCT020	BKN030
FM160000 10012KT 7000 SHRA BKN008 SCT025				
RMK				
T 18 20 24 25 Q 1019 1020 1019 1017				

In this TAF the weather will change to below the alternate minimum conditions from **0000 UTC** and an alternate is needed.

The regulation however requires that an alternate must already be available 30 minutes prior to these conditions being present.

In this case for any arrival from 2330 UTC an alternate should be available.



When a TAF includes a FM or a BECMG, causing operational requirements to become effective the timing for the beginning of the operational requirement is:

- 30 minutes before the start of the FM.



- 30 minutes before the start of the BECMG



APPLICATION WITH A TTF

Example:

TTF METAR YMES 172230Z 10019KT 9999 BKN016 20/17 Q1017

RMK RF00.0/000.0

FM2230 10015KT 9999 BKN010 BKN020

In this TTF the weather will change to below the alternate minimum conditions at **2230 UTC** and an alternate is needed.

With Trend Type Forecasts the regulation does not require Operational Requirements to be activated 30 minute before the weather change occurs.

A TTF and the associated weather watch are seen to be accurate enough and contain big enough safety margins.



When a TTF includes a FM or a BECMG, causing operational requirements to become effective the timing for the beginning of the operational requirement is:

- At the start of the FM.



- At the start of the BECMG



Weather Clearing to better than Alternate Minima causing Operational Requirements to be removed

In the event where the forecasted weather at the destination is expected to improve to better than the alternate minima at a specific time:

- Provision for an alternate should still be made for arrival after the specified time plus 30 minutes, or
- Sufficient fuel should be carried to hold until the specified time plus 30 minutes.

Application with a TAF

Example:

TAF	AMD	YSBK	151639Z	1518/1612
33025G45KT	3000	+RA BKN002 BKN008	SCT018	
FM160000	23015KT	9000 -DZ	SCT012 SCT025	
RMK				
T 18 20 24 25 Q	1019 1020	1019 1017		

In this TAF the weather will change to better than the alternate minima conditions from **0000 UTC** and the requirement for an alternate is removed.

The regulation however states that the alternate requirement remains in place until 30 minutes after this time.



In lieu of carrying an alternate, the pilot may opt to carry additional fuel to allow the aircraft to hold until 30 minutes after the forecast cessation of the bad weather conditions.

In this case for any arrival up to 0030 UTC an alternate should be available or sufficient holding fuel should be carried to ensure the aircraft can hold until 0030 UTC

When a TAF's include a FM or a BECMG, causing operational requirements to be removed the operational requirement will remain effective until:

- 30 minutes after the FM time.



- 30 minutes after the end of the BECMG.



Application with a TTF

Example:

```
TTF METAR YMES 172230Z 10019KT 7000 BKN012 20/17 Q1017
RMK RF00.0/000.0
FM2230 10015KT 9999 FEW010 BKN020
```

In this TTF the weather will change to better than the alternate minimum conditions from **2230 UTC** and the requirement for an alternate is removed.

With Trend Type Forecasts the regulation does not require Operational Requirements to remain in place for 30 minutes after the forecasted cessation of the bad weather conditions.



When a TTF includes a FM or a BECMG, causing operational requirements to be removed the operational requirement remains effective until:

- The start of the FM.



- The end of the BECMG

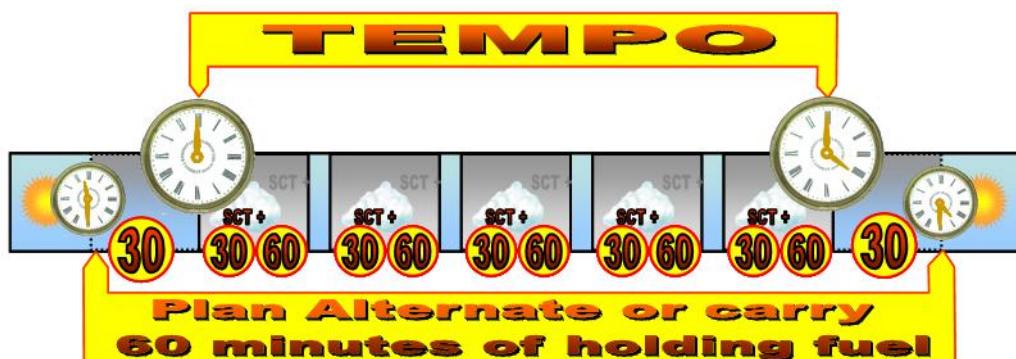


TEMPO and INTER occurrences below Alternate Minima

TEMPO

If the weather is above specifies alternate minima but contains TEMPO periods where it is below the alternate minima:

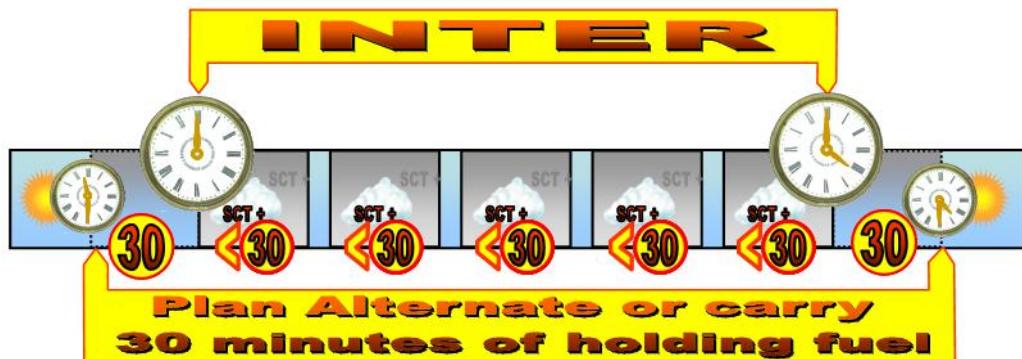
- Provision for an alternate should be made for arrivals from 30 minutes before the start of the period to 30 minutes after the end of the period, or
- Sufficient fuel should be carried to hold for at least **60 minutes**.



INTER

If the weather is above specifies alternate minima but contains INTER periods where it is below the alternate minima:

- Provision for an alternate should be made for arrivals from 30 minutes before the start of the period to 30 minutes after the end of the period, or
- Sufficient fuel should be carried to hold for at least **30 minutes**.



ROUTINE METEOROLOGICAL AERODROME REPORT (METAR) AND SPECIAL SELECTED REPORT (SPECI)

INTRODUCTION

Aerodrome weather reports are observations of actual meteorological conditions within a radius of approximately 5 nm (8 km) of the aerodrome reference point.

METAR and SPECI have the same format containing a non-uniform number of characters reporting on existing weather conditions. Weather phenomenon that does not occur is omitted.

METAR

METAR's are routine report, issued every 30 minutes or hourly, depending on the particular aerodrome.

In some countries METARs are referred to as ATUALs, referring to the fact that the weather being reported on is the current conditions that are actually present.

METARs are available at pre-flight briefings or on request to aircraft in flight.

METARs has no validity period - it is a report on weather for that time only.

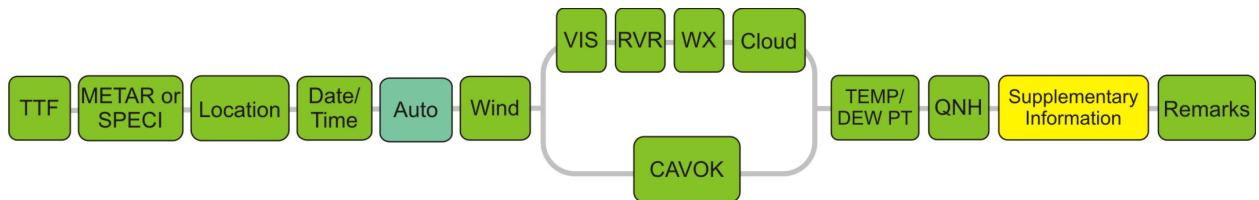
SPECI

SPECI's are aerodrome weather reports that gets issued only when weather conditions fluctuate about or are below specified conditions:

- BKN or OVC cloud below an aerodrome's highest alternate minimum or below 1500 ft, whichever is highest.
- Visibility is below an aerodrome's highest alternate minimum visibility or 5000m, whichever is greater.
- Wind:
 - Mean direction change by 30° if the wind speed is more than 20 kt (before and after change).
 - Wind speed change by 10 kt if the mean wind speed is more than 30kt (before and after change).
 - Wind gusts vary by more than 10 kt if the mean speed is more than 15 kt
 - Wind gust exceeds last reported gust by 10 kt.

- When any of the following begins, ends or change in intensity:
 - Thunderstorm.
 - Hailstorm.
 - Sleet.
 - Freezing Precipitation.
 - Drifting snow.
 - Dust storms.
 - Sandstorm.
 - Squall.
 - Fog.
- When wind shear is observed or reported by pilots.
- At the incidence of any other phenomena likely to be significant to the operation of an aircraft.
- When the QHN altimeter setting changes by 2 hPa or more.
- When the temperature changes by 5°C or more.

FORMAT



DECIPHERING THE METAR

METARs and SPECIs use the same format. Where differences do occur they will be pointed out.

Identifier

```
METAR YMML 200030Z 23025G38KT 0550 R16/M0050 +SHRA OVC004
BKN008           BKN012           13/02          Q1003
RMK RF00.0/000.0
```

METARs can be identified by the word METAR at the beginning of the message.

```
SPECI YPLC 180300Z AUTO 16016KT 3500 // BKN005 BKN011
OVC018 18/18 Q1004
RMK RF00.8/040.6
```

SPECIs can be identified by the word SPECI at the beginning of the message.

Location

```
METAR YMML 200030Z 23025G38KT 0550 R16/M0050 +SHRA OVC004
BKN008           BKN012           13/02          Q1003
RMK RF00.0/000.0
```

YMML ICAO designator for which the METAR is relevant

METARs and SPECIs report on weather within an 8 km (5nm) radius of the airfield.

Time

```
METAR YMML 200030Z 23025G38KT 0550 R16/M0050 +SHRA OVC004
BKN008           BKN012           13/02          Q1003
RMK RF00.0/000.0
```

- 200030Z** - The Date and Time for the METAR in the following format.
- 20** - The day of the month.
 - 00** - The hours of the day, using a 24 hour clock.
 - 30** - Minutes past the hour.
 - Z** - Indicator of time zone. All reports are in UTC, which is also referred to as ZULU (Z) time.

At some airfields weather data is recorded and reported by automatic weather stations, in these event the word "AUTO" will follow the date time group.

METAR YHOO 240300Z AUTO 06009KT //// // /////
35/M16 Q1016 RMK RF00.0/000.0

AUTO implies that the observations are fully automatic and done without human intervention.

If any element cannot be observed, the group in which it would have been encoded shall be replaced by the appropriate number of solidi (/).

The number of solidi depends on the number of symbolic letters for the specific group which is not able to be reported; i.e.

- four for visibility group,
- two for the present weather group, and
- three or six for the cloud group, as appropriate.

METAR YHOO 240300Z AUTO 06009KT //// // /////
35/M16 Q1016 RMK RF00.0/000.0

Wind

The wind reported is the average wind velocity for the 10 minutes prior to the report.

Direction and speed

METAR YSWG 202100Z **25009KT** CAVOK 11/07 Q1015
RMK RF00.0/000.0

25009KT - The Surface wind at the station:

250 - The mean wind direction (°True) rounded to the nearest 10°

- Values of wind direction less than 100° shall be preceded by 0
- Wind from true north shall be reported as 360

09 - The wind speed.

- Values of wind speed less than 10 units shall be preceded by 0
- Values of speed greater than 100 knots shall be reported in full

KT - The unit of measurement for the wind speed. In Australia knots are used.

Wind speed can be:

- KT – Knots
- MPS – Meters per second
- KMH – Kilometers per hour

Variable Wind

METAR YHOO 240300Z AUTO **VRB05KT** // /
////// 35/M16 Q1016 RMK RF00.0/000.0

VRB05KT - **VRB** indicates that the wind direction is variable (**05** – speed and **KT** – unit of measurement).

- Variable wind is normally reported when the wind speed is 3kt or less
- Variable wind at higher speed is reported when direction changes with 180° or more, for example when a thunderstorm passes over.

Varying Wind

METAR YHOO 240300Z 19009KT **160V230** // /
////// 35/M16 Q1016 RMK RF00.0/000.0

160V230 - If, the total variation in wind direction is 60° or more but less than 180° and the mean wind speed is greater than 3 knots, the observed two extreme directions between which the wind has varied shall be given in clockwise order.

Gusting Wind

If the maximum wind gust speed exceeds the mean speed by 10 knots the maximum speed shall be reported.

METAR YMML 200030Z **23025G38KT** 0550 R16/M0050 +SHRA
OVC004 BKN008 BKN012 13/02 Q1003
RMK RF00.0/000.0

23025G38KT - Mean wind with the maximum gust:

- 230** - Mean wind direction.
25 - Mean wind speed.
G - Indicator to show that there are gusts present.
38 - Maximum wind speed.
KT - Unit of measurement for the speed.

Calm Conditions

METAR YHOO 240300Z AUTO **00000KT** // / / / /
35/M16 Q1016 RMK RF00.0/000.0

00000KT - Calm Wind Conditions

Visibility

Horizontal Visibility

When no marked directional variation in the horizontal visibility is observed, minimum visibility shall be given as a four digit group measured in meters.

METAR YMML 200030Z 23025G38KT	0550	R16/M0050 +SHRA		
OVC004	BKN008	BKN012	13/02	Q1003
RMK RF00.0/000.0				

0550 - Horizontal visibility is at least 550 meters.

Visibility shall be reported using the following reporting steps:

- Up to 800 metres rounded down to the nearest 50 metres i.e. 0550
- Between 800 and 5 000 metres rounded down to the nearest 100 metres i.e. 3500 or 4200
- Between 5 000 metres up to 9 999 metres rounded down to the nearest 1 000 metres i.e. 7000;
- With 9999 indicating 10 km and above.

Directional Visibility

Directional Visibility is reported when horizontal visibility varies significantly in different directions

METAR YMML 200030Z 23025G38KT	0550SW	4400E			
R16/M0050 +SHRA	OVC004	BKN008	BKN012	13/02	Q1003
RMK RF00.0/000.0					

0550SW - Indicates the minimum visibility which is to the South West of the aerodrome.

4400E - Indicates the maximum visibility which is to the East of the aerodrome

Directional variations are only reported when:

- The minimum value is below 5000m
- The differences are at least 50% of the minimum visibility.

Only the eight cardinal compass directions are used when expressing minimum visibility

Runway Visual Range (RVR)

RVR at the touchdown zone of the active landing runway is reported when the horizontal visibility at the airfield drops to below 1500m (only at aerodrome with RVR measuring equipment).

METAR YMML 200030Z 23025G38KT 0900 **R16/1000D** +SHRA
OVC008 OVC012 BKN030 13/02 Q1003
RMK RF00.0/000.0

R16 - Indicate for which runway is the RVR reported.

Parallel runways are indicated by:

- L – Left runway
- R – Right runway

For aerodromes with more than 2 parallel runways the following addition indicator can be used:

- C – Central runway.
- LL – Left of Left runway.
- RR – Right of right runway.

1000 - Indicate the distance in meters that the pilot will be able to see in the direction of the runway

Mean runway visual range over the 10 minutes period immediately preceding the observation.

If the RVR, during the 10 minutes preceding the observation, varies significantly, a 1-minute minimum and a 1-minute maximum will be reported.

```
METAR YMML 200030Z 23025G38KT 0750 R16/0350V1000
+SHRA OVC008 OVC012 BKN030 13/02 Q1003
RMK RF00.0/000.0
```

R16/0350V1000 indicates that the RVR on RWY 16 will vary between 350m and 1000m

In the event where the **technical regulation's** requirement is outside the capabilities of the measuring equipment the following RVR values may be reported:

```
METAR YMML 200030Z 23025G38KT 0750 R16/P1500
+SHRA OVC008 OVC012 BKN030 13/02 Q1003
RMK RF00.0/000.0
```

- P1500 – The P indicates that the actual RVR is more than 1500m where 1500m is the maximum capability of the measuring equipment.

```
METAR YMML 200030Z 23025G38KT 0750 R16/M0050
+SHRA OVC008 OVC012 BKN030 13/02 Q1003
RMK RF00.0/000.0
```

- M0050 – The M indicates that the actual RVR is less than 50m where 50m is the minimum capability of the measuring equipment.

D - Indicate the trend in the visibility

If the RVR, during the 10 minutes preceding the observation, show a distinct trend, the trend will be indicated as:

U = Upwards (improving RVR)

D = Downward (decreasing RVR)

N = Nil (no distinct change in RVR)

If it is not possible to determine a tendency, the trend indicator is omitted.

CAVOK

CAVOK – Ceiling and Visibility OK

CAVOK is used when –

- Visibility greater than 10km
- No cloud below 5000ft or below the highest sector altitude (whichever is greater) and no CBs
- No precipitation, thunderstorms, shallow fog, low drifting snow or dust devils



Whenever a total of BKN middle or low cloud cover at or above 5000 ft is present and CAVOK was used, the cloud amount and bases are given.

Weather

The present weather is reported in no more than three weather (w'w') groups. Each group is from two to nine characters and includes the appropriate intensity indicator and weather abbreviations.

Where appropriate the first character in a weather group is the intensity indicator followed by descriptors and phenomena. For our purposes the difference between a descriptor and phenomena is less important compared to understanding the weather condition and how it will affect operations.

METAR YMML 200030Z 23025G38KT 2500 +TSRA
OVC008 OVC012 BKN030 13/02 Q1003
RMK RF00.0/000.0

+TSRA - A weather group consisting of:

- + - The intensity indicate that describes the intensity of the weather at the time of the observation.

The intensity of precipitation associated with showers and/or thunderstorms, blowing dust, sand or snow, dust storms and sand storms is indicated by:

- - for light.
- No prefix for moderate.
- + for heavy

TS - Descriptor (use the table in the Jeppesen Meteorology section to decode).

CODE	WX Descriptor
BC	Patches (or Patches of)
BL	Blowing
DR	Drifting
FZ	Freezing
MI	Shallow
SH	Showers (or Showers of)
TS	Thunderstorms (or Thunderstorms with)
PR	Aerodrome partially covered by fog

- SH - Indicate precipitation of a shower type.
- Showers are produced by convective clouds.
 - They are characterised by their abrupt beginning and end and by the generally rapid and sometimes great variations in the intensity of the precipitation.
 - Drop and solid particles in a shower is generally larger than those falling in non shower precipitation.
 - Between showers opening may be observed unless stratiform clouds fill the intervals between the cumuliform clouds.
- TS - Used to report the occurrence of a thunderstorm whenever thunder is heard within the 10 minutes preceding the report.
- TS may be followed, without a space, by weather phenomena where they are present.
 - TS on its own is used to report a thunderstorm with no precipitation.
 - A thunderstorm is regarded as having ceased if no thunder has been heard for 10 minutes.

RA – Phenomena (use the table in the Jeppesen Meterology section to decode).

CODE	WX Phenomena
BR	Mist
DU	Dust
DS	Dust Storm
DZ	Drizzle
FC	Funnel Cloud
FG	Fog
FU	Smoke
GR	Hail
GS	Small Hail Pellets
HZ	Haze
IC	Ice Crystals (very small ice crystals in suspension, also known as Diamond Dust)
PL	Ice Pellets
PO	Dust Devils
RA	Rain
SA	Sand
SG	Snow Grains
SN	Snow
SQ	Squalls
SS	Sand Storm
UP	Unknown Precipitation
VA	Volcanic Ash

Weather in the Vicinity

For weather that occurs between 8 km and 16 km from the aerodrome reference point the qualifier VC (vicinity) will be used along with one of the following:

CODE	WX Phenomena
TS	Thunderstorms (or Thunderstorms with)
SH	Showers (or Showers of)
DS	Dust Storm
FC	Funnel Cloud
FG	Fog
PO	Dust Devils
SS	Sand Storm
BLDU	Blowing Dust
BLSA	Blowing Sand
BLSN	Blowing Snow

Clouds

METAR YMML 200030Z 23025G38KT 2500 +TSRA
FEW008 SCT012 BKN030 13/02 Q1003
RMK RF00.0/000.0

Amounts

Cloud cover is reported in layers or masses using the following coverage descriptors (refer to Meteorological Services – Definitions and Regulations for full explanation):

- FEW – 1 to 2 OKTAS
- SCT – 3 to 4 OKTAS
- BKN – 5 to 7 OKTAS
- OVC – 8 OKTAS

Heights

Cloud base height is given in hundreds of feet AGL

- FEW008 is a FEW clouds at 800 ft AGL
- SCT012 is SCT clouds at 1200 ft AGL
- BKN030 is BKN clouds at 3000 ft AGL

Cloud Layers

METARs and SPECIs will report up to three separate layers of clouds with the understanding that *significant convective* clouds will **always** be reported.

Where significant convective clouds are reported they get appended to the relevant cloud group. If a cloud layer consists of only CB and TCU clouds with a common cloud base, the layer is reported as CB and amount shall be sum of the CB and TCU amounts.

Significant convective clouds are:

- CB – Cumulonimbus
- TCU – Towering Cumulus which describes Cumulus congestus of great vertical extent

Layers are given from the lowest to the highest layer.

- The first group is the lowest layer or mass, irrespective of amount.
- The second group is the next higher layer covering at least 2 OKTAS.
- The third group is the following higher layer covering at least 4 OKTAS
- CB and TCU are reported separately if they were not already included in one of the other layers

Cloud Types

With the exception of significant convective clouds the types of clouds are not identified.

Obscured Skies

If the sky is obscured, the cloud groups are omitted and vertical visibility is reported

METAR YMML 200030Z 23025G38KT 9000 **VV//** 13/02 Q1003
RMK RF00.0/000.0

VV// - Vertical visibility group:

VV – To indicate Vertical Visibility group.

// - The vertical visibility distance is given in hundreds of feet. Where the distance cannot be determined three solidi will be used.

No Cloud Cover

If there are no low or middle cloud present the weather codes CAVOK, SKC or NSC may be included. Refer to Meteorological Services – Definitions and Regulations for full explanation of these codes.

Temperature and Dew Point

METAR	YMM	200030Z	23025G38KT	0550	R16/M0050	+SHRA
OVC004			BKN008	BKN012	13/02	Q1003
RMK RF00.0/000.0						

13/02 - Temperature and Dew point temperature, to the nearest degree.

13 - The first number indicating air temperature, 13°C

02 - The second number indicating dew point, 02°C

Temperatures from -9°C to 9°C will be reported with a 0 preceding the value

When the temperatures are below 0° Celsius, the reading is preceded by the letter M to indicate Minus.

METAR	YMM	200030Z	23025G38KT	0550	R16/M0050	+SHRA
OVC004			BKN008	BKN012	13/M02	Q1003
RMK RF00.0/000.0						

Atmospheric Pressure

METAR	YMM	200030Z	23025G38KT	0550	R16/M0050	+SHRA
OVC004			BKN008	BKN012	13/02	Q1003
RMK RF00.0/000.0						

Q1003 - The **QNH**, preceded by the letter Q, in hectopascal.

- QNH is rounded off to the lowest QNH reading.
- If the QNH is less than 1000hPa, it will be preceded by a 0.
- If the pressure is expressed in inches mercury, the Q is replaced by an A

METAR	YXXX	200030Z	23025G38KT	0550	R16/M0050	+SHRA
OVC004			BKN008	BKN012	13/M02	A1003
RMK RF00.0/000.0						

Supplementary Information

In Australia the Supplementary Information part of the report is used to report on:

- Recent weather phenomena of operational significance.
- Wind shear in the lower layers.

Recent Weather

Up to three groups of recent weather following the letters RE, with no intensity, will be given if any of the following have been observed since the previous report, or in the last hour (whichever is shorter):

- Freezing precipitation.
- Moderate or heavy drizzle, rain or snow.
- Moderate or heavy: ice pellets, hail, small hail and/or snow pellets.
- Moderate or heavy blowing snow (including snowstorm).
- Sandstorm and duststorm.
- Thunderstorm
- Funnel cloud(s) (tornado or water-spout)
- Volcanic ash.

METAR YMML 200030Z 23025G38KT 2500 +SHRA OVC004 BKN008CB			
13/02	Q1003	REBLSN	WS
RMK RF00.0/000.0			

REBLSN - Recent weather group, where **RE** indicates recent weather, followed by the weather phenomena. In this example blowing snow.

Wind Shear

The existence of wind shear along the take-off path or approach path between runway level and 1600 ft is reported using the weather code WS. The wind shear must be significant to aircraft operations to be reported.

METAR YMML 200030Z 23025G38KT 2500 +SHRA OVC004 BKN008CB			
13/02	Q1003	REBLSN	WS
RMK RF00.0/000.0			

WS RWY16 - Wind Shear group:

WS - Indicate operationally significant wind shear exist.

RWY16 - The wind shear is reported for RWY 16.

Where wind shear affect all the runways, the code ALL RWY is used.

METAR YMML 200030Z 23025G38KT 9000 NSC 13/02			
Q1003	WS	ALL	RWY
RMK RF00.0/000.0			

Remark

- In Australia information regarding rainfall is reported in the remarks section of the report.
- Remarks are also used for additional information that the reporting authority deems necessary.

Rainfall

```
METAR YMML 200030Z 23025G38KT 3000 OVC008 BKN150 13/02
Q1003 RETS WS ALL RWY
RMK
RF02.0/025.0 FRONT APR
```

RMK - Indicate the beginning of remarks.

RF02.0/025.0 - Rainfall information:

RF - Rain Fall

02.0 - The first group of figures reports the amount of rain that fell in the 10 minutes prior to the report. In this example 2.0 mm of rain fell between 0020 UTC and 0030 UTC.

025.0 - The group that follows the separator (/) reports the amount of rain that fell since 0900 **local time**. In this example 25.0 mm of rain fell in the 90 minutes before the report, from 0900 EST (Melbourne Local Time), to 1030 EST (0030 UTC, the time of the report).

In Australia a Meteorological Day runs from 9am to 9am the next day.

Additional Information

```
METAR YMML 200030Z 23025G38KT 3000 OVC008 BKN150 13/02
Q1003 RETS WS ALL RWY
RMK
```

Any information that could affect operations can be added to the remarks section. In this example an approaching front is reported.

METEOROLOGICAL ADVICES – SIGMET AND AIRMET

INTRODUCTION

SIGMET and AIRMET is information issued by a *meteorological watch office* concerning the occurrence or expected occurrence of specified en-route weather phenomena which may affect the safety of aircraft operations.

SIGMET

SIGMET advices will be issued for any of the following meteorological conditions:

- Below FL 450.
 - Active thunderstorm

SIGMET for thunderstorms is only issued when they are:

- OBSC (Obscured) by haze or smoke and cannot be readily identified.
- EMBD (Embedded) within cloud layers and cannot be readily identified.
- FRQ (Frequent) with little or no separation between adjacent storms and covering more than 75% of the area affected.
- SQL (Squall Line) of thunderstorms with little or no separation between individual clouds.

- Tropical revolving storm
- Heavy hail
- Severe turbulence
- Severe icing
- Marked mountain waves

Mountain waves are considered severe when accompanying downdrafts of 600 ft/min or more and/or severe turbulence is observed or forecasted.

- Widespread sand storms or dust storms.
- Volcanic ash cloud
- Severe line squall

- Above FL 450.
 - Moderate or severe turbulence
 - CB
 - Hail

Pilots-in-command of aircraft encountering any of the listed phenomena which was not reported in SIGMET advices, must report the details of the phenomena in an AIRER SPECIAL (Refer to the AIREP SPECIAL section)

A SIGMET may be written or on the radio and issued to aircraft that may be affected via ATC initiated FIS.

AIRMET

AIRMET advices will be issued for any of the following meteorological conditions when the phenomena have not been included in a current Area Forecast:

- Isolated and Occasional thunderstorm
- Moderate icing
- Moderate turbulence

Turbulence is included when the turbulence is expected to occur in an area, or at a time, where or when it is not a normal seasonal feature.

- Extensive areas of visibility of less than 8km
- Extensive areas of cloud coverage of BKN or OVC below 1500 ft above ground level
- Wind of 40 kt or more within 2000 ft above ground level

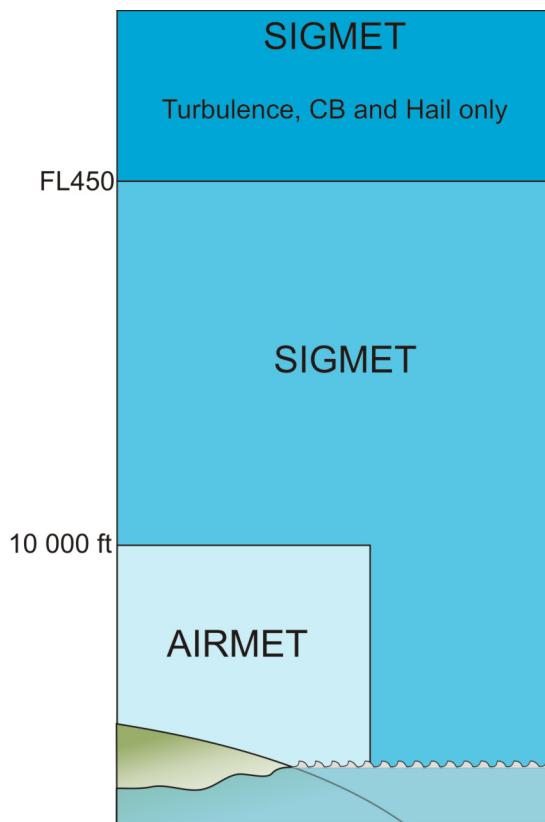
AIRMET information concerning phenomena of lesser severity than SIGMET information is given to aircraft operating at of below 10 000ft.

Pilots-in-command of aircraft encountering any of the listed phenomena which was not reported in AIRMET advices, must report the details of the phenomena in an AIRER SPECIAL (Refer to the AIREP SPECIAL section)

A SIGMET may be written or on the radio and issued to aircraft that may be affected via ATC initiated FIS.

SIGMET VS AIRMET

SIGMET and AIRMET are advices to warn pilots of dangerous weather conditions. The following diagram indicates the differences between SIGMET and AIRMET.



RESPONSIBILITY FOR PUBLISHING SIGMET/AIRMET

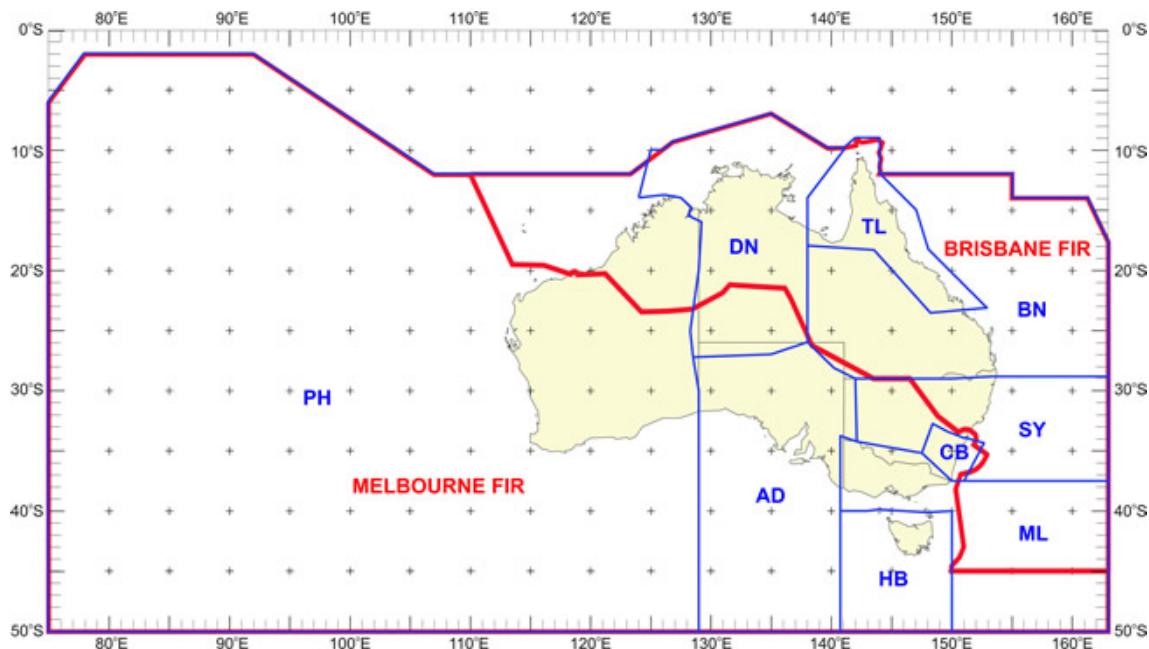
Aviation Weather Centre, Melbourne

- High Level Turbulence
- High Level Icing

Volcanic Ash Advisory Centre (VAAC) Darwin

- High Level Volcanic Ash Cloud

The issuing of Low Level SIGMET (below FL450) generally corresponds to the following areas with each area being served by a forecasting or meteorological office:



DECIPHERING SIGMET/AIRMET ADVICES

WSAU21 AMMC 230010

YMMM SIGMET MW01 VALID 230106/230506 YMMC - YMM
MELBOURNE FIR SEV TURB FCST WI
S2300 E10300 - S3100 E10700 - S3600 E11300 -
S3700 E12000 - S3500 E12000 - S2900 E10900 -
S2200 E10400 - FL280/370 MOV SE 25KT NC.
STS:REV MW11 222106/230106=

- WSAU21 - World Meteorological Organisation (WMO) header for Australia.
- WCAU01 for SIGMET on tropical cyclones
- WVAU01 for SIGMET on volcanic ash cloud
- WSAU21 for SIGMET for other phenomena

WSAU21 AMMC 230010

YMMM SIGMET MW01 VALID 230106/230506 YMMC - YMM
MELBOURNE FIR SEV TURB FCST WI
S2300 E10300 - S3100 E10700 - S3600 E11300 -
S3700 E12000 - S3500 E12000 - S2900 E10900 -
S2200 E10400 - FL280/370 MOV SE 25KT NC.
STS:REV MW11 222106/230106=

AMMC

- WMO indicator for the Meteorological Weather Office (MWO)

Adelaide RFC	APRM	Canberra MO	ASRF
Perth RFC	APRF	Hobart RFC	AMHF
Brisbane RFC	ABRF	Townsville MO	ABTL
Sydney RFC	ASRF	Melbourne RFC	AMRF
Darwin RFC	ADRM	Melbourne AWC	AMMC

230010

- Issuing date and Time
- 23** - Day of the month.
- 00** - Hour of the day.
- 10** - Minutes in the hour.

YMMM

- Indicating the Flight Information Centre (FIC) serving the FIR

YMMM – Melbourne
YBBB - Brisbane

SIGMET

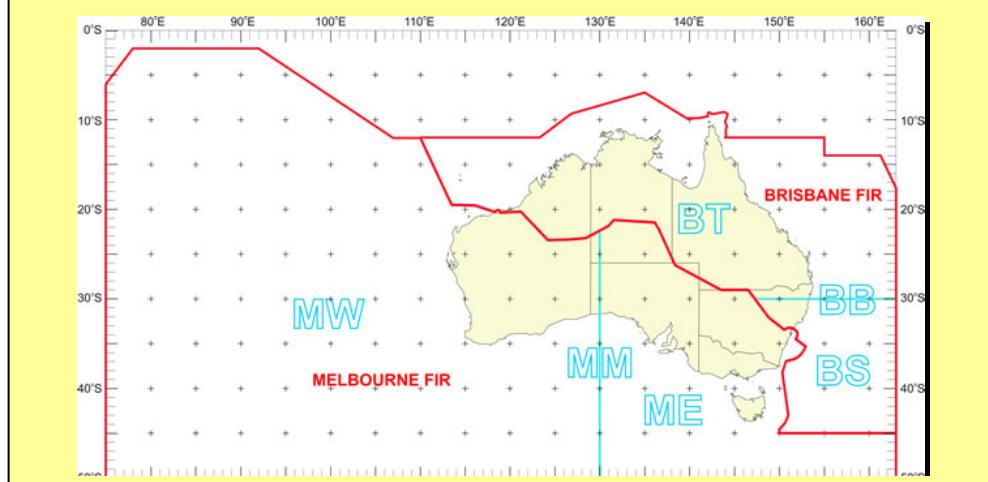
- Indicating if the advice is a SIGMET or AIRMET

MW01

- Daily sequence number:

MW - A two digit group that indicates the location of the event.

To help the recipients to identify the air routes affected the SIGMET number contains two letters corresponding to areas on this map.



01 - A two digit number that indicates the number of SIGMET issued since 0000 UTC within the FIR.

WSAU21 AMMC 230010
YMMM SIGMET MW01 **VALID 230106/230506 YMMC - YMMM**
MELBOURNE FIR SEV TURB FCST WI
S2300 E10300 - S3100 E10700 - S3600 E11300 -
S3700 E12000 - S3500 E12000 - S2900 E10900 -
S2200 E10400 - FL280/370 MOV SE 25KT NC.
STS:REV MW11 222106/230106=

VALID 230106/230506 - Period of validity:

VALID - Identify the validity group.

230106 - Date and time of the beginning of the validity period.

23 - Day of the month.

01 - Hour of the day.

06 - Minutes.

230506 - Date and time of the end of the validity period.

23 - Day of the month.

05 - Hour of the day.

06 - Minutes.

YMMC - Location indicator for the WMO office originating the message.

YMMM - FIR indicator.

WSAU21 AMMC 230010
YMMM SIGMET MW01 VALID 230106/230506 YMMC - YMMM
MELBOURNE FIR SEV TURB FCST WI
S2300 E10300 - S3100 E10700 - S3600 E11300 -
S3700 E12000 - S3500 E12000 - S2900 E10900 -
S2200 E10400 - FL280/370 MOV SE 25KT NC.
STS:REV MW11 222106/230106=

- The text within the boxed area gives a description of the weather phenomena.

- Type of information - **observed** or **forecast**;
- Time of observation or forecast of commencement, as appropriate;
- Location
- Geographical
- Vertical;
- Movement or expected movement;
- Expected development;
- SIGMET for tropical cyclone and volcanic ash cloud includes provision for an OUTLOOK for 6 and 12 hours respectively.

MELBOURNE FIR- Indicates the location of the phenomena.

SEV - Indicates the severity of the phenomena.

TURB - Indicates the phenomena (refer to the SIGEMT and AIRMET sections for the various phenomena that advices are supplied for)

FCST - Indicate if the phenomena is forecasted or has been observed by either the meteorological observer or aircrew.

WSAU21 AMMC 230010
YMMM SIGMET MW01 VALID 230106/230506 YMMC – YMMM
MELBOURNE FIR SEV TURB FCST **WI**
S2300 E10300 – S3100 E10700 – S3600 E11300 –
S3700 E12000 – S3500 E12000 – S2900 E10900 –
S2200 E10400 – FL280/370 MOV SE 25KT NC.

STS:REV MW11 222106/230106=

WI

- Abbreviation for “with in”

All abbreviations can be found in the Jeppesen, Meteoroloogical section pages

S2300. - A detailed description of the area where the phenomena is expected. In this example the latitude and longitude of boundary points are listed in sequence, when plotted these point will mark the area affected by turbulence.

FL280/370 - The phenomena will exist between FL280 and FL370.

MOV - Movement of the phenomena is expected:

SE - The area, as defined by the sequence of latitudes and longitudes, is moving in a south-easterly direction.

25KT- The defined area is moving at 25 knots.

NC - Expected development of the phenomena, in this example there is no change expected, the turbulence is expected to remain severe.

```
WSAU21 AMMC 230010
YMMM SIGMET MW01 VALID 230106/230506 YMMC - YMM
MELBOURNE FIR SEV TURB FCST WI
S2300 E10300 - S3100 E10700 - S3600 E11300 -
S3700 E12000 - S3500 E12000 - S2900 E10900 -
S2200 E10400 - FL280/370 MOV SE 25KT NC.
```

STS:REV MW11 222106/230106=

STS - Status Line

REV - Indicate the relation of this SIGMET to previous SIGMET advices.

- New for new SIGMET
- REV for reviews
- CNL for cancelations

MW11 222106/230106 - Daily sequence number and validity period of the previous SIGMET being reviewed or cancelled.

METEOROLOGICAL ADVICES – VOLCANIC ASH ADVISORY

INTRODUCTION

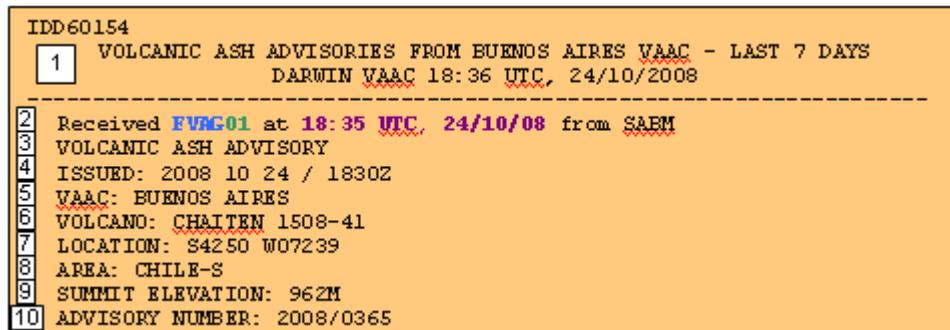
Active volcanoes to the north and east of Australia are monitored by the Bureau of Meteorology's Volcanic Ash Advisory Centre (VAAC) in Darwin. During reported activity NOTAM's and SIGMET advices will be issued. The BOM will also issue a Volcanic Ash Advisory

DECIPHERING VOLCANIC ASH ADVISORIES

IDD60154
VOLCANIC ASH ADVISORIES FROM BUENOS AIRES VAAC - LAST 7 DAYS
DARWIN VAAC 18:36 UTC, 24/10/2008

Received FVAG01 at 18:35 UTC, 24/10/08 from SABM
VOLCANIC ASH ADVISORY
ISSUED: 2008 10 24 / 1830Z
VAAC: BUENOS AIRES
VOLCANO: CHAITEN 1508-41
LOCATION: S4250 W07239
AREA: CHILE-S
SUMMIT ELEVATION: 962M
ADVISORY NUMBER: 2008/0365
INFORMATION SOURCE: WEBCAM DGAC
AVIATION COLOR CODE: RED
ERUPTION DETAILS: CONTINUOUS EMISSION
OBS ASH DATE/TIME: 24/1719Z
OBS ASH CLOUD: VA CLD TOP ETI FL070
FCST ASH CLD + 06HR:24/2300Z SFC/FL200 S4250 W07240 - S4215
W07240 -
S4215 W07140 - S4250 W07240
FL200/350 NO ASH EXP
FL350/550 NO ASH EXP
FCST ASH CLD + 12HR:25/0500Z SFC/FL200 S4230 W07200 - S4320

- The first section (orange shading) gives information on the advice, VAAC and the volcano.
- The second part (green shading) gives information on the current emissions.
- The next part (blue shading) is predictions on the development of the volcanic ash cloud.
- The final part (pink shading) is information on the next advices.



1 Volcanic Ash Advisory heading with information regarding the originating authority and publishing authority. In this example the advice originated from the Buenos Aires VAAC and was reissued (published) by the Darwin (VAAC)

2 Originators information

FVAG01 - WMO Header, **FVAG** is for Buenos Aires and WVAU for Australia. **01** to **04** is used to identify separate advisories for one or more coincident eruptions

18:35 UTC, 24/10/08 – Time (UTC) and Date for when the advice was received by the publishing authority, in this case Darwin VAAC received the information at 18354UTC on 24 October 2008.

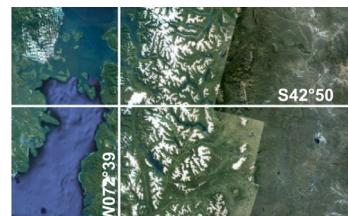
3 Volcanic Ash Advisory identifier.

4 Date and time for when the message was issued by the originating authority, in this case Buenos Aires VAAC issued the advice at 1830 UTC on 24 October 2008.

5 Identifying the originating VAAC.

6 Name and IAVCEI reference number for the erupting volcano. (IAVCEI - International Association of Volcanology and Chemistry of the Earth's Interior)

7 The volcano's geographic position expressed in latitude and longitude.



8 The area where the volcano is located.



9 The volcano's summit elevation in meters or feet AMSL

10 A sequence number for the event added to the year.

11 INFORMATION SOURCE: WEBCAM DGAC
12 AVIATION COLOR CODE: RED
13 ERUPTION DETAILS: CONTINUOUS EMISSION
14 OBS ASH DATE/TIME: 24/1719Z
15 OBS ASH CLOUD: VA CLD TOP ETI FL070

- 11 Identifying the source for the information.

Pilot report
Satellite Image
Vulcanological Authority

- 12 Aviation code identify the risk to aircraft.

Red - Ash reported or expected above 25 000 feet.
Eruption is in progress or an eruption is likely to take place.

Orange - Eruption in progress but the ash has not reaching or is not expected to reach 25 000 feet.

Yellow - The volcano is known to be active from time to time and activity has recently increased significantly. The volcano is not currently considered dangerous but caution should be exercised

OR

(After an eruption where status has changed from red or orange) activity decreased significantly and the volcano is not currently considered dangerous but caution should be exercised.

Green - Activity considered to have ceased and volcano reverted to its normal state.

Nil - No colour code available, refer to information in the advisory for details.

- 13 Eruption detail on what is currently taking place at the volcano.
- 14 The date and time of the information that was used to draft the advice.
- 15 Details on the location of the ash cloud at the time of the advice.

Details of the eruption cloud as assessed by the VAAC, including:

- vertical and horizontal extent of volcanic ash if known;
- information if weather clouds obscure the area, or
- if there is no evidence of a plume or ash on satellite imagery.
- Indication of direction of movement of ash cloud in terms of the wind direction and speed of movement at selected flight levels in broad descriptive terms.

The forecasted development and movement of the ash cloud is described in 6 hour increments. For these forecasts the atmosphere is divided into three layers and the boundaries containing the ash cloud is defined by a sequence of latitude and longitude coordinates.

6 hours forecast

16	FCST ASH CLD + 06HR: 24/2300Z SFC/FL200 S4250 W07240 - S4215 W07240 - S4215 W07140 - S4250 W07240
17	FL200/350 NO ASH EXP
18	FL350/550 NO ASH EXP

16 The forecast location of the ash cloud in 6 hours time between the surface and FL200:

- 06HR** - Indicate that the 6 hour prognosis to follow.
24/2300Z - The date and time for the start of the 6 hour prognosis.
SFC/FL200 Layer of the atmosphere concerned.
S4250.... - Sequence of latitudes and longitudes defining the boundaries of the ash cloud



17 The forecast location of the ash cloud in 6 hours time between Flight Level 200 and 350 (in this example no ash is expected at these heights for this time).

18 The forecast location of the ash cloud in 6 hours time between Flight Level 350 and 550 (in this example no ash is expected at these heights for this time).

12 hours forecast

19	FCST ASH CLD + 12HR: 25/0500Z SFC/FL200 S4230 W07200 - S4320 W07200 - S4400 W07130 - S4300 W07240 - S4230 W07200
20	FL200/350 NO ASH EXP
21	FL350/550 NO ASH EXP

- 19 The forecast location of the ash cloud in 12 hours time between the surface and FL200:

12HR - Indicate that the 6 hour prognosis to follow.

25/0500Z - The date and time for the start of the 6 hour prognosis.

SFC/FL200 - Layer of the atmosphere concerned.

S4250.... - Sequence of latitudes and longitudes defining the boundaries of the ash cloud



- 20 The forecast location of the ash cloud in 12 hours time between Flight Level 200 and 350 (in this example no ash is expected at these heights for this time).

- 21 The forecast location of the ash cloud in 12 hours time between Flight Level 350 and 550 (in this example no ash is expected at these heights for this time).

18 hours forecast

22	FCST ASH CLD + 18HR: 25/1100Z SEC/FL200 S4230 W07200 – S4320 W07020 – S4330 W07020 – S4330 W07110 – S4300 W07240 – S4320 W07200
23	FL200/350 NO ASH EXP
24	FL350/550 NO ASH EXP

- 22 The forecast location of the ash cloud in 18 hours time between the surface and FL200:

18HR - Indicate that the 6 hour prognosis to follow.

25/1100Z - The date and time for the start of the 6 hour prognosis.

SFC/FL200 - Layer of the atmosphere concerned.

S4250.... - Sequence of latitudes and longitudes defining the boundaries of the ash cloud



- 23 The forecast location of the ash cloud in 18 hours time between Flight Level 200 and 350 (in this example no ash is expected at these heights for this time).

- 24 The forecast location of the ash cloud in 18 hours time between Flight Level 350 and 550 (in this example no ash is expected at these heights for this time).

25	NEXT ADVISORY: FURTHER INFORMATION WILL BE ISSUED IF ANY ASH CLD IS DETECTED/OBSERVED
26	REMARKS: ASH PLUME SEEN WITH WEBCAM 17192 TOP AROUND FL070

- 25 Information regarding the next advisory.

- The normal frequency of issue is every 6 hours, more often if significant new information becomes available.
- Under certain circumstances for low level eruptions (i.e. below FL250), advices may be issued every 24 hours.
- The normal format is:

NEXT ADVISORY: NO LATER THAN DD/TTTT UTC

- If the ash cloud is moving into an adjacent VAAC's area of responsibility, and an agreement was reached that they will take over the issuing of advisories, the phrase used is:

NEXT ADVISORY: WILL BE ISSUED BY WASHINGTON VAAC

26 Remarks are for any further pertinent information that could affect the safety of aircraft.

TERMINAL AERODROME FORECAST (TAF)

INTRODUCTION

Aerodrome Forecasts (TAF) are statements of meteorological conditions that are expected for a specified period within 5nm of the aerodrome reference point.

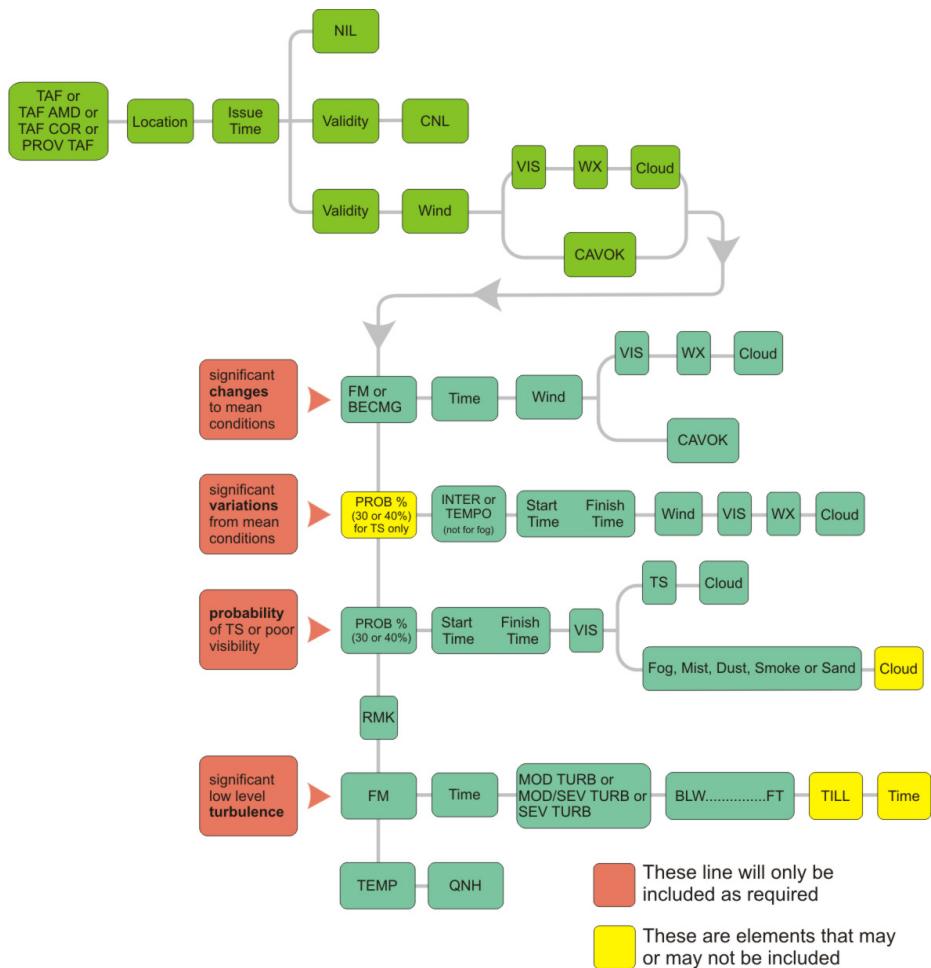
TAF SERVICE PROVISION

The TAF service provided depend on the category airfield, which is determined by the amount and type of traffic.

CATEGORY	AERODROME TYPE	ROUTINE TAF SERVICE
A	International All aerodromes serving some sort of International traffic	Issued 6 hourly and valid for either 18, 24 or 30 hours. Commencement times 00, 06, 12 and 18 UTC Continues MET watch and amendment service
B	Major Domestic Control Towers More than 40 000 passengers pa	Issued 6 hourly and valid for either 12, 18 or 24 hours. Commencement times 00, 06, 12 and 18 UTC Continues MET watch and amendment service
C	Minor Domestic Less than 40 000 passengers pa	As determined by consultation with clients. MET watch and amendments service during validity period
D	Strategic Domestic Alternate for RPT Other aerodromes	As determined by consultation with clients. MET watch and amendments service during validity period
E	Observations Only Critical Locations Aerodromes with AWS	No TAF service except for SAR, mercy flights, etc when requested.

A list of all Australian aerodromes and there categories for which TAF will be available can be found in the Jeppesen, Meteorology section.

FORMAT



DECIPHERING A TAF

IDENTIFIER

TAFs can be as one of the following:

- Confirmed Forecasts.** These forecasts are identified by the code TAF at the beginning of the message. Confirmed forecasts can be used for planning purposes.

TAF YBNA 062300Z 0700/0712
13012KT 9999 -SHRA FEW015 BKN040
INTER 0700/0712 5000 SHRA BKN015
RMK
T 24 25 24 22 Q 1021 1020 1019 1019

NIL indicate that aerodrome forecasts will not be issued

TAF YABC 010605Z **NIL**

CNL indicate that the aerodrome TAF has been cancelled

TAF YABC 010605Z **CNL**

- **Provisional Forecasts.** These forecasts are identified by the code TAF PROV at the beginning of the message. Provisional forecasts are prepared by a meteorological office not associated with the aerodrome and must be viewed as being deficient in accuracy.

TAF PROV YNRC 070007Z 0702/0714
02018G30KT CAVOK
FM070400 35014KT CAVOK
FM071000 02008KT 9999 -SHRA BKN080
RMK
T 30 33 29 23 Q 1014 1011 1010 1012

Provisional forecasts may be used for planning purposes with the proviso that the pilot in command makes provision for a suitable alternate with a confirmed forecast.

- **Amended Forecasts.** These forecasts are identified by the code TAF AMD at the beginning of the message. Amendments are issued when necessary if changes are expected during the validity period of a forecast.

TAF AMD YARM 062302Z 0623/0712
11015KT 9999 NSW BKN010
BECMG 0700/0702 10012KT 9999 BKN030
FM070900 10012KT 9999 BKN010
RMK
T 14 17 18 14 Q 1025 1025 1023 1023

CNL indicate that the observations from an aerodrome have unexpectedly become insufficient to allow the forecaster to maintain an adequate weather watch, eg an automatic station becomes unserviceable

TAF AMD YABC 010605Z **CNL**

- **Corrected Forecasts.** These forecasts are identified by the code TAF COR at the beginning of the message. Corrections does not amend the TAF but correct errors in metadata, eg validity periods.

TAF COR YAYE 062236Z 0700/0712
12010KT CAVOK
RMK
T 28 33 34 33 Q 1011 1009 1007 1006

LOCATIONS

TAF YBNA 062300Z 0700/0712 25009KT 9999 -SHRA FEW015 BKN040
INTER 0700/0712 5000 SHRA BKN015
RMK
T 24 25 24 22 Q 1021 1020 1019 1019

YBNA

- ICAO designator for which the TAF is relevant
- TAF's forecast on weather within 5nm radius of the aerodrome reference point.**

TIME

TAF YBNA **062300Z** 0700/0712 25009KT 9999 -SHRA FEW015 BKN040
INTER 0700/0712 5000 SHRA BKN015
RMK
T 24 25 24 22 Q 1021 1020 1019 1019

062300Z - The Date and Time of issue for the TAF.

06 - The day of the month.

23 - The hours of the day, using a 24 hour clock.

00 - Minutes past the hour.

Z - Indicator of time zone. All forecasts are in UTC, which is also referred to as ZULU (Z) time.

VALIDITY PERIOD

TAF YBNA 062300Z **0700/0712** 25009KT 9999 -SHRA FEW015 BKN040
INTER 0700/0712 5000 SHRA BKN015
RMK
T 24 25 24 22 Q 1021 1020 1019 1019

0700/0712 - The validity period of the TAF expressed as:

07 - The day of the month for the beginning of the forecast.

00 - The hours of the day, using a 24 hour clock for the beginning of the forecast.

07 - The day of the month for the end of the forecast.

12 - The hours of the day, using a 24 hour clock for the end of the forecast.

WIND

DIRECTION AND SPEED

TAF YBNA 062300Z 0700/0712 **25009KT** 9999 -SHRA FEW015 BKN040
INTER 0700/0712 5000 SHRA BKN015
RMK
T 24 25 24 22 Q 1021 1020 1019 1019

25009KT - The Surface wind at the station:

250 - The mean wind direction (°True) rounded to the nearest 10°

- Values of wind direction less than 100° shall be preceded by 0
- Wind from true north shall be reported as 360

09 - The wind speed.

- Values of wind speed less than 10 units shall be preceded by 0
- Values of speed greater than 100 knots shall be reported in full

KT - The unit of measurement for the wind speed. In Australia knots are used.

Wind speed can be:

- KT – Knots
- MPS – Metres per second
- KMH – Kilometres per hour

VARIABLE WIND

TAF YBNA 062300Z 0700/0712 **VRB05KT** 9999 CAVOK
RMK
T 24 25 24 22 Q 1021 1020 1019 1019

VRB05KT - **VRB** indicates that the wind direction is variable (**05** – speed and **KT** – unit of measurement).

- Variable wind is normally reported when the wind speed is 3kt or less
- Variable wind at higher speed is reported when direction changes with 180° or more, or when it is impossible to forecast a single wind direction.

GUSTING WIND

When it is forecasted that the maximum wind speed will exceed the mean speed by 10 knots the maximum speed shall be reported.

TAF YMER 062300Z 0700/0712 **05025G40KT** 9000 SCT005 BKN012
RMK
T 24 25 24 22 Q 1021 1020 1019 1019

05025G40KT - Mean wind with the maximum gust:

050 - Mean wind direction.

25 - Mean wind speed.

G - Indicator to show that there are gusts present.

40 - Maximum wind speed.

KT - Unit of measurement for the speed.

CALM CONDITIONS

TAF YHOO 240300Z 2412/2500 **00000KT** CAVOK
RMK
T 24 22 18 17 Q 1019 1020 1019 1018

00000KT - Calm Wind Conditions

VISIBILITY

HORIZONTAL VISIBILITY

When the forecasted visibility is not the same in different directions the minimum visibility is given in the TAF.

```
TAF AMD YPAD 071643Z 0717/0824 03008KT 5000 RA SCT010 BKN030
RMK
T 22 22 23 22 Q 1008 1008 1008 1008
```

5000 - Minimum Horizontal Visibility, in this example the visibility is at least 5000 meters.

Visibility shall be reported using the following reporting steps:

- Up to 800 metres rounded down to the nearest 50 metres i.e. 0550
- Between 800 and 5 000 metres rounded down to the nearest 100 metres i.e. 3500 or 4200
- Between 5 000 metres up to 9 999 metres rounded down to the nearest 1 000 metres i.e. 7000;
- With 9999 indicating 10 km and above.

CAVOK

CAVOK – Ceiling and Visibility OK

CAVOK is used when –

- Visibility greater than 10km
- No cloud below 5000ft or below the highest sector altitude (whichever is greater) and no CBs
- No precipitation, thunderstorms, shallow fog, low drifting snow or dust devils



Whenever a total of BKN middle or low cloud cover at or above 5000 ft is present and CAVOK was used, the cloud amount and bases are given.

WEATHER

Forecast weather is expressed using the codes listed below (also available in the meteorology section of the Jeppesen). Each group is from two to nine characters and includes the appropriate intensity indicator and weather abbreviations.

Where appropriate the first character in a weather group is the intensity indicator followed by descriptors and phenomena.

TAF	AMD	YPAD	071643Z	0717/0824	23025G38KT	2500	+TSRA	OVC008
OVC012 BKN030								
RMK								
T 22 22 23 22 Q 1008 1008 1008 1008								

- +TSRA** - A weather group consisting of:
- - The intensity indicate that describes the intensity of the weather at the time of the observation.

The intensity of precipitation associated with showers and/or thunderstorms, blowing dust, sand or snow, dust storms and sand storms is indicated by:

- - for light.
- No prefix for moderate.
- + for heavy

TS - Descriptor (use the table in the Jeppesen Meterology section to decode).

CODE	WX Descriptor
BC	Patches (or Patches of)
BL	Blowing
DR	Drifting
FZ	Freezing
MI	Shallow
SH	Showers (or Showers of)
TS	Thunderstorms (or Thunderstorms with)
PR	Aerodrome partially covered by fog

SH - Indicate precipitation of a shower type.

- Showers are produced by convective clouds.

- They are characterised by their abrupt beginning and end and by the generally rapid and sometimes great variations in the intensity of the precipitation.
- Drop and solid particles in a shower is generally larger than those falling in non shower precipitation.
- Between showers opening may be observed unless stratiform clouds fill the intervals between the cumuliform clouds.

- TS - Used to report the occurrence of a thunderstorm whenever thunder is heard within the 10 minutes preceding the report.
- TS may be followed, without a space, by weather phenomena where they are present.
 - TS on its own is used to report a thunderstorm with no precipitation.
 - A thunderstorm is regarded as having ceased if no thunder has been heard for 10 minutes.

RA – Phenomena (use the table in the Jeppesen Meterology section to decode).

CODE	WX Phenomena
BR	Mist
DU	Dust
DS	Dust Storm
DZ	Drizzle
FC	Funnel Cloud
FG	Fog
FU	Smoke
GR	Hail
GS	Small Hail Pellets
HZ	Haze
IC	Ice Crystals (very small ice crystals in suspension, also known as Diamond Dust)
PL	Ice Pellets
PO	Dust Devils
RA	Rain
SA	Sand
SG	Snow Grains
SN	Snow
SQ	Squalls
SS	Sand Storm
VA	Volcanic Ash

NSW (Nil Significant Weather)

After a change group, if the weather ceases to be significant the weather group is replaced by NSW, or CAVOK if appropriate.

CLOUDS

Cloud information shall be limited to cloud of operational significance, i.e. cloud below 5000ft (1500m) or cloud below the highest minimum sector altitude (MSA) if the MSA is higher than 5000ft.

```
TAF AMD YPAD 071643Z 0717/0824 23025G38KT 2500 +TSRA FEW008
SCT012 BKN030
RMK
T 22 22 23 22 Q 1008 1008 1008 1008
```

AMOUNTS

Cloud cover is reported in layers or masses using the following coverage descriptors (refer to Meteorological Services – Definitions and Regulations for full explanation):

- FEW – 1 to 2 OKTAS
- SCT – 3 to 4 OKTAS
- BKN – 5 to 7 OKTAS
- OVC – 8 OKTAS

HEIGHTS

Cloud base height is given in hundreds of feet AGL for example:

- FEW008 is a FEW clouds at 800 ft AGL
- SCT012 is SCT clouds at 1200 ft AGL
- BKN030 is BKN clouds at 3000 ft AGL

CLOUD LAYERS

TAF will forecast up to three separate layers of clouds with the understanding that *significant convective clouds will always be reported*.

Significant convective clouds are:

- CB – Cumulonimbus
- TCU – Towering Cumulus which describes Cumulus congestus of great vertical extent

Where significant convective clouds are forecasted they get appended to the relevant cloud layer. If a cloud layer consists of only CB and TCU clouds with a common cloud base, the layer is forecasted as CB and the amount shall be the sum of the CB and TCU amounts.

Layers are given from the lowest to the highest layer.

- The first group is the lowest layer or mass, irrespective of amount.
- The second group is the next higher layer covering at least 2 OKTAS.
- The third group is the following higher layer covering at least 4 OKTAS
- CB and TCU are reported separately if they were not already included in one of the other layers

CLOUD TYPES

With the exception of significant convective clouds the types of clouds are not identified.

CLEAR SKIES

When clear sky is forecasted, the cloud group is replaced by the abbreviation SKC (Sky Clear - Refer to Meteorological Services – Definitions and Regulations for full explanation).

In the even where there is no operationally significant clouds forecasted and CAVOK or SKC is not appropriate the abbreviation NSC will be used. (Refer to Meteorological Services – Definitions and Regulations for full explanation)

OBSCURED SKIES

If the sky is expected to be obscured and clouds cannot be forecasted, the cloud groups are omitted and vertical visibility is reported

```
TAF AMD YPAD 071643Z 0717/0824 23025G38KT 2500 +TSRA VV//
RMK
T 22 22 23 22 Q 1008 1008 1008 1008
```

VV// - Vertical visibility group:

VV – To indicate Vertical Visibility group.

// - The vertical visibility distance is given in hundreds of feet. Where the distance cannot be determined three solidi will be used.

Minimum and Maximum Temperature

In Australia temperatures may be forecasted as an element of the remarks section. In other parts of the world the maximum and minimum temperature during the forecast period is supplied.

```
TAF VHHH 072300Z 0800/0906 09010KT 7000 FEW015 SCT040
TX20/0806Z TN14/0800Z TN16/0823Z TEMPO 0800/0804 03010KT TEMPO
0804/0809 29010KT=
```

Example of a Hong Kong (VHHH) TAF showing minimum and maximum temperatures

TX20/0806Z - Maximum Temperature Group:

TX - Indicator that the information to follow is maximum temperature information.

20 - The maximum expected temperature in degrees Celsius.

08 - The day of the month on which the maximum temperature is expected.

06 - The hour of the day at which the maximum temperature is expected.

Z - Indicate the time zone, Z (Zulu) for UTC.

TN14/0800Z - Minimum Temperature Group:

TN16/0823Z

- TN** - Indicator that the information to follow is minimum temperature information.
- 14** - The minimum expected temperature in degrees Celsius. In this example, due to the validity period there are two times, 23 hours apart when minimum temperatures are forecasted.
- 16** - The day of the month on which the minimum temperature is expected.
- 08** - The hour of the day at which the minimum temperature is expected.
- 00** - In this example, due to the validity period there are two times, 23 hours apart when minimum temperatures are forecasted.
- 23** - Indicate the time zone, Z (Zulu) for UTC.

Temperatures from -9°C to 9°C will be reported with a 0 preceding the value

When the temperatures are below 0° Celsius, the reading is preceded by the letter M to indicate Minus.

```
TAF FAJS 142300Z 1500/1606 10010KT 8000 SCT040
TX13/1514Z TNM03/1507Z TNM04/1606Z TEMPO
0800/0804 03010KT TEMPO 0804/0809 29010KT=
```

CHANGE GROUPS

```
TAF AMD YPAD 071643Z 0717/0824
03008KT 5000 RA SCT010 BKN030
FM071900 03008KT 7000 RA BKN010
BECMG0802/0804 22012KT 9999 -RA FEW012 BKN030
FM080800 16010KT 9999 -SHRA BKN030
TEMPO 0717/0803 3000 RA BKN008
PROB30 INTER 0720/0803 1000 TSRA BKN008 SCT030CB
INTER 0803/0810 5000 SHRA SCT020 BKN030
RMK
T 22 22 23 22 Q 1008 1008 1008 1008
```

Change groups shall be used when, during the specified period, a change in some or all the elements forecasted is expected. The change groups that can be used are (Refer to Meteorological Services – Definitions and Regulations for full explanation):

- FM – From
- TILL – Until
- BECMG – Becoming
- TEMPO – Temporary changes.
- INTER – Interim changes.

- PROB30 – 30% Probability.
- PROB40 – 40% Probability

REMARK

In Australia the remarks section is used to forecast temperatures and atmospheric pressure as well as to supply any operationally relevant information.

For both temperature and atmospheric pressure four values are forecasted. The times for these values are:

- First value – 90 minutes starting at the commencement time of the TAF.
- Second value – 90 minutes either side of the commencement time of the TAF plus 3 hours.
- Third value – 90 minutes either side of the commencement time of the TAF plus 6 hours.
- Fourth value – 90 minutes either side of the commencement time of the TAF plus 9 hours.

TEMPERATURE

```
TAF AMD YPAD 071643Z 0717/0824
03008KT 5000 RA SCT010 BKN030
INTER 0803/0810 5000 SHRA SCT020 BKN030
RMK
T 22 22 23 22 Q 1008 1008 1008 1008
```

RMK - Indicate the beginning of remarks.

T 22 22 23 22 - Rainfall information:

T - Temperature information to follow.

22 - The first value (**22**) is the expected temperature for the first 90 minutes of the validity period. (In the example from 1700Z to 1830Z)

22 - The second value (**22**) is the expected temperature for the three hour period following the previous period. (In the example from 1830Z to 2130Z)

23 - The third value (**23**) is the expected temperature for the three hour period following the previous period. (In the example from 2130Z to 0030Z)

22 - The fourth value (**22**) is the expected temperature for the three hour period following the previous period. (In the example from 0030Z to 0330Z).

ATMOSPHERIC PRESSURE (QNH)

TAF AMD YPAD 071643Z 0717/0824
03008KT 5000 RA SCT010 BKN030
INTER 0803/0810 5000 SHRA SCT020 BKN030
RMK
T 22 22 23 22 **Q 1008 1008 1008 1008**

Q 1008 1008 1008 1008 - Atmospheric Pressure (QNH) information:

- Q** - QNH to follow
- 1008** - The first value (**1008**) is the lowest expected QNH for the first 90 minutes of the validity period. (In the example from 1700Z to 1830Z)
- 1008** - The second value (**1008**) is the lowest expected QNH for the three hour period following the previous period. (In the example from 1830Z to 2130Z)
- 1008** - The third value (**1008**) is the lowest expected QNH for the three hour period following the previous period. (In the example from 2130Z to 0030Z)
- 1008** - The fourth value (**1008**) is the lowest expected QNH for the three hour period following the previous period. (In the example from 0030Z to 0330Z).

ADDITIONAL INFORMATION

Any additional information that have relevance to operations, that have not been included previously, may be included as additional information, for example turbulence below 5000ft.

TREND FORECAST (TTF)

INTRODUCTION

The trend forecast is an aerodrome weather report (METAR or SPECI) to which a statement of trend, for the elements wind, visibility, weather and clouds, is appended.

VALIDITY PERIOD

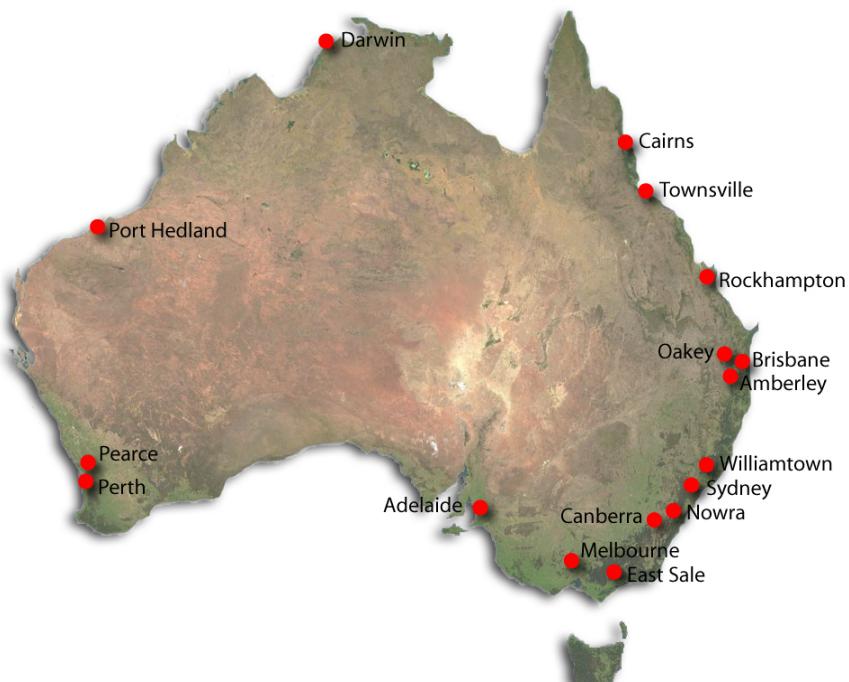
Normally the TTF's forecast the weather conditions expected to affect an aerodrome for the three hours following the time of the report. At aerodromes where the TTF service is not a 24 hour service the validity period will be less than three hours. In such cases the expiry time of the TTF will be indicated in the remarks section of the report.

PRECEDENCE

The TTF supersedes the Aerodrome Forecast (TAF) for its validity period. For aerodromes where the TTF service is not a 24 hour service, a statement in the remarks section during the last three hours of the service will indicate when the TAF supersedes the TTF, e.g. USE TAF FOR ARRIVALS AFTER 0800Z.

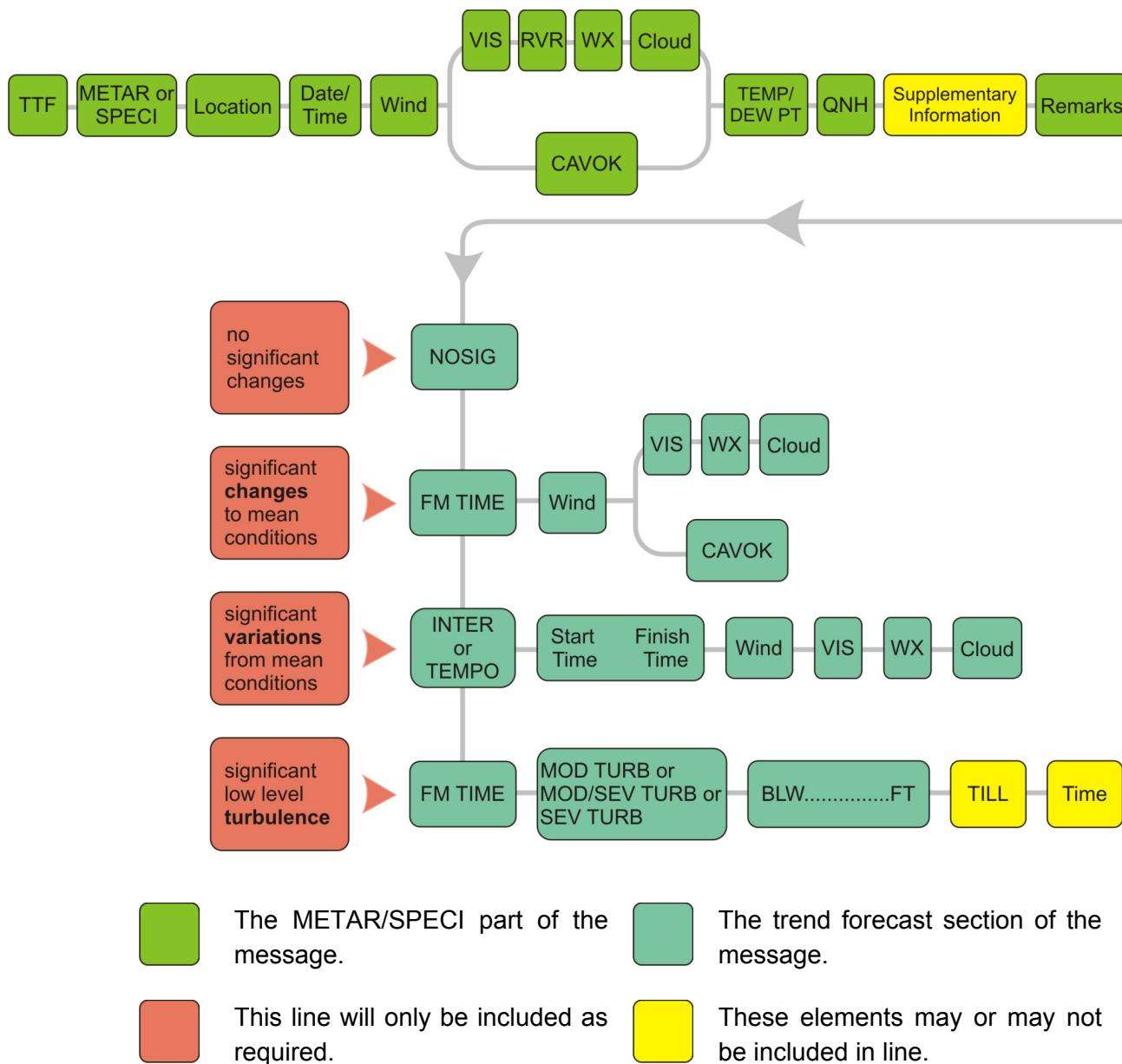
AVAILABILITY

TTF's are available at the following stations in Australia.



Airfields with TTF Services

FORMAT



DECIPHERING THE TTF

Refer to the METAR/SPECI manual for the deciphering of the METAR/SPECI component of the TTF

NOSIG

METAR	TTF	YMM	200030Z	23025G38KT	0550	R16/M0050	+SHRA
OVC004		BKN008		BKN012		13/02	Q1003
RMK RF00.0/000.0 NOSIG							

NOSIG is used when no significant changes to the existing conditions (as per the METAR/SPECI) are expected for the validity of the TTF.

Note: NOSIG **does not mean** no significant weather.

FM

FM (from) is used in the same way as for the TAF except that in the TTF the time is given in the format FMHHMM (hours and minutes).

```
TTF METAR YSSY 040500Z 04012KT CAVOK 25/15 Q1015
RMK RF00.0/000.0
FM0600 03015KT 9999 -SHRA SCT030
```

FM0600 - FROM change group

06 The hours of the day, using a 24 hour clock.
00 Minutes past the hour.

INTER AND TEMPO

INTER and TEMPO are used in the same way as for the TAF except that in the TTF the INTER/TEMPO period is given in the format HHMM/HHMM (hours and minutes).

```
TTF SPECI YBBN 040510Z 11006KT 9999 VCSH SCT004 BKN064
20/18 Q1017
RMK RF00.0/016.4
INTER 0510/0810 3000 SHRA BKN010
```

INTER - Indicates the beginning of the TEMPO change group.

0510 indicates the start of the period where **05** is hours and **10** minutes.
0810 indicates the end of the period where **08** is hours and **10** minutes.

TURBULENCE

Turbulence is used in the same way as for the TAF except that in the TTF the times are given in the format FMHHMM and TILL HHMM (hours and minutes).

The turbulence group is given in the format of a FROM as described above.

```
TTF METAR YMML 040500Z 34016KT 9999 FEW040 BKN110 BKN200
23/04 Q1007
RMK RF00.0/000.0
FM0500 MOD TURB BLW 5000FT
FM0515 24020G30KT 9999 -SHRA FEW015 BKN025
```

In the event where the turbulence is expected to last only until a time within the validity period of the TTF, the FROM group will be ended by closed by an UNTILL.

```
TTF METAR YMML 040500Z 34016KT 9999 FEW040 BKN110 BKN200
23/04 Q1007
RMK RF00.0/000.0
FM0500 MOD TURB BLW 5000FT TILL0620
FM0515 24020G30KT 9999 -SHRA FEW015 BKN025
```

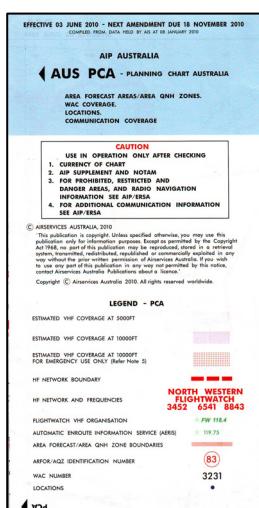
AREA FORECAST (ARFOR)

INTRODUCTION

The Area Forecast system is designed primarily to meet the needs of pilots of general aviation. The system provides for the routine issue of forecasts for designated areas and the prompt issue of amendments when prescribed criteria are satisfied.

AVAILABILITY

Forecasts are issued for the numbered areas shown in the map below.



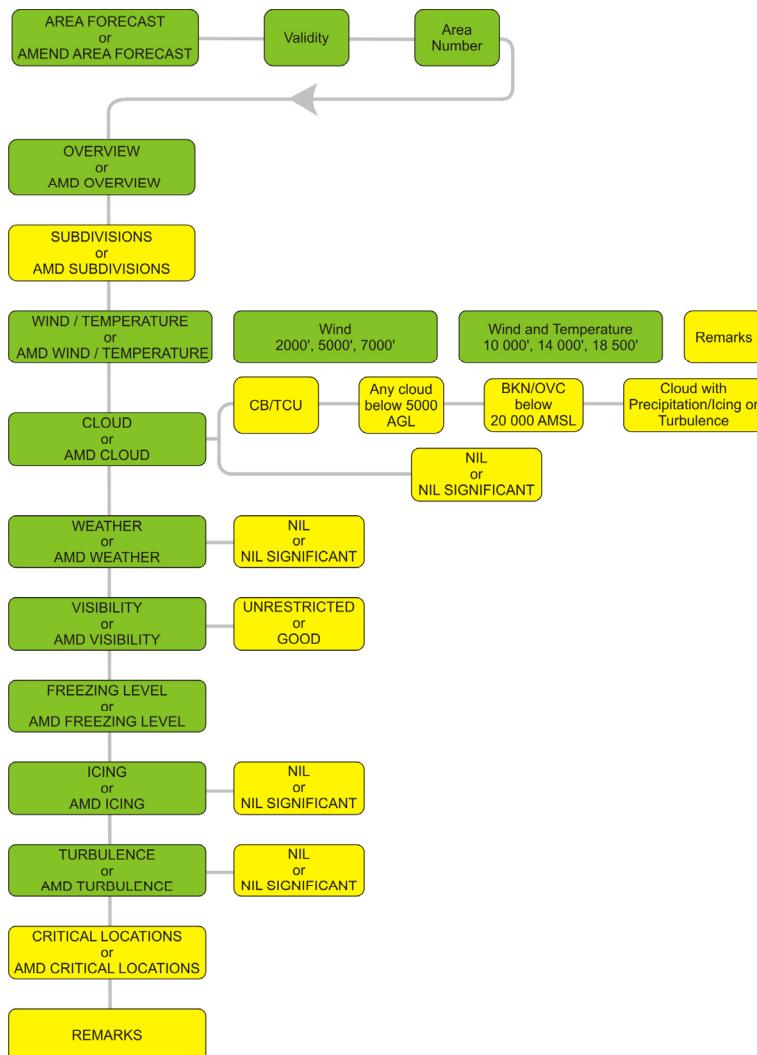
More detail of these forecast areas can be found in the Airservices Australia *Planning Chart Australia (PCA)*.

VALIDITY PERIOD

There may be variations in commencement of validity between different regions and between those times when daylight saving is or is not operating. However the following principles apply:

- The standard validity period is twelve hours but this may vary from state to state.
- An Area Forecast covering daylight hours will be available as soon as practicable in the morning.
- Area Forecasts are not prepared for those times when air traffic volume is so low as not to justify routine issues. In these cases a route forecast will service any individual flights.
- Area Forecasts will generally be available a minimum of one hour before commencement of validity.

FORMAT



DECIPHERING AN ARFOR

MESSAGE IDENTIFIER

22:31 UTC, 18/10/2008
AREA FORECAST 182300 TO 191100 AREA 21.

The forecast is identified as AREA FORECAST unless the forecast is an amendment, in which case it will be identified as an AMEND AREA FORECAST. In amended forecasts, any amended section will be annotated with AMD preceding the section heading.

VALIDITY PERIOD

22:31 UTC, 18/10/2008
AREA FORECAST 182300 TO 191100 AREA 21.

The validity period is written **DDHHMM TO DDHHMM**, where :

- DD** - is the day of the month; and
- HH** - is the hours (UTC); and.
- MM** - is the minutes in the hour.

AREA NUMBER

22:31 UTC, 18/10/2008
AREA FORECAST 182300 TO 191100 **AREA 21**

The relevant forecast zone is specified by an area forecast number (refer to the *Planning Chart Australia (PCA)* for detailed information)..

Note:

- Areas 24, 87 and 88 are only designated for the purpose of Area QNH.
- Any flights in these areas can be provided with a route forecast

OVERVIEW

The overview will highlight any conditions which may inhibit safe operations for pilots flying under visual flight rules. The overview will include the affected areas or regions, and where necessary, will make reference to any spatial and temporal variations in the conditions.

The ARFOR could assist in making the following decisions:

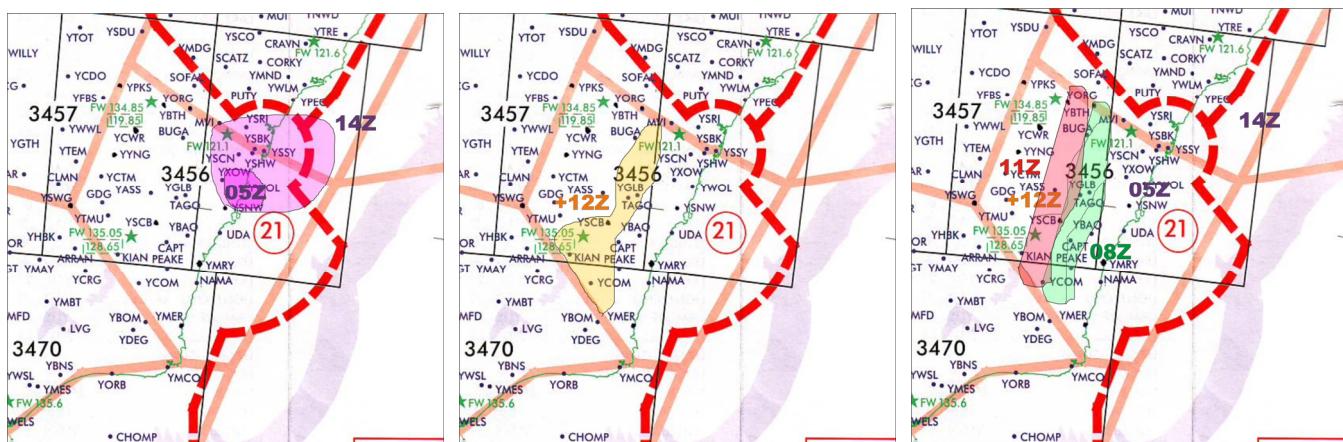
- Are the meteorological conditions
 - Visual Meteorological Conditions (VMC),
 - Marginal,
 - Instrument Flight Rules (IFR); or
 - too poor for flying?
- Is it better to plan for a coastal or inland track?
- If bad weather is encountered, what is the contingency plan?

- Return?
- Change altitude?
- Change heading?
- Land immediately?

Some examples:

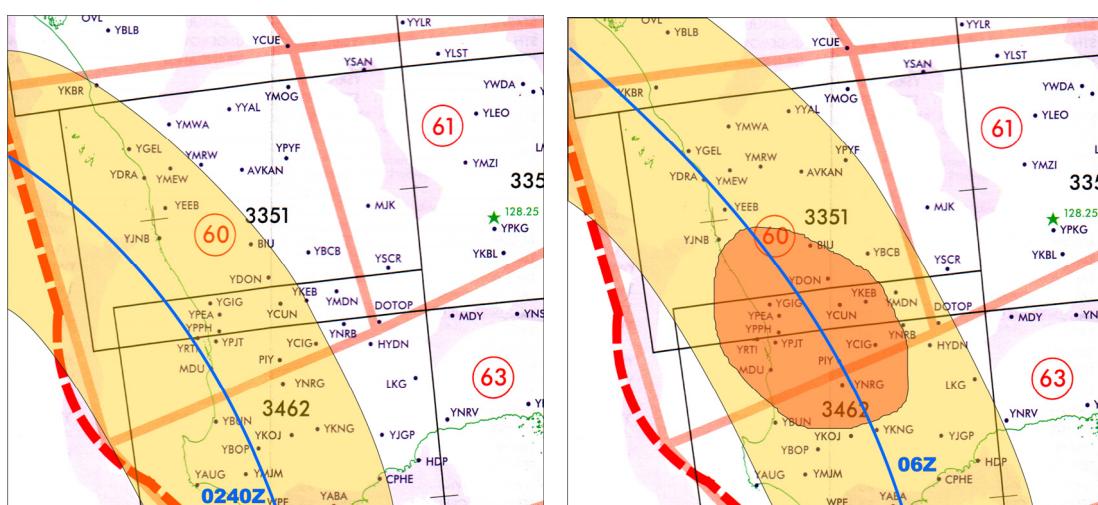
OVERVIEW:

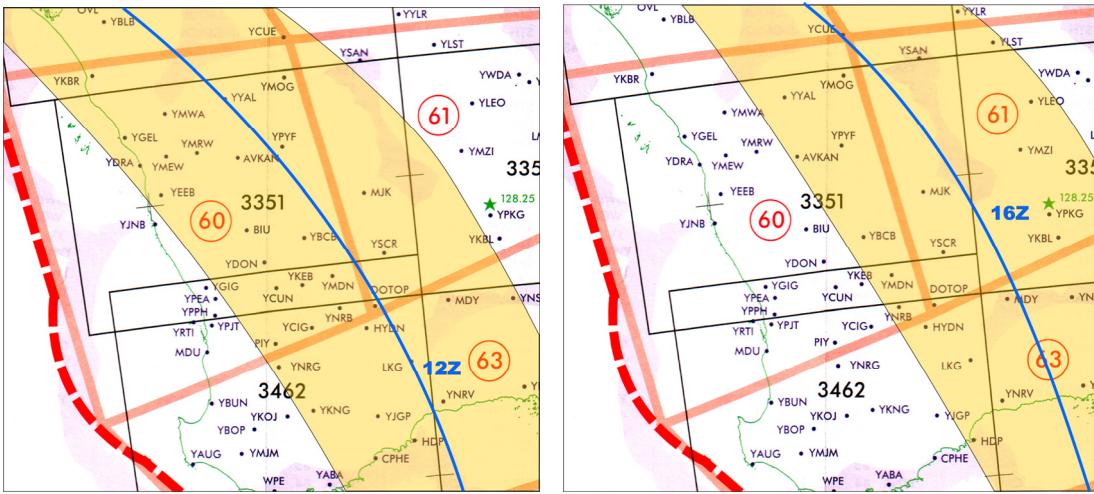
ISOLATED SHOWERS SEA/COAST N OF YSNW, EXTENDING NE OF MVI/YSNW AFTER 14Z. ISOLATED FOG/MIST AFTER 12Z, CHIEFLY RANGES AND SLOPES. BROKEN LOW CLOUD RANGES/SLOPES E OF YBTH/YCOM BY 08Z AND E OF YORG/KIAN BY 11Z. BROKEN LOW CLOUD ALSO IN PRECIPITATION.



OVERVIEW:

AMD OVERVIEW: COLD FRONT NEAR YRTI/WPE, FORECAST NEAR YDRA/PIY BY 06Z, NEAR YYAL/DOTOP BY 12Z AND NEAR MDY/YCUE BY 16Z. WITHIN 120NM OF FRONT: AREAS OF RAIN AND ISOLATED THUNDERSTORMS. AREAS OF LOW CLOUD. MODERATE LOW LEVEL TURBULENCE TENDING TO SEVERE SOUTH OF YEEB [SEE SIGMET]. REMAINDER EAST OF FRONT: ISOLATED SHOWERS. MODERATE LOW LEVEL TURBULENCE. REMAINDER WEST OF FRONT: SCATTERED SHOWERS.



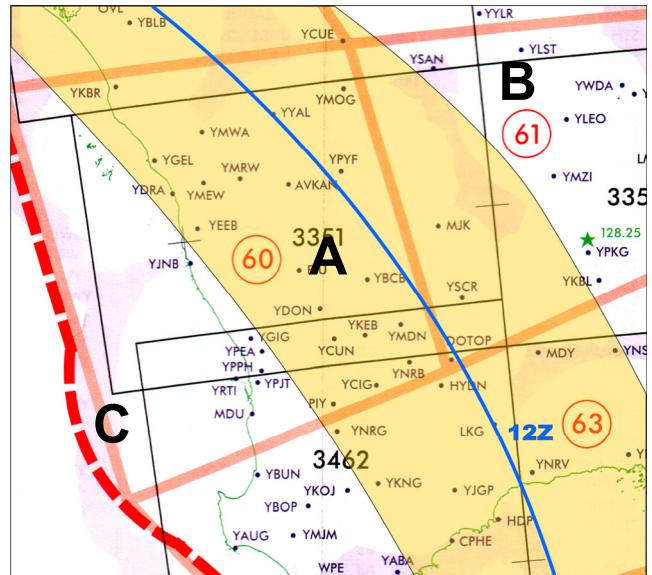


SUBDIVISIONS

Area forecasts may be divided into spatial, temporal or weather-related subdivisions. Spatial subdivisions are given using PCA locations or lat/long coordinates.

SUBDIVISIONS:

- A: WITHIN 120NM OF FRONT.
- B: REMAINDER E OF FRONT.
- C: REMAINDER W OF FRONT.



WINDS AND TEMPERATURES

Upper level winds are given for 2000 (or 3000 in elevated regions), 5000, 7000, 10 000, 14 000 and 18 500 feet. If subdivisions are present, the wind for each sub-area will be supplied.

The expected mean wind direction is given in three figures to the nearest ten degrees True, followed by a solidus (/), followed by the mean wind speed in two figures to the nearest five knots, e.g. 290/40. CALM and VRB (variable) are used when appropriate.

A REMARKS section may be included below the WIND section to provide further information.

Upper level temperatures are given for 10 000, 14 000 and 18 500 feet. These are given in whole degrees Celsius, following the forecast of the upper wind for the level concerned. e.g. 290/40 PS08, 300/50 ZERO, 360/10 MS10. The abbreviation PS is used for positive temperatures, and MS (minus) is used for negative temperatures.

AMD WIND:						
	3000	5000	7000	10000	14000	18500
A/B:	320/50	320/55	310/60	300/60 ZERO	300/55 MS05	300/70 MS13
C:	270/25	290/30	280/40	300/55 MS01	300/70 MS07	310/90 MS15

CLOUD

The inclusion of cloud is restricted to:

any cumulonimbus (CB) or towering cumulus (TCU)

- Any cloud with a base at or below 5000 feet above the highest terrain in the area covered by the forecast
- Any broken or overcast cloud with base at or below 20 000 feet above mean sea level (MSL)
- Any cloud associated with any forecast precipitation, moderate or severe icing or moderate or severe turbulence.

Cloud amount and type are given using the abbreviations in the tables on the right.

If no, or no significant, cloud is expected throughout the area or subdivision, the format used is NIL or NIL SIGNIFICANT.

When CU and SC, or AC and AS, occur together at similar heights, they are combined, i.e. CU/SC or AC/AS.

Cloud **base** and **tops** are given in feet above MSL.

Code	Cloud Amount
FEW	Few (1 to 2 oktas)
SCT	Scattered (3 to 4 oktas)
BKN	Broken (5 to 7 oktas)
OVC	Overcast (8 oktas)

Code	Cloud Type
ISOL	Isolated
OCNL	Occasional (well separated)
FRQ	Frequent (little or no separation)
EMBD	Embedded (in layers of other cloud)

Code	Cloud Type
CU	Cumulus
SC	Stratocumulus
CB	Cumulonimbus
TCU	Towering cumulus
ST	Stratus
AS	Altostatus
AC	Altocumulus
NS	Nimbostratus

CLOUD:

A: ISOL CB 2000/30000 [BASE 3000 WELL INLAND].
 BKN ST 0800/3000 [BASE 1700 WELL INLAND].
 BKN CU/SC 2500/15000 [BASE 3500 WELL INLAND].
 BKN AC/AS ABOVE 10000.
 B: BKN ST 1000/2500 IN SHRA [BASE 1500 INLAND].
 BKN CU/SC 3000/10000 [BASE 3500 INLAND] W OF YMEW/PIY.
 SCT AC/AS 9000/14000 W OF YMEW/PIY.
 C: BKN ST 1000/3000 [BASE 1500 INLAND] IN SHRA.
 BKN CU/SC 3000/12000 [BASE 3500 INLAND].
 SCT AC/AS 9000/15000.

WEATHER

Forecast weather is given using the abbreviations and codes in the tables below. If no, or no significant, weather is expected throughout the area or subdivision, the format used is NIL or NIL SIGNIFICANT.

Code	Description	Code	Description	Code	Description
AC	Altocumulus	FEW	Few	OVC	Overcast
AC/AS	Altocumulus and Altostratus with bases at the same level	FG	Fog	RA	Rain
AS	Altostratus	FM	From (only used in Critical Locations section)	SC	Stratocumulus
AMD	Amendment	FRQ	Frequent	SCT	Scattered
BKN	Broken	GR	Hail	SEV	Severe
CAVO K	Cloud visibility and weather ok.	GS	Small Hail	SH	Shower
CB	Cumulonimbus	INTER	Intermittent variations (only used in Critical section Locations)	SN	Snow
CU	Cumulus	ISOL	Isolated	ST	Stratus
CU/SC	Cumulus and Stratocumulus with bases at the same level	MOD	Moderate	TCU	Towering Cumulus
DZ	Drizzle	NS	Nimbostratus	TEMP O	Temporary variations (only used in Critical Locations section)
EMBD	Embedded	OCNL	Occasional	TS	Thunderstorm

AMD WEATHER:
SHRA. FG LAND TILL 01Z. ISOL TSRA AVKAN/YMDN TILL 24Z.

In this example:

- SHRA** - Showers of rain. Showers are associated with cumulus cloud. Using the information in the cloud section these areas can be identified.
- FG...** - FOG. The fog is forecasted for land areas and will dissipate by 01UTC
- ISOL...** - Isolated (individual) thunderstorm with rain. These thunderstorms will be occur between AVKAN and YMDN (Area 60) and will clear by 24UTC.

AMD WEATHER:
ISOL TSRA TILL 24Z.

In this example:

- ISOL...** - Isolated (individual) thunderstorm with rain. These thunderstorms will be occur in areas with CB. Refer to the cloud section to identify the areas with CB.

VISIBILITY

Horizontal visibility is given :

- In metres to the nearest 100 metres up to and including 5000 metres, and
- In whole kilometres above that value.
- Forecast visibilities of 50 metres or less are given as ZERO.
- If the visibility is forecast to be above 10 kilometres, the words UNRESTRICTED or GOOD are used.

The forecast value is followed by the units used e.g. 8KM or 1000M.

Significant variations of visibility are included. Significant vertical variations of horizontal visibility will be given. Information is supplied on the depth of any layers affected by drizzle, haze and duststorms.

AMD VISIBILITY:
0300M IN FOG. 3000M IN TSRA. 4000M IN SHRA.

The visibility in the entire area is more than 10km, with the following area where the visibility is:

- 0300M** - The visibility will be 300m in areas where fog has been forecasted. Refer to the overview and/or weather sections for details on these areas.
- 3000M** - The visibility will be 3000m in thunderstorms with rain. Refer to the overview and/or cloud sections for details on areas with CB that will produce these conditions.
- 4000M** - The visibility will be 4000m in showers with rain. Refer to the overview and/or cloud sections for details on areas with cumuliform cloud that could produce these conditions.

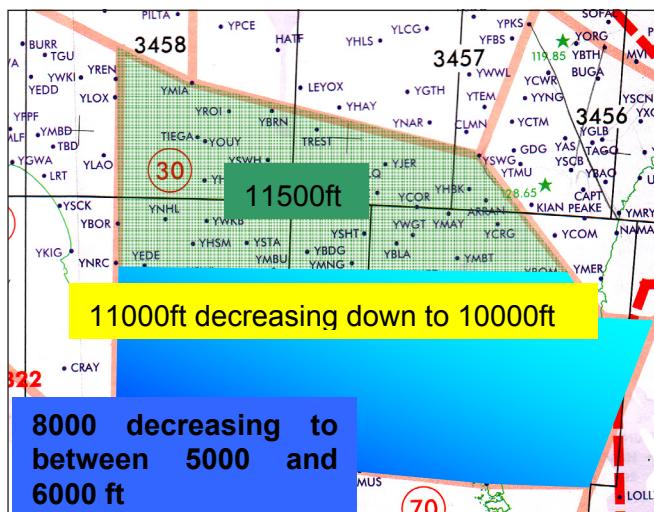
FREEZING LEVEL

Freezing level is the height in feet above MSL of zero degrees Celsius. Reference is made to any variations in height greater than 1000 feet, and to the occurrence of more than one freezing level.

FREEZING LEVEL:

N OF 37S: 11500 DECREASING.

S OF 37S: 11000 IN THE N GRADING 8000 IN SW, DECREASING 10000 IN N
GRADING 5000/6000 IN S BY 11Z



ICING

This section provides information on the expected occurrence of moderate or severe icing in precipitation or cloud including convective cloud.

The height in feet above MSL of the bottom and top of the layer is given as, for example, MOD IN RA 5000/8000.

When the layer of icing is expected to extend above 20 000 feet, descriptions such as MOD ABOVE 14000 are used.

AMD ICING:

SEV IN CB TOPS.

MOD IN AC/AS/CU TOPS.

The areas where icing will occur can be found using the cloud section.

TURBULENCE

This section provides information on moderate or severe turbulence including turbulence associated with convective cloud.

- The height above MSL of the bottom and top of any layer(s) is given as, for example, MOD IN CLOUD 12000/16000
- When the turbulence is expected to extend to ground level, descriptions such as BELOW 8000 are used.
- When the turbulence is expected to be confined to clouds, descriptions such as MOD IN CLOUD BELOW 8000 are used.
- When the turbulence is expected to extend above 20 000 feet, descriptions such as SEV ABOVE 15000 are used.

TURBULENCE:

MOD IN CU.

ISOL MOD TURB BLW 7000FT RANGES/LEE SLOPES W OF MVI/YCOM FROM 09Z.

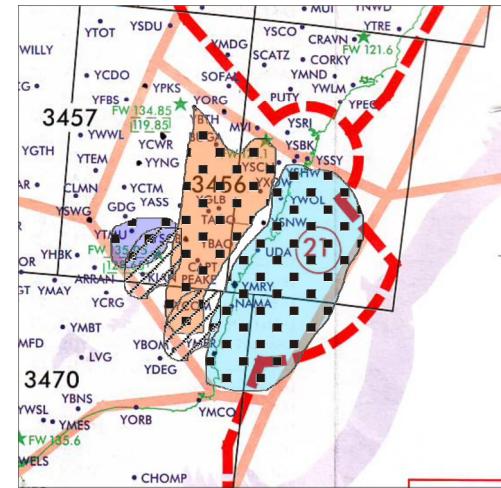
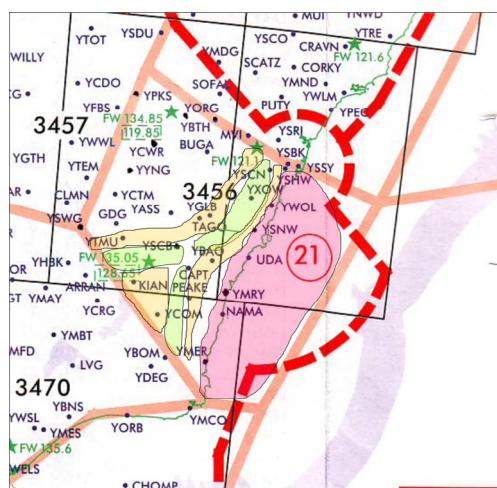
In order to identify the areas that will be affected by turbulence the cloud section must be consulted

CLOUD:

BKN ST 2000/4000 SLOPES, 3000/5000 RANGES, 1500/3000 SEA/COAST.

SCT/BKN CU/SC 3500/8000 SEA/COAST, 5000/8000 SLOPES/RANGES E OF YBTH/YCOM.

FEW CU 6000/8000 W SLOPES/RANGES REMAINDER.



Areas of turbulence associated with the CU

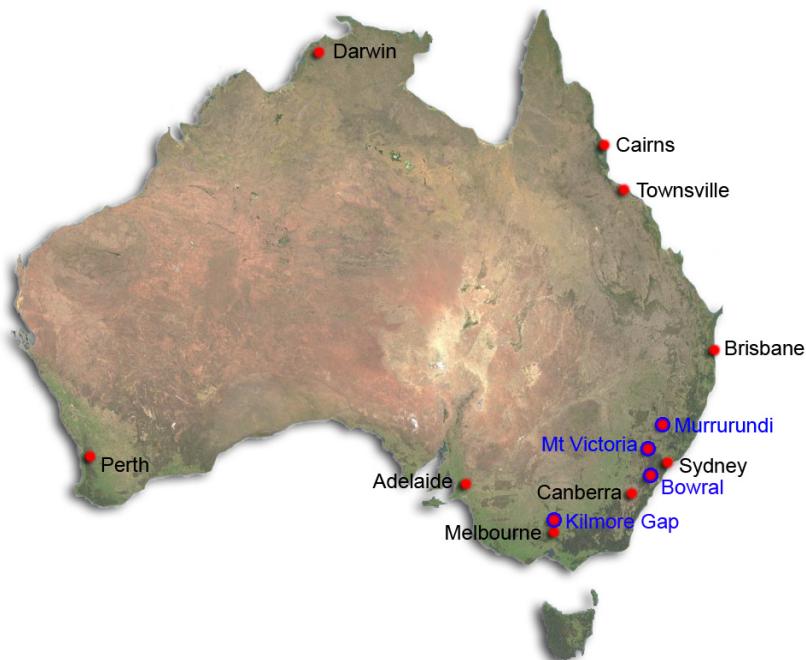


Area of turbulence below 7000ft on the ranges and leeslopes

CRITICAL LOCATIONS

These are locations such as gaps in mountain ranges which are frequently used by general aviation aircraft.

Critical location forecasts are appended to Area Forecasts for Bowral and Mt Victoria (NSW) on AREA 21, Mt Victoria and Murrurundi (NSW) on AREA 20, and Kilmore Gap (Vic) on AREA 30.



Critical location forecasts are written in a mixture of plain language and TAF format making reference as necessary to cloud, visibility and weather.

- CAVOK is used to indicate visibility greater than 10 KM, cloud ceiling above 5000 FT above ground level and nil significant weather.

AMD CRITICAL LOCALITIES:

KILMORE GAP: BKN ST 1200 ([CLOUD ON GROUND](#))

FM23 9999 BKN SC 2000

FM00 9999 SCT SC 3000

CLOUD ON GROUND: All heights in an ARFOR is AMSL and the reader might interpret height in this section as AGL. “Cloud on ground” is included to ensure that the reader will understand that the clouds are on the ground and not 1200 AGL.

REMARKS

This section will include any relevant information not included elsewhere in the forecast.

FIXED TIME PROGNOSTIC UPPER WIND AND TEMPERATURE CHARTS

INTRODUCTION

These forecasted winds and temperatures, are compiled and calculated by a computer. The winds and temperatures are valid for a fixed time, in Australia these times are 0000UT, 0600UT, 1200UT, or 1800UT. Each chart is valid for three hours either side of the fixed time.

In Australia three different charts supply all upper air wind and temperature :

- Route Sector Winds Charts
- Grid Point Forecasts
- Wind / Temp (WAFS)

ROUTE SECTOR WINDS (RSWT)

Route Sector Winds and Temperatures are produced for frequently used air routes (or sectors of these air routes). Mean wind are given for the whole sector. In the case where the sector is long, it may be divided into shorter sectors.

RSWT are forecasted for six levels:

- 150hPa – FL445
- 200hPa – FL385
- 250hPa – FL340
- 300hPa – FL300
- 400hPa – FL235
- 500hPa – FL185

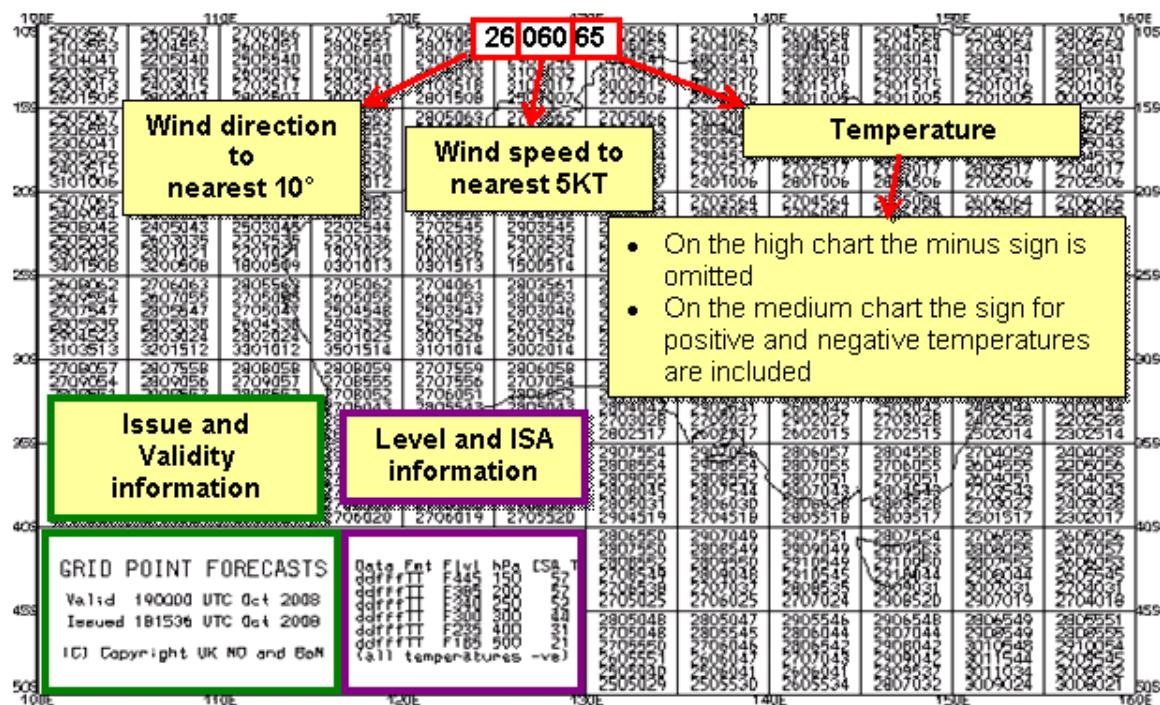
IDQ60273	ISSUE DATE AND TIME	VALID PERIOD	PERIOD FOR WHICH THE FORECAST WINDS AND TEMPERATURES ARE VALID
	ISSUE 181635	VALID 182100 – 190300	
FL - ISA	YMMML/YSSY	YMMML/YPAD	YMMML/YMHB
445 -56	2704059	241805558	2806555
385 -56	2604555	2102053	2906554
340 -52	2704050	2501544	2807051
300 -45	2703042	2603543	2806543
235 -32	2803527	2805028	2805529
185 -21	2701513	2804517	2907519
FL - ISA	Wind Direction	YMMML/YGTH/YWLG	YSSY/YMCO/YMHB
445	ISA Temperature	2559	2704059
385		2603560	2703560
Flight Levels	50	2202051	2705050
	42	2401027	2803527
	235 -32	2803527	2702527
	185 -21	2803016	2702015
		2500513	2602016
		2803017	2906018
		2702015	2702515
		2602016	2703016

GRID POINT FORECASTS

Wind and temperature data derived from Word Area Forecast System is presented in 5° latitude and longitude squares. The information is printed on a graphical background to assist with interpretation.

The wind and temperature for the centre of each square is supplied for specific flight levels:

- Australia High-level:
 - 150hPa – FL445
 - 200hPa – FL385
 - 250hPa – FL340
 - 300hPa – FL300
 - 400hPa – FL235
 - 500hPa – FL185
- Australia Mid-level:
 - 400hPa – FL235
 - 500hPa – FL185
 - 600hPa – FL140
 - 700hPa – FL100
 - 850hPa – FL050



WIND AND TEMPERATURE CHARTS

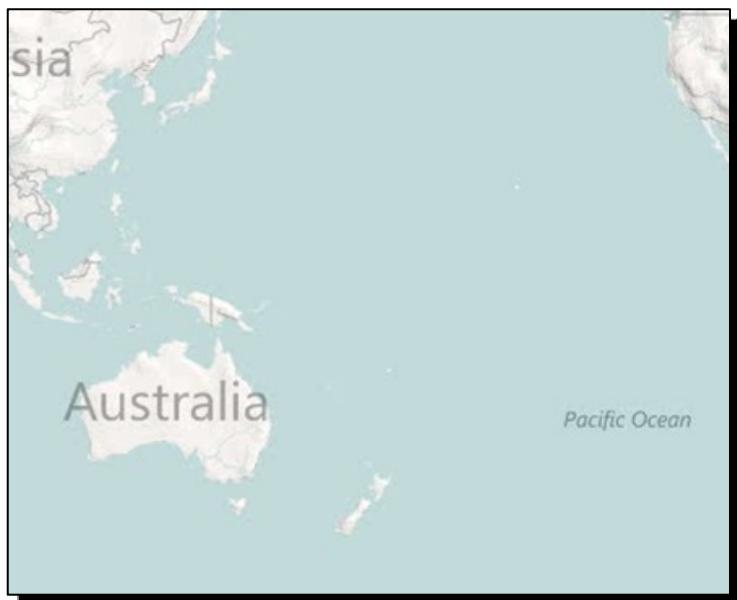
Wind and temperature charts are produced for four areas:

Australian Region

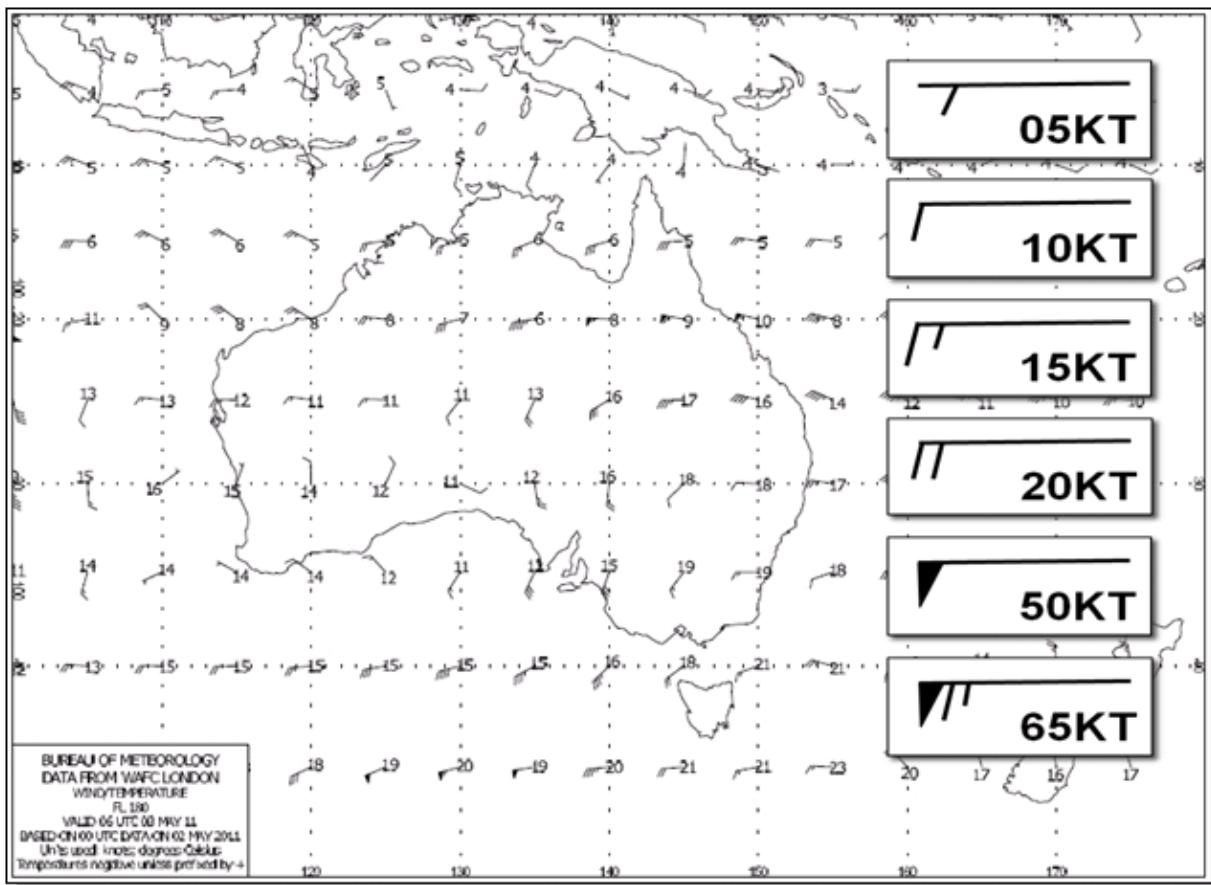


ICAO Area E (Latitude 45°N to 47°S, Longitude 025°E to 180°E)

ICAO Area F (Latitude 42°30N to 47°30S, Longitude 100°E to 110°W)



ICAO Area K (Latitude 00°N to 90°S, Longitude 000°E to 180°E)



Wind direction is indicated by the wind direction line. The wind will blow from the direction to which the line is pointing.

The temperature is given °C with the minus sign omitted.

SIGNIFICANT WEATHER CHARTS (SIGWX)

INTRODUCTION

The significant weather expected in the airspace is depicted using approved symbols and abbreviations. In Australia the following SIGWX are published:

- Medium Level Chart (A100 to FL250)
- High Level Chart (FL250 to FL630)

PUBLISHING INFORMATION

The availability of the Australian SIGWX is as follows:

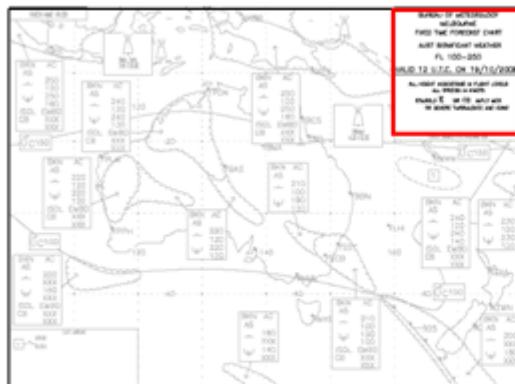
Chart Valid (UTC) Time	SIGWX High Available at (UTC)	SIGWX Medium Available at (UTC)
0000	0800	0900
0600	1400	1500
1200	2000	2100
1800	0200	0300

Note: Times for SIGWX is approximate times

CHART VALIDITY AND PUBLISHING INFORMATION

Each chart will cover variations in weather for the period three hours either side of the validity time.

Chart Valid (UTC) Time	Chart valid for flights between times (UTC)
0000	2100 to 0300
0600	0300 to 0900
1200	0900 to 1500
1800	1500 to 2100

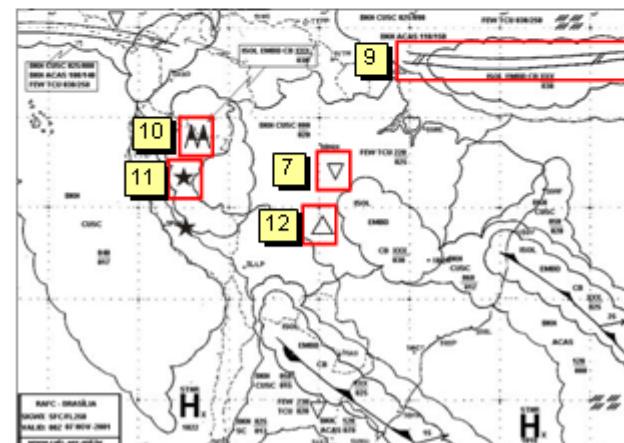
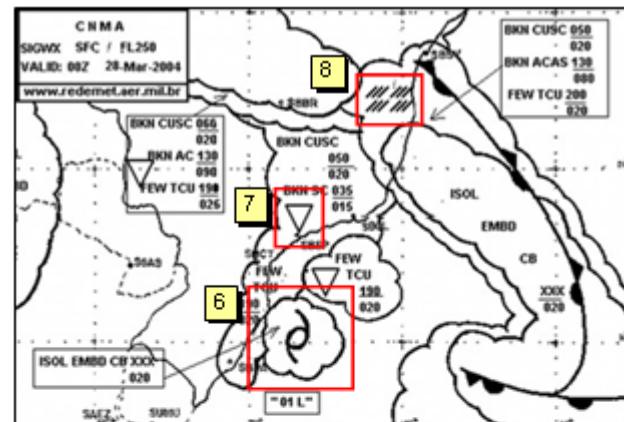


**BUREAU OF METEOROLOGY
MELBOURNE
FIXED TIME FORECAST CHART
AUST SIGNIFICANT WEATHER
FL 100-250
VALID 12 U.T.C. ON 19/10/2008
ALL HEIGHT INDICATIONS IN FLIGHT LEVELS
ALL SPEEDS IN KNOTS
SYMBOLS K OR CB IMPLY MOD
OR SEVERE TURBULENCE AND ICING
CHECK SIGMETS FOR VOLCANIC ASH**

- 1 Identifying the Australian Bureau of Meteorology as the publishing authority for the attached chart.
- 2 Identify the chart as an Australian Significant Weather chart.
- 3 Specify the levels for which the chart is valid. In this case a medium chart from FL 100 to FL 250.
- 4 Validity time and date (Refer to Chart Validity table above for more information).
- 5 General information on units and the use of symbols.

CHART SYMBOLS AND USAGE

- 6 Tropical Cyclone
- 7 Showers
- 8 Rain
- 9 Inter-tropical Convergence Zone
- 10 Mountains Obscured
- 11 Snow
- 12 Hail



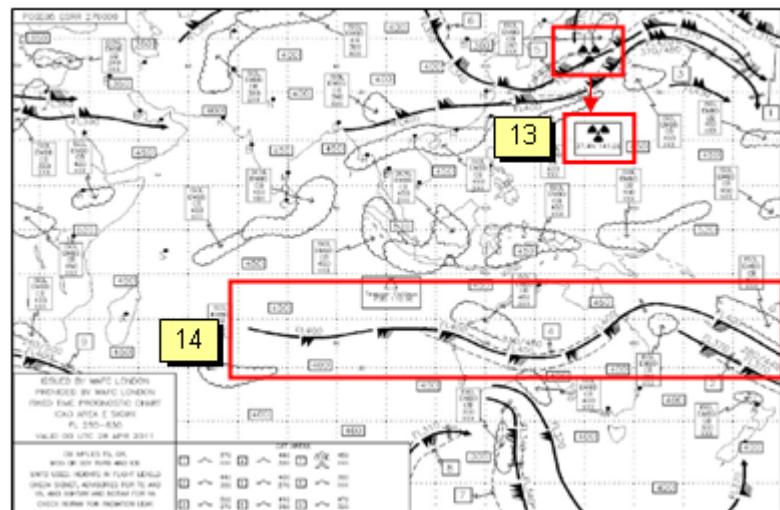


13 Radioactive materials in the atmosphere



14 FL270 Location of a jetstream

The location, speed and height of the maximum wind are indicated. Two lines (||) crossing the jetstream indicate the location where the speed changes by 20 kts



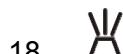
15 380 Level of the Tropopause



16 460 Tropopause high indicate a "hump" in the tropopause

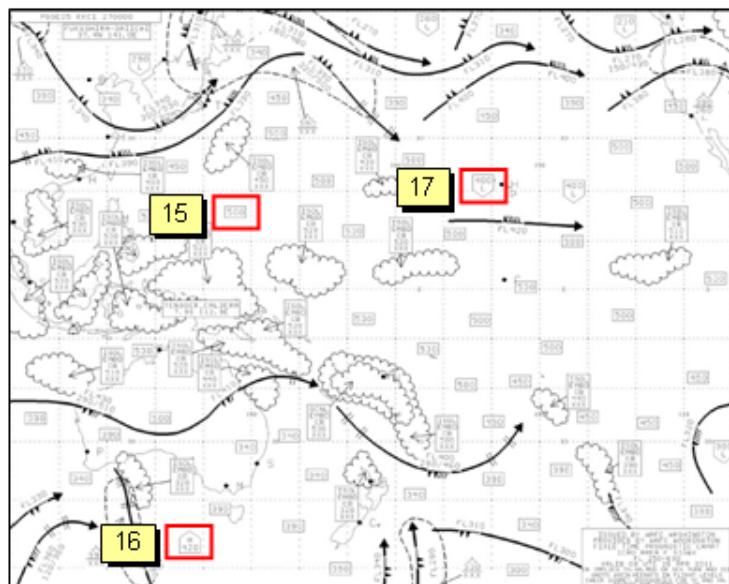


17 270 Tropopause low indicate a "dip" in the Tropopause

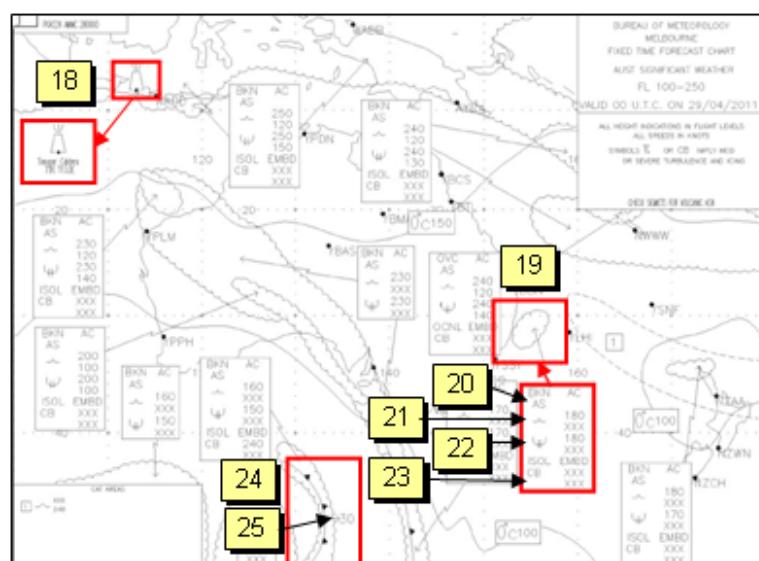


18 Volcanic eruption

The black dot at the bottom of the symbol indicates the location of the volcano.
In this example the name of the volcano is printed in a separate information box



19 The borders of areas with significant cloud is indicated by a scalloped line



20 Information on the types of cloud is bordered by the scalloped line.

- 21  Moderate Turbulence
 Severe Turbulence

Vertical Location

 220
130

The vertical position for atmospheric events is defined by two figures printed next to the symbol that identifies the event.

The figure at the top defines the highest vertical boundary of the event

22  Moderate Aircraft Icing

Intensity	Aircraft Reaction	Reaction Required
	<ul style="list-style-type: none"> No loss of speed 	<ul style="list-style-type: none"> No change of course or altitude is necessary •
	<ul style="list-style-type: none"> Ice accretion continues to increase but not at a rate to affect the safety of the aircraft Airspeed may be lost. 	<ul style="list-style-type: none"> Change of heading and/or altitude is considered desirable
	<ul style="list-style-type: none"> Ice accretion continues to increase and begins to affect the performance and manoeuvrability of the aircraft 	<ul style="list-style-type: none"> Change of heading and/or altitude is considered essential

23 Information on CBs if present within the scalloped line.

24 Location of a front, in this example a cold front.

25 Direction and speed of movement of the front

Fronts



Warm Front



Cold Front

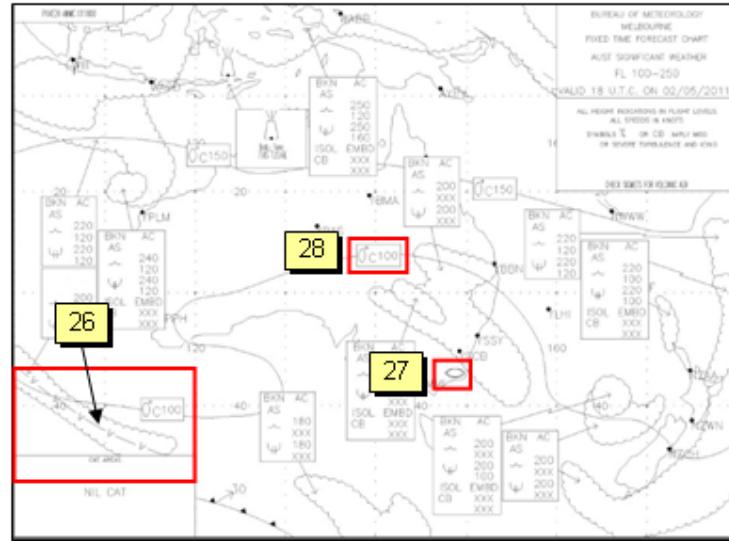


Occluded Front



Quasi-stationary Front

- 26  Severe squall line
- 27  Mountain waves
- 28  Freezing Level



As indicated above, the Australian Bureau of Meteorology does not publish a Significant Weather Chart – Low. Other countries do publish these charts and some of the symbols that are commonly used on them are:

	Drizzle		Widespread Blowing Snow
	Severe sand or dust haze		Widespread sand or dust haze
	Widespread mist		Widespread fog
	Widespread smoke		Widespread haze
	Convergence line		Freezing precipitation
	State of the sea		Sea-surface temperature
	Widespread strong surface wind		