



**METEOROLOGY  
and  
NAVIGATION  
EXAMINATION MANUAL**

**NATIONAL PILOTS LICENCE**

For Examination Purposes Only !

*PLEASE - Do not mark or damage this manual in any way,  
or remove from the examination terminal.*

Issue: 2 - 2014



# NATIONAL PILOTS LICENCE

## METEOROLOGY and NAVIGATION EXAMINATION MANUAL

### Contents




























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Source: SA Weather Services

Source: Aeronautical Information RSA 2010

## SYNOPTIC SYMBOLS - LOW, MEDIUM and HIGH CLOUD

$C_L$	LOW CLOUD	$C_M$	MEDIUM CLOUD	$C_H$	HIGH CLOUD
	Cu Small cumulus		As Thin		Ci Strands, not increasing
	Cu Moderate or large Cumulus		As Thick or Ns		Ci Dense
	Cb Cumulonimbus without anvil		Ac Thin at one level		Ci Dense, anvil shaped from Cb
	Sc formed by the spreading out of Cu		Ac Thin patches at more than one level		Ci Hooked, increasing amounts
	Sc Stratocumulus		Ac In bands and in increasing amounts		Ci and/or Cs, below 45°, thickening
	St Stratus		Ac Formed from spreading Cu		Ci and/or Cs above 45° thickening
	Fs Fractus stratus		Ac Layered or with and/or Ns		Cs Covering entire sky
	Cu and Sc with bases at different levels		Ac Castellanus		Cs Not increasing
	Cb With anvil		Ac Several layers in a chaotic sky		Cc Cirrocumulus

### TOTAL CLOUD COVER

h	HEIGHT IN FEET (Rounded off)		SKY COVERAGE (Total amount)		HEIGHT IN FEET (Rounded off)		SKY COVERAGE (Total amount)
0	0 - 149		No Clouds	5	2 000 - 3 499		Five oktas
1	150 - 299		One okta or less	6	3 500 - 4 999		Six oktas
2	300 - 599		Two oktas	7	5 000 - 6 499		Seven oktas or more but not overcast
3	600 - 999		Three oktas	8	6 500 - 7 999		Completely overcast
4	1 000 - 1 999		Four oktas	9	8 000 or more or no clouds		Sky obscured



## SIGNIFICANT PRESENT and FORECAST WEATHER























Sign Present and Forecast Weather				
Qualifier		Weather Phenomena		
Intensity of Proximity 1	Descriptor 2	Precipitation 3	Obscuration 4	Other 5
- Light	MI Shallow BC Patches	DZ Drizzle RA Rain	BR Mist FG Fog	PO Dust/sand whirls
Moderate (no qualifier)	PR Partial (Covering part of the aerodrome) DR Low Drifting	SN Snow SG Snow Grains IC Ice crystals (diamond dust)	FU Smoke VA Volcanic Ash	SQ Squalls FC Funnel Clouds (tornado or waterspout)
+ Heavy	BL Blowing SH Shower(s) TS Thunderstorm	PE Pellets GR Hail	DU Widespread Dust SA Sand	SS Sandstorm DS Duststorm
VC Vicinity	FZ Freezing (supercooled)	GS Small hail and/or snow pellets	HZ Haze	

The significant present and forecast weather groups are constructed by considering columns 1 to 5 in the table above in sequence, that is intensity, followed by description, followed by weather phenomena.

An example could be: **+SHRA** (heavy shower (s) of rain).



## SIGNIFICANT WEATHER SYMBOLS - 1

SYMBOLS FOR SIGNIFICANT WEATHER CHARTS			
	Thunderstorms		Drizzle
	Tropical cyclone		Rain
	Severe line squall*		Snow
	Moderate turbulence		Shower
	Severe turbulence		Widespread blowing snow
	Mountain waves		Severe sand or dust haze
	Slight aircraft icing		Widespread sandstorm or duststorm
	Moderate aircraft icing		Widespread haze
	Heavy aircraft icing		Widespread mist
	Widespread fog		Widespread smoke
	Hail		Freezing precipitation**

\* In flight documentation for flights operating up to FL 100, this symbol refers to "line squall".

\*\* This symbol does not refer to icing due to precipitation coming into contact with an aircraft which is at a very low temperature.

NOTE: Height indications between which phenomena are expected, top above base, as per chart legend.

### SIGNIFICANT WEATHER - LOW CHARTS (BELOW FL180)

Scalloped lines = Used to demarcate significant cloud boundaries



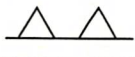




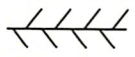


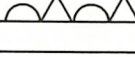

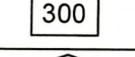
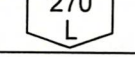
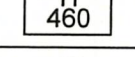
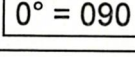
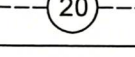
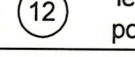


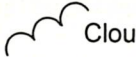




X = position of pressure centres given in hPa

XXX

XXX

= Indicates cloud base or tops which are outside the parameters of specific SIG WX charts

## SIGNIFICANT WEATHER SYMBOLS - 2

SIGNIFICANT WEATHER CHARTS - SYMBOLS	
 Cold front at the surface	 Quasi-stationary front at the surface
 Cold front above the surface	 Quasi-stationary front above the surface
 Warm front at the surface	 Position, speed and level of maximum wind
 Warm front above the surface	 Convergence line
 Occluded front at the surface	 Intertropical convergence zone
 Occluded front above the surface	 Volcanic eruption
 Tropopause level	 Tropopause low
 Tropopause high	 Freezing level
 Isotherm (°C)	 Temperature at selected points (°C)
 Wind at selected points (half a barb = 5 knots, full barb = 10 knots and a triangle 50 knots)	
 Zone of maximum wind	 Cloud border
	 Cloud tops
 Centre of high altitude of the isobaric surface	 Centre of low altitude of the isobaric surface
 <p>The double bar denotes changes of level by 3 000 ft or less and/or wind speeds by 37 km/h - 20 kts. In the example, at the double bar the wind speed is 225 km/h - 120 kts.</p> <p>The heavy line delineating the jet axis begins/ends at the points where a wind speed of 150 km/h - 80 kts is forecast.</p>	

<b>SOL CB:</b> Individual Cells	<b>OCNL CB:</b> Well separated Cells	<b>FRQ CB:</b> Little or No Separation
<b>EMBD:</b> Embedded in Cloud and Haze	<b>LYR:</b> Layered Cloud	<b>NSC:</b> No Sig Cloud
	<b>NSW:</b> No Sig Weather	

## FORECAST WEATHER ABBREVIATIONS

### VISIBILITY

BR	Mist	FG	Fog	BCFG	Fog patches
MIFG	Shallow fog	VCFG	Vicinity fog	PRFG	Partial Fog
FU	Smoke	HZ	Dust haze	SA	Dust or Sandstorm

### PRECIPITATION

DZ*	Drizzle	RA*	Rain	RASH	Showers
FZDZ*	Freezing drizzle	FZRA*	Freezing rain	GR*	Hail
XXSH	Heavy showers	SN*	Snow		

### THUNDERSTORMS

TS*	Thunderstorm	TSGR*	Thunderstorm with hail		
ISOL	Isolated	OCNL	Occasional	FRQ	Frequent
EMBD	Embedded	LSQ	Line Squall		

### TURBULENCE

MTW	Mountain Wave	TURB	Turbulence	WS	Wind Shear
-----	---------------	------	------------	----	------------

### REGIONS

LOC	Local	MON	Over mountains	ESC	Along escarpment
CIT	Urban areas	VAL	In valleys	HIV	On Highveld
LOV	Over Lowveld	MAR	Maritime	COT	Coastal

### CLOUD COVER

LYR	Layer	FEW	1 - 2 Oktas	SCT	3 - 4 Oktas
		BKN	5 - 7 Oktas	OVC	Overcast

NOTE: Those items which are marked with an asterisk (\*) may be preceded by XX, which means **HEAVY**.



**TAF - Terminal Aerodrome Forecast (valid 6 to 30 hours)**

Compiled at RAASA for NPL Exams.  
**Date:** 2014-01-23 **Time:** 13:53:06

**Gauteng**

TAF FAOR 231000Z 2312/2418 27008KT 9999 SCT040  
 TEMPO 2314/2320 4000 TSRA FEW035CB  
 BECMG 2320/2322 35008KT CAVOK  
 BECMG 2408/2410 28008KT SCT040  
 TEMPO 2414/2418 4000 TSRA BKN015 SCT030CB  
 TX28/2413ZTN16/2404Z=

**Limpopo Province**

TAF FAPP 230900Z 2310/2318 08007KT 9999 BKN040  
 PROB30 TEMPO 2312/2318 5000 -TSRA SCT035CB  
 TX30/2312ZTN22/2318Z=

**Mpumalanga**

TAF FAEO 230900Z 2310/2318 30008KT 9999 SCT025  
 PROB30 TEMPO 2312/2318 5000 -TSRA SCT030CB  
 TX26/2312ZTN18/2318Z=

**KwaZulu Natal**

TAF FAPM 230900Z 2310/2318 31005KT CAVOK  
 BECMG 2310/2312 9999 SCT025  
 TEMPO 2313/2318 4000 TSRA BKN010 FEW035CB BKN080  
 BECMG 2315/2317 VRB03KT  
 TX33/2311ZTN22/2318Z=

**Freestate**

TAF FABL 231000Z 2312/2412 34012KT 9999 SCT050  
 TEMPO 2312/2318 5000 TSRA FEW060CB BKN060  
 TX33/2313ZTN16/2403Z=

**Northern Cape**

TAF FAKM 230900Z 2310/2318 30015KT 9999 SCT050  
 TEMPO 2312/2318 5000 TSRA FEW050CB  
 TX34/2312ZTN26/2318Z=

**Western Cape**

TAF FACT 231000Z 2312/2418 32020KT 9999 SCT025  
 FM231600 32018KT 9999 BKN020  
 PROB30 TEMPO 2322/2410 3000 -RA BKN009  
 FM241200 24012KT 9999 SCT025  
 TX26/2312ZTN16/2404Z=  
 TAF FAGG 231000Z 2312/2412 26010KT 9999 SCT020  
 TEMPO 2400/2407 BKN010  
 TX29/2312ZTN16/2404Z=



**METAR - Meteorological Aerodrome Report**

Compiled at RAASA for NPL Exams.

Date: 2014-01-23 Time: 13:53:06

**Gauteng**

FAOR 231330Z 21008KT 9999 FEW042TCU 23/13 Q1020 NOSIG RMK CB TO W S E=  
 FAGC 231400Z AUTO 24008KT /// // // 27/11 Q1018=  
 FAGM 231300Z 02006KT 9999 RA FEW043TCU 21/06 Q1020=

**Limpopo Province**

FAPP 231300Z 04007KT 9999 SCT050TCU 27/14 Q1016 NOSIG=  
 FAHS 231300Z AUTO 07001KT /// // // 31/18 Q1011=  
 FAPH 231300Z AUTO 17003KT /// // // 31/19 Q1011=  
 FATZ 231300Z AUTO 08003KT /// // // 27/17 Q1015=

**Northwest Province**

FAMM 231300Z 28006KT 9999 FEW035TCU SCT035 31/14 Q1017 NOSIG=  
 FALI 231300Z AUTO 25005KT /// // // 27/13 Q1018=  
 FAKD 231300Z AUTO 22007KT /// // // 31/11 Q1016=

**Mpumalanga**

FANS 231300Z AUTO ///KT /// // // 28/15 Q1014=  
 FAKN 231300Z 04006KT 9999 SCT025 FEW030TCU 29/17 Q1015 NOSIG=

**KwaZulu Natal**

FADN 231300Z NIL=  
 FAPM 231300Z AUTO 11013KT /// // // 29/20 Q1010=  
 FALY 231300Z AUTO 06002KT /// // // 33/15 Q1012=

**Freestate**

FABL 231330Z 31010KT 260V360 9999 BKN050 31/11 Q1015 NOSIG=

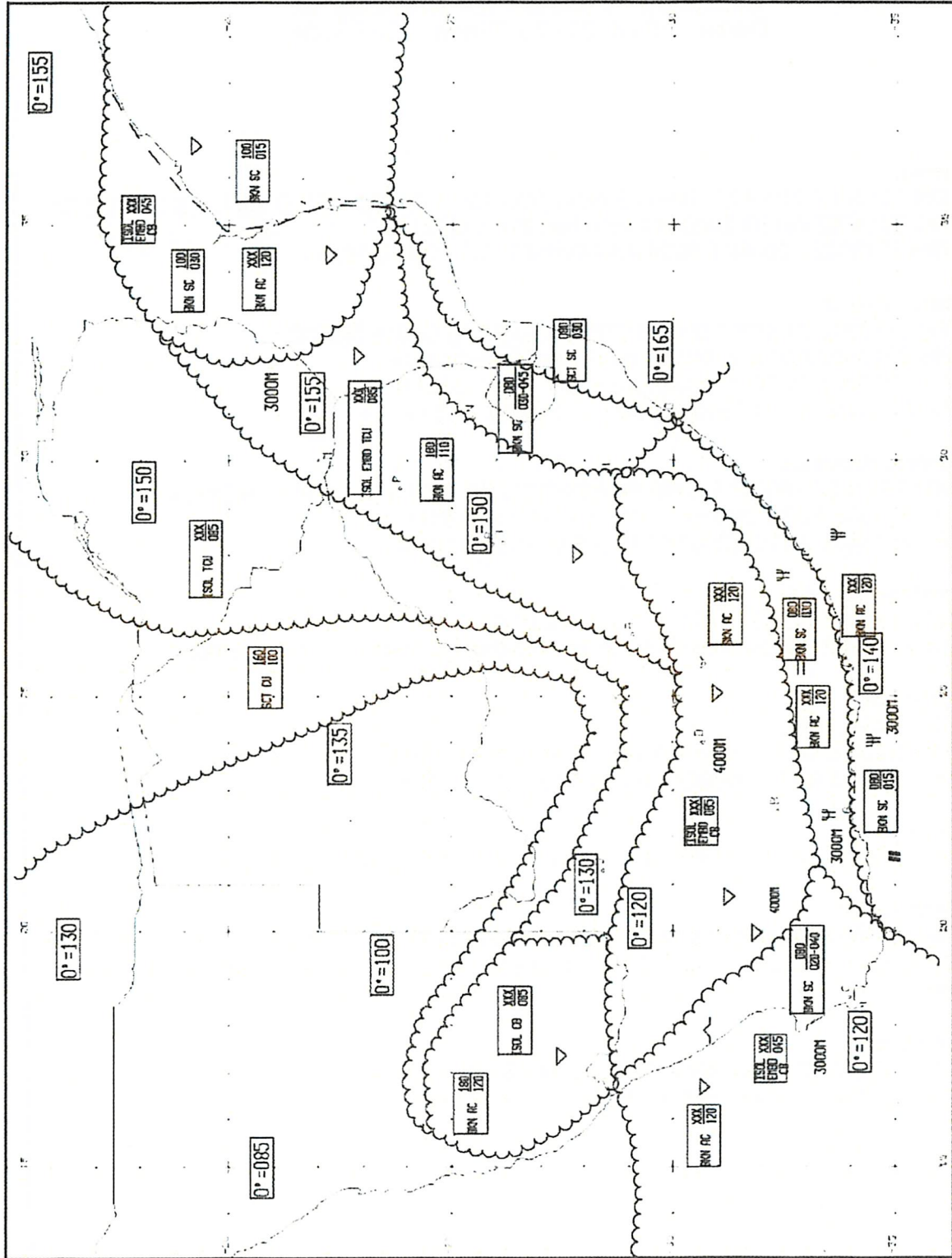
**Northern Cape**

FAKM 231300Z 27008KT 9999 SCT050 FEW060CB 31/08 Q1014=  
 SPECI FADY 231337Z 27027KT 9999 TS FEW070TCU FEW080CB BKN120 26/13  
 Q1015=

**Western Cape**

FACT 231330Z 32014KT 9999 FEW020 24/16 Q1010 NOSIG=  
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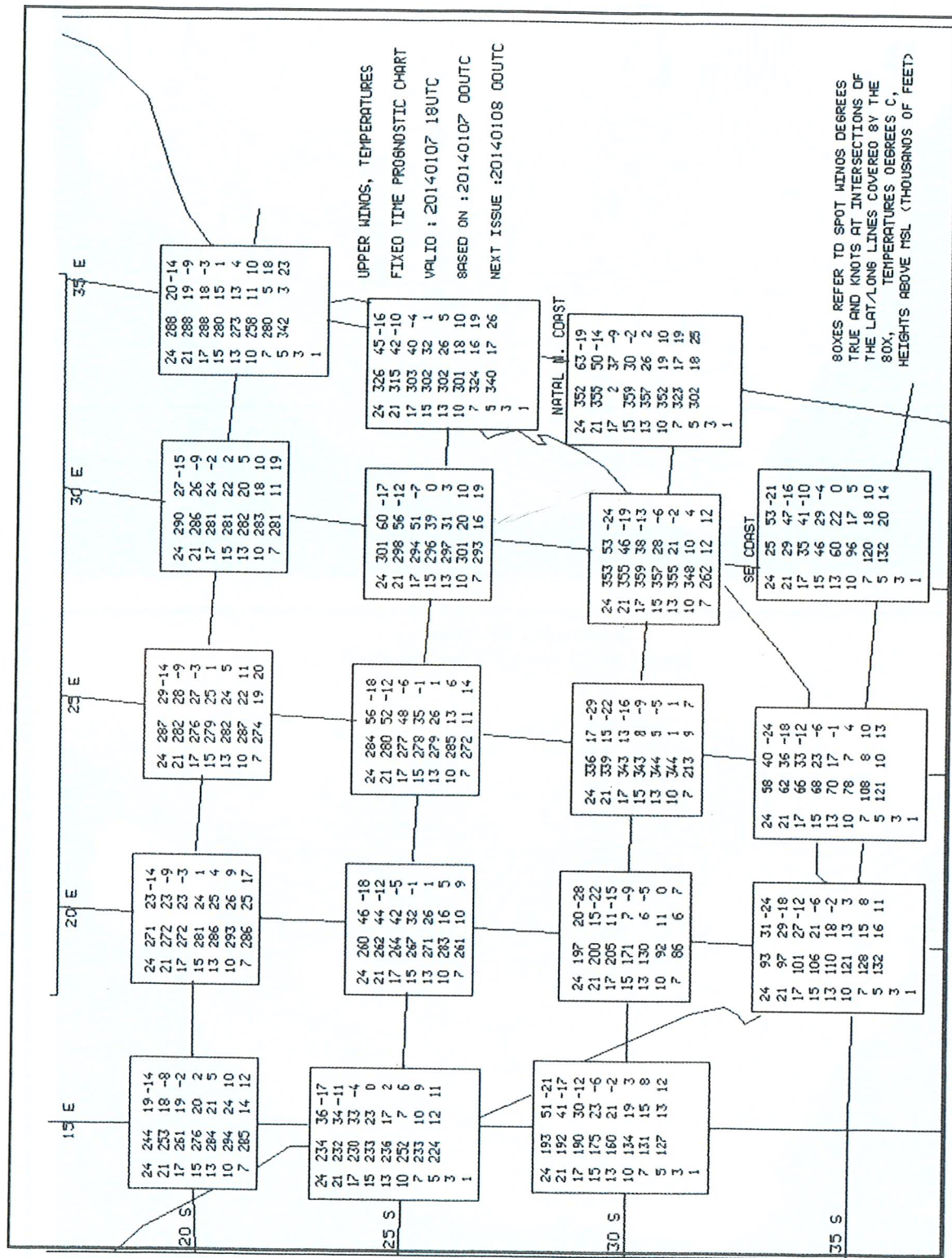
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FIXED TIME PROGNOSTIC CHART VALID - 18H00 UT 2014/03/30  
COMPILED BY RAASA - ISSUED AT 04H00 UT 2014/03/30





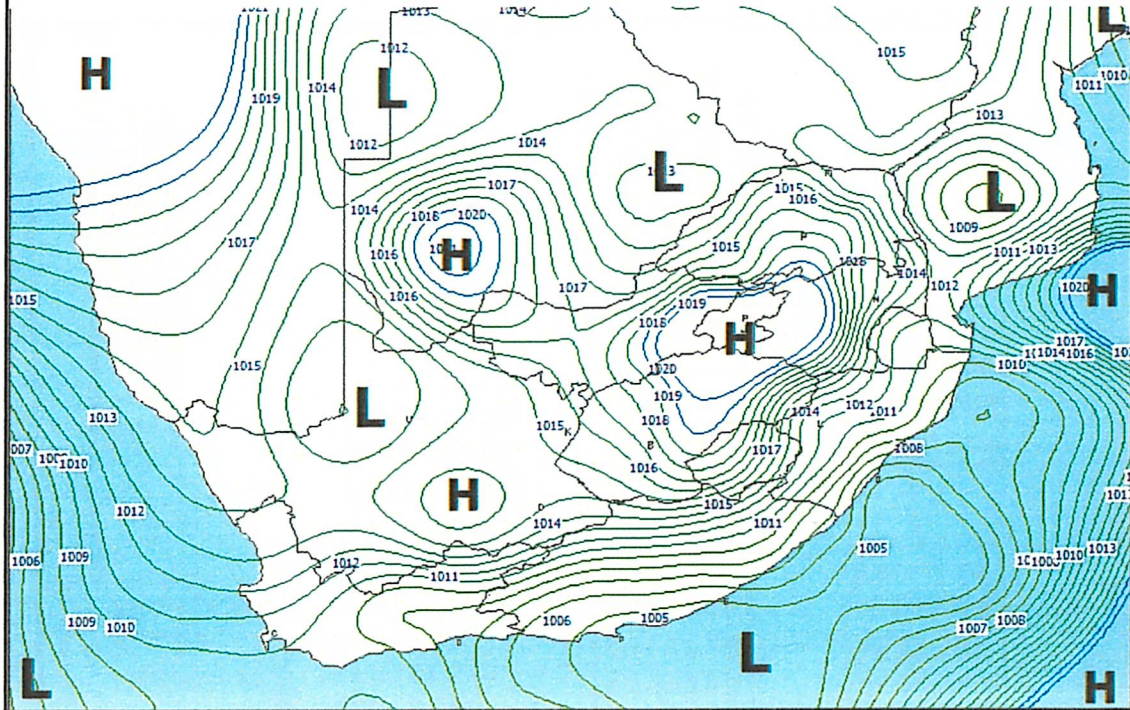
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COMPILED BY RAASA - ISSUED AT 04H00 UT 2014/03/30

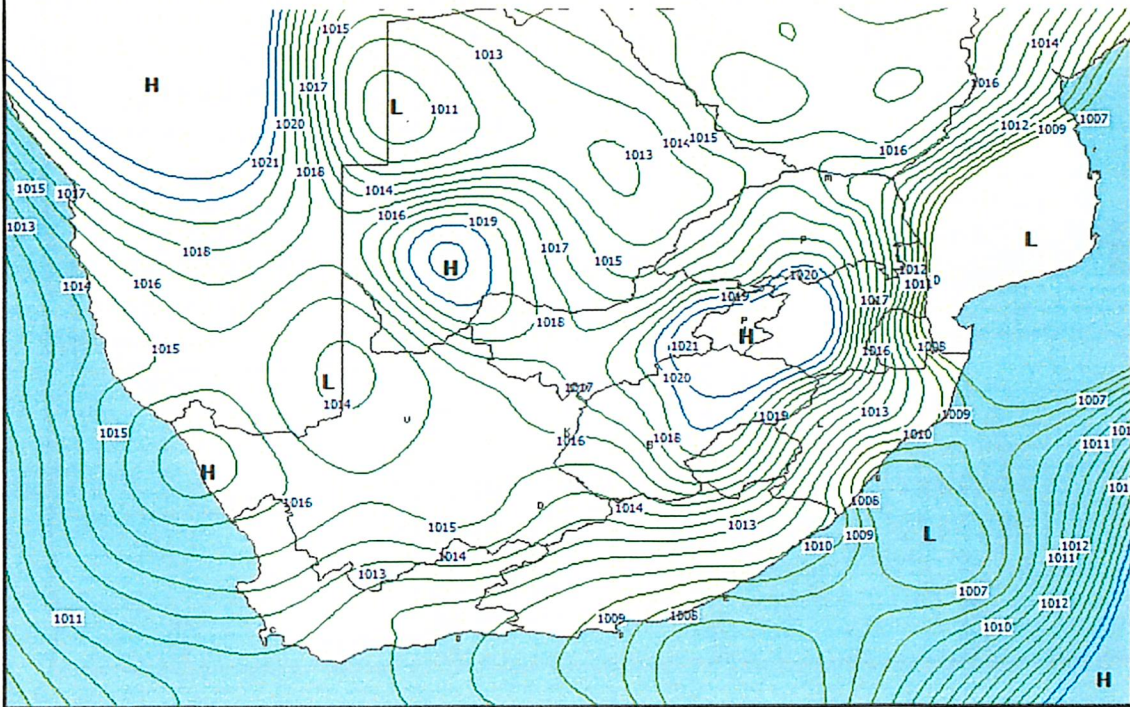




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Date: 2014-03-30 Time: 12:00 Z



COMPILED BY RAASA -  
Date: 2014-03-15 Time: 06:00 Z

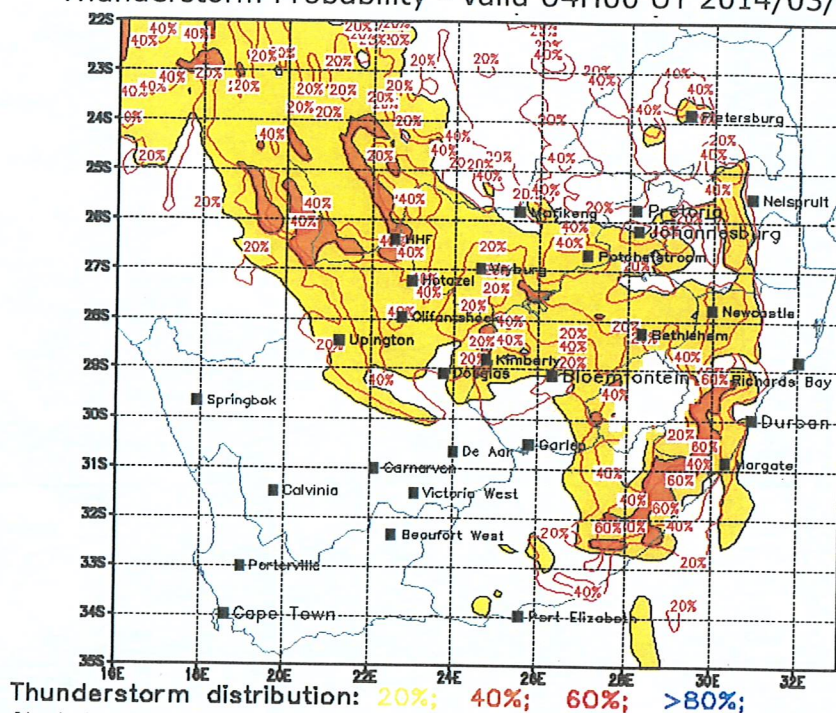




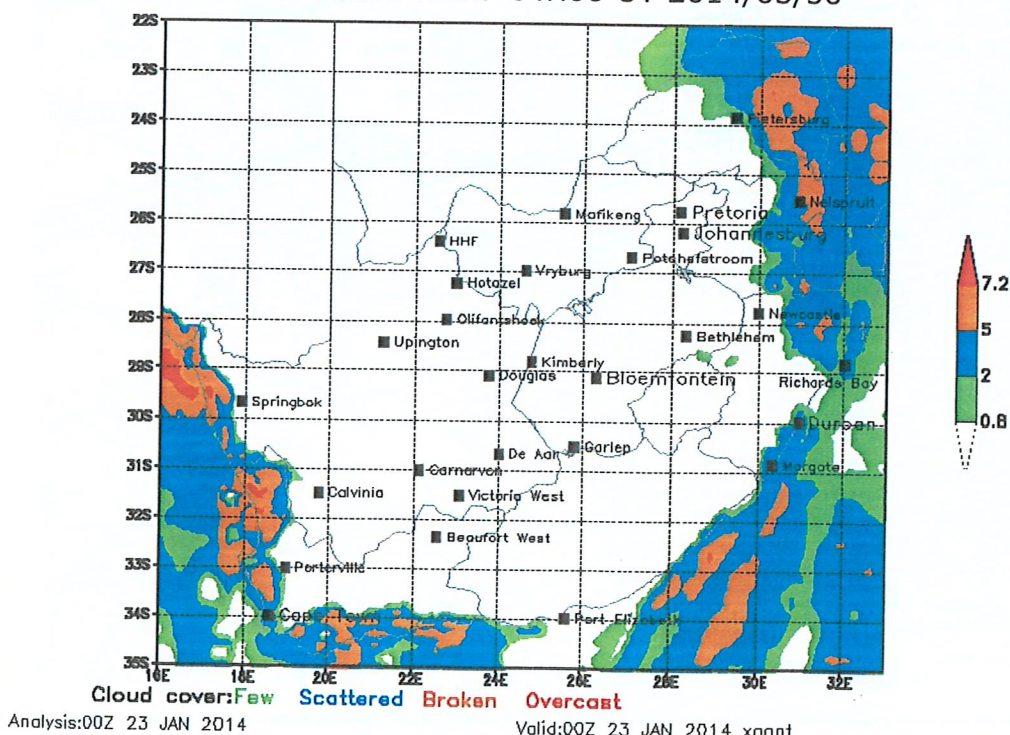
# TS PROBABILITY and CLOUD AMOUNT

COMPILED BY RAASA - ISSUED AT 04H00 UT 2014/03/30

## Thunderstorm Probability - Valid 04H00 UT 2014/03/30



## Local Cloud Amount 04H00 UT 2014/03/30















# Aeronautical References and Symbols

COMPILED BY RAASA - ISSUED AT 04H00 UT 2014/03/30

## AERODROMES

Civil.....	
Military.....	
Joint Civil and Military.....	
Emergency Aerodrome / Aerodrome with no Facilities.....	
Heliport and Helistop.....	
Heliport Military.....	

### AERODROME DATA

(The following information accompanies Aerodromes)

Elevation above Sea Level: 4760

Minimum Lighting: L

Runway hard surfaced: H

NOTE: A dash (-) is inserted where L and H does not apply

Length of longest runway in hundreds of metres: 14

 **RAND AIRPORT**  
4760 L H 14

 **SPRINGS**  
5340 -- 6

## HYPSONETRIC TINTS

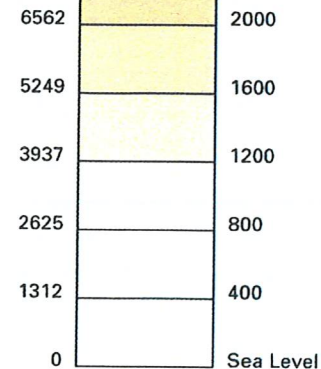
HIPSOMETRIESE TINTE  
FEET  
VOET

Highest point on map  
Hoogste punt op kaart

25° 00'S





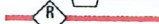

















30° 37'E

7031



## REFERENCE

## VERKLARING

International Boundary .....		Internasionale Grens
Provincial Boundary .....		Provinsiale Grens
Railway; Tunnel; Station or Siding .....		Spoorweg; Tonnél; Stasie of Sytlyn
Power Line .....		Kraglyn
National Freeway; National Route .....		Nasionale Deurpad; Nasionale Roete
Arterial Route .....		Hoofverkeersroete
Main Road .....		Hoofpad
Secondary Road .....		Sekondêre Pad
Other Road .....		Ander Pad
Hiking Trail .....		Voetslaanpad
Lighthouse .....		Vuurtoring
Post Office; Police Station .....		Poskantoor; Polisiestasie
School; Place of Worship .....		Skool; Plek van Aanbidding
Communication Tower; Mine .....		Kommunikasietoring; Myn
Perennial River and Water .....		Standhoudende Rivier en Water
Non-perennial River and Water .....		Nie-standhoudende Rivier en Water
Dry Water Course; Pan .....		Droëloop; Pan
Marsh and Vlei .....		Moeras en Vlei
Sand .....		Sand
Protected Areas .....		Bewarings Gebied
Woodland .....		Beboste Gebied
Built-up Area(High/Low Density), Small Centre .....		... Beboude Gebied(Hoë/Lae Digtheid), Klein Sentrum

**NOT FOR NAVIGATIONAL PURPOSES**

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