

METEOROLOGY MANUAL

PRIVATE PILOT LICENCE

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SOUTH AFRICAN



*CIVIL AVIATION
AUTHORITY*

PRIVATE PILOT LICENCE

METEOROLOGY MANUAL




























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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 As 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

PRESENT WEATHER SYNPTIC SYMBOLS - 1

a PRESSURE TENDENCY - PREVIOUS 3 HOURS					
Code Number		Meaning	Code Number		Meaning
0		Rising, then falling.	1		Rising, then steady.
2		Rising steadily.	3		Falling then rising,
4		Steady.	5		Falling, then rising.
6		Falling, then steady.	7		Falling steadily.
8		Rising, then falling.			

PAST WEATHER			
	Duststorm/Sandstorm		Storm of drifting snow
	Fog		Drizzle
	Rain		Snow
	Shower (s)		Thunderstorms
	Hail		













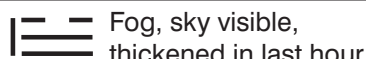









































VV VISIBILITY CODE

00 to 50 = metres x 100 (e.g. 03 = 300 m)


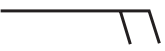



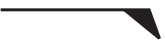
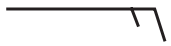

56 to 80 = subtract 50, visibility in km (e.g. 58 = 8 km)











81 to 89 = subtract 80, then multiply by 5 and add 30
(e.g. 83 - 80 = 3 x 5 = 15 + 30 = 45 km)

PRESENT WEATHER SYNOPTIC SYMBOLS - 2

ww PRESENT WEATHER		
 Smoke	 Haze	 Widespread dust in suspension
 Duststorm or Sandstorm	 Mist	 Fog, no change in last hour
 Fog, thinned in last hour	 Fog, thickened in last hour	 Fog within sight
 Fog patches	 Fog, sky visible, thinned in last hour	 Fog, sky visible, no change in last hour
 Fog, sky visible, thickened in last hour	 Drizzle, intermittent Slight	 Drizzle, continuous Slight
 Drizzle, intermittent Moderate	 Drizzle, continuous Moderate	 Drizzle, intermittent Heavy
 Drizzle, continuous Heavy	 Rain, intermittent Slight	 Rain, continuous Slight
 Rain, intermittent Moderate	 Rain, continuous Moderate	 Rain, intermittent Heavy
 Rain, continuous Heavy	 Rain and drizzle, slight	 Drizzle and rain, heavy
 Slight drizzle, freezing	 Heavy drizzle, freezing	 Slight rain, freezing
 Heavy rain, freezing	 Snow, intermittent Slight	 Snow, continuous Slight
 Snow, intermittent Moderate	 Snow, continuous Moderate	 Snow, intermittent Heavy
 Snow, continuous Heavy	 Rain, shower (s) Slight	 Rain, shower (s) Heavy
 Showers of rain and snow - Slight	 Showers of rain and snow - Heavy	 Snow showers Slight
 Snow showers Heavy	 Showers of hail Slight	 Showers of hail Heavy
 Ice pellets	 Thunderstorm, no precipitation	 Lightning visible, but no thunder heard
 Thunderstorm with rain - Slight	 Thunderstorm with rain - Heavy	 Thunderstorm with hail - Slight
 Thunderstorm with hail - Heavy	 Thunderstorm with snow - Slight	 Thunderstorm with snow - Heavy

PRESENT WEATHER SYNOPTIC SYMBOLS - 3

SURFACE WIND			
	Calm		20 kt
	5 kt		25 kt
	10 kt		50 kt
	15 kt		65 kt

ww PRESENT WEATHER	
 Weather during the past hour and not at the time of observation	 Drizzle in the last hour
 Rain in the last hour	 Snow in the last hour
 Rain and snow in the last hour	 Freezing rain or drizzle in the last hour
 Showers of rain in the last hour	 Showers of snow in the last hour
 Showers of hail in the last hour	 Fog in the last hour
 Thunderstorm in the last hour	

SYNOPTIC WEATHER STATION MODELS - 1

<p style="text-align: center;">STATION 1</p>	<p style="text-align: center;">STATION 2</p>
<p style="text-align: center;">STATION 3</p>	<p style="text-align: center;">STATION 4</p>
<p style="text-align: center;">STATION 5</p>	<p style="text-align: center;">STATION 6</p>
<p style="text-align: center;">STATION 7</p>	<p style="text-align: center;">STATION 8</p>

SYNOPTIC WEATHER STATION MODELS - 2

<p style="text-align: center;">STATION 9</p>	<p style="text-align: center;">STATION 10</p>
<p style="text-align: center;">STATION 11</p>	<p style="text-align: center;">STATION 12</p>
<p style="text-align: center;">STATION 13</p>	<p style="text-align: center;">STATION 14</p>
<p style="text-align: center;">STATION 15</p>	<p style="text-align: center;">STATION 16</p>

SIGNIFICANT PRESENT WEATHER

QUALIFIER		WEATHER PHENOMENA		
INTENSITY OF PROXIMITY 1	DESCRIPTOR 2	PRECIPITATION 3	OBSCURATION 4	OTHER 5
- Light	MI Shallow	DZ Drizzle	BR Mist	PO Well-developed dust/sand whirls
MODERATE (no qualifier)	BC Patches	RA Rain	FG Fog	SQ Squalls
	DR Drifting	SN Snow	FU Smoke	FC Funnel cloud (tornado or waterspout)
+ Heavy	BL Blowing	SG Snow grains	VA Volcanic ash	
[well-developed in the case of dust/sand whirls (dust devils) and funnel clouds]	SH Shower(s)	IC Diamond dust (Ice crystal)	DU Widespread dust	SS Sandstorm
	TS Thunderstorm	PE Ice pellets	SA Sand	DS Duststorm
	FZ Supercooled	GR Hail	HZ Haze	
VC In the vicinity	PR Partial covering part of the aerodrome	GS Small hail and/or snow pellets		

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).

TAF (Aerodrome Forecasts)

WESTERN CAPE

FACT 200600Z 200718 21010KT 9999 BKN035 FM0900 21020G30KT 9999 FEW035
TX28/12ZTN19/07Z=
FAGG 200600Z 200718 25015KT 5000 -RA OVC015 TEMPO 1018 2000 +RA OVC008
TX18/12ZTN14/18Z=

EASTERN CAPE

FAEL 200600Z 200718 25015G25KT 9999 SCT030 SCT040 TEMPO 0710 5000 -RA
BKN015 BKN025 BECMG 0809 240G30KT TX20/12ZTN16/18Z=
FAPE 200600Z 200718 21015KT 9000 HZ SCT010 BKN020 PROB30 TEMPO 0710 4000
-DZRA BKN008 BECMG 1113 9999 SCT015 BKN035 PROB30 TEMPO 1618
BKN015 TX26/12ZTN22/18Z=
FAUT 200600Z 200718 24008KT 9999 OVC008 TEMPO 5000 RA OVC005
TX19/12ZTN15/18Z=

KWAZULU-NATAL

FADN 200600Z 200718 04007KT CAVOK BECMG 0810 04012KT TEMPO 1518 SCT018
BECMG 1618 14012KT TX34/11ZTN27/18Z=
FAPM 200600Z 200718 03010KT 9999 FEW015 SCT025 TEMPO 1618 5000 TSRA
BKN012 SCT040CB TX32/12ZTN23/18Z=

NORTHERN CAPE

FAKM 200600Z 200718 20005KT CAVOK TX21/13ZTN14/18Z=
FAUP 200600Z 200718 20005KT CAVOK TX22/13ZTN16/18Z=

FREESTATE

FABL 200600Z 200718 350107KT CAVOK BECMG 0911 9999 SCT050 PROB40 TEMPO
1218 5000 TSRA FEW055CB TX34/13ZTN20/07Z=

NORTH WEST PROVINCE

FAMM 200600Z 200718 23010KT CAVOK TX29/12ZTN15/18Z=
FAPN 200600Z 200718 32006KT 9999 SCT040 BECMG 1618 21010KT CAVOK
TX34/12ZTN25/18Z=

GAUTENG

FAJS FAJS 200600Z 200718 06008KT CAVOK BECMG 0709 06012KT
TX31/12ZTN23/07Z=
FAWB 200600Z 200718 29010KT 9999 SCT045 BECMG 1618 23010KT CAVOK
TX33/12ZTN27/18Z=

MPUMALANGA

FAKN 200600Z 200718 06007KT 9999 SCT035 BECMG 1113 FEW035CB SCT040
TEMPO 1318 5000 TSRA BKN040 TX32/12ZTN24/18Z=
FAEO 200600Z 200718 34010KT 9999 BKN020 BECMG 1012 FEW035CB SCT040
PROB40 TEMPO 1218 5000 TSRA BKN050 TX29/12ZTN18/18Z=

METAR (Aerodrome Actuals)

WESTERN CAPE

FACT 200700Z 16016KT 9999 SCT030 21/11 Q1022 NOSIG=
 FAGG 200700Z 00000KT 1000 VCFG FEW000 BKN025 16/15 Q1022=
 FALW 200700Z AUTO 16009KT /// // ///// 21/10 Q1020=

EASTERN CAPE

FAEL 200700Z 25007KT 9999 FEW020 SCT100 21/13 Q1012=
 FAPE 200700Z 30022G33KT 9999 SCT019 BKN040 19/13 Q1008 NOSIG=
 FAUT 200700Z 06002KT 9999 FEW008 BKN015 19/16 Q1015=

KWAZULU-NATAL

FADN 200700Z 10010KT 9999 FEW018 27/23 Q1010 NOSIG=
 FARB 200700Z 36008KT 9999 SCT025 32/21 Q1010=

NORTHERN CAPE

FAUP 200700Z 21005KT CAVOK 21/M01 Q1019=
 FAKM 200700Z 27004KT 9999 FEW045 17/05 Q1021=

FREESTATE

FABL 200700Z 24005KT 200V270 9999 FEW020 17/06 Q1021 NOSIG=
 FABM 200700Z 28005KT 9999 BKN012 22/16 Q1020=

NORTH WEST PROVINCE

FAMM 200700Z 21005KT 9999 FEW030 24/M00 Q1019=
 FAPN 200700Z 00000KT CAVOK 31/14 Q1016=

GAUTENG

FAJS 200730Z 02008KT 350V070 CAVOK 26/M02 Q1025 NOSIG=
 FALA 200730Z 06011KT 9999 BKN018 20/16 Q1023=
 FAGM 200730Z 07010KT 6000BR+ BKN050 OVC020 16/15 Q1025=























MPUMALANGA

FAKN 200700Z 09006KT 9999 FEW030 27/14 Q1019=
 FAEO 200700Z 33007KT 9999 BKN020 SCT100 22/13 Q1021=

LIMPOPO PROVINCE

FAPP 200700Z 35005KT 9999 FEW040 29/13 Q1017=
 FAHS 200700Z AUTO 08004KT /// // ///// 29/17 Q1013=

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.










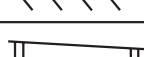
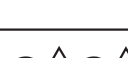
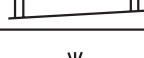
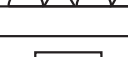

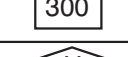
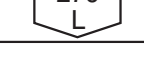
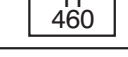
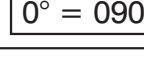
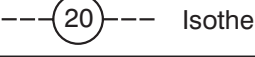






SIGNIFICANT WEATHER - LOW CHARTS (BELOW FL180)

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>	

ISOL CB: Individual Cells **OCNL CB:** Well separated Cells **FRQ CB:** Little or No Separation

EMBD: Embedded in Cloud and Haze **LYR:** Layered Cloud **NSC:** No Sig Cloud **NSW:** 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
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REGIONS

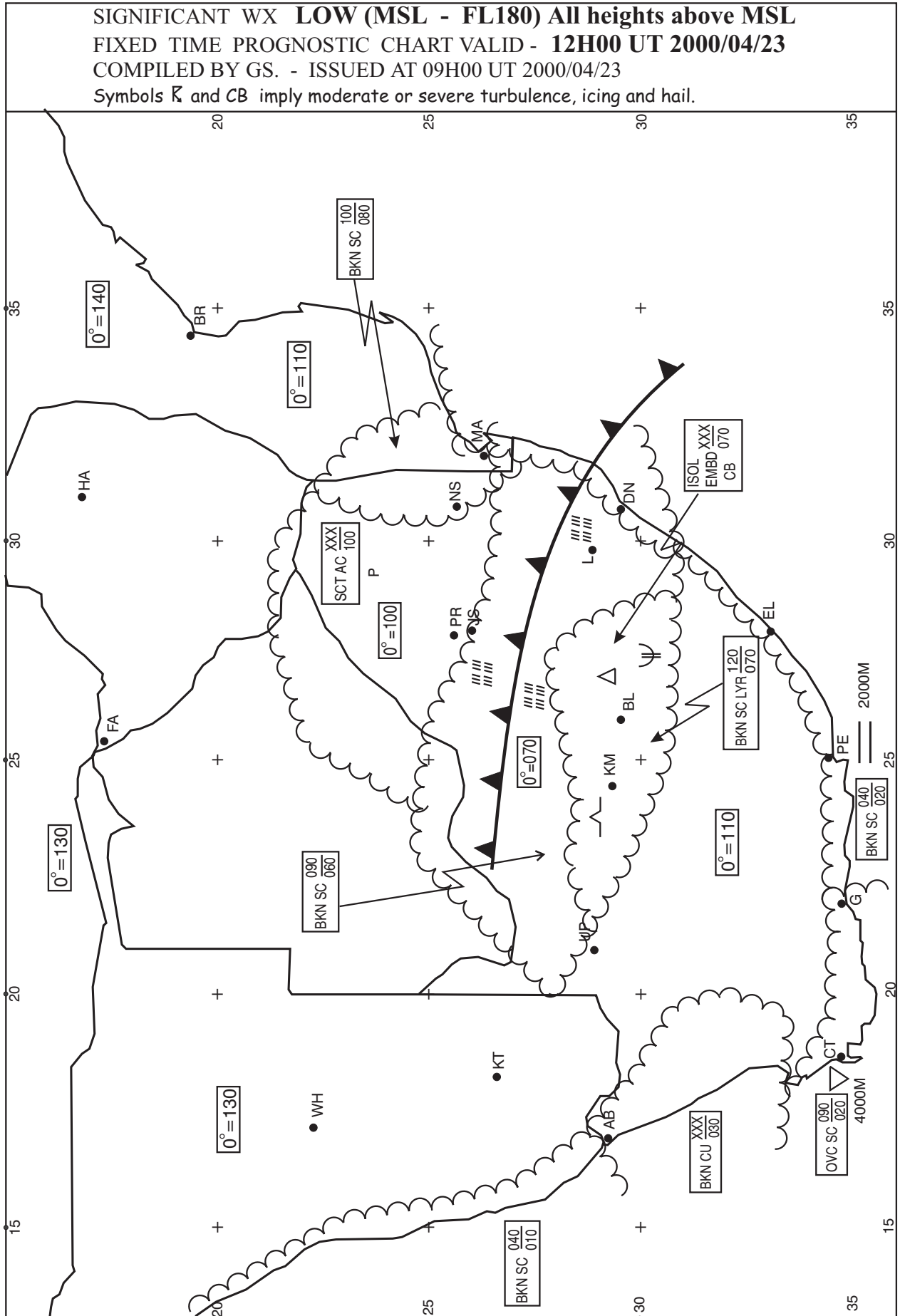
LOC	Local	MON	Over mountains	ESC	Along escarpment
CIT	Urban areas	VAL	In valleys	HIV	On Highveld
LOV	Over Lowveld	MAR	Maritime	COT	Coastal

CLOUD COVER

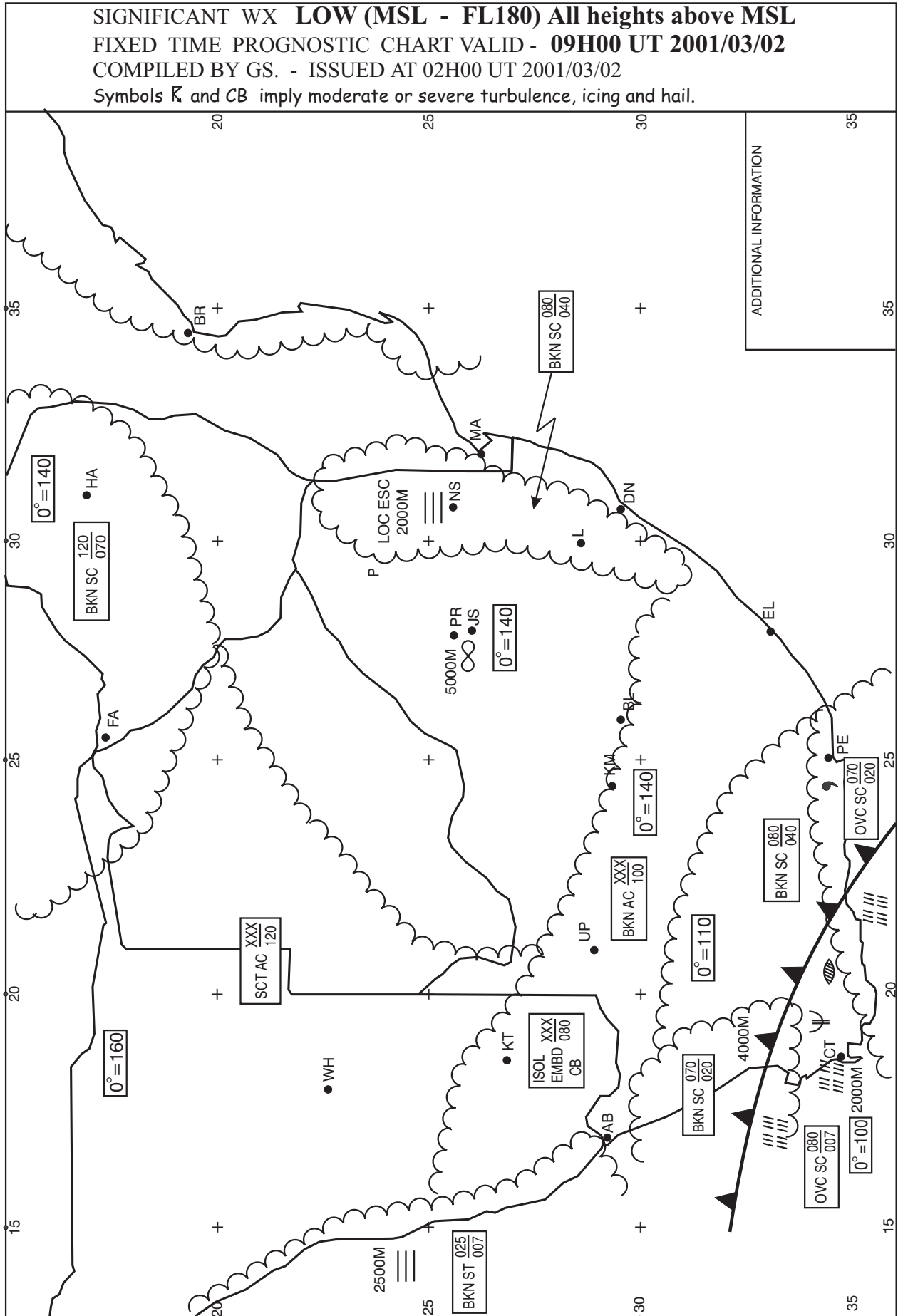
LYR	Layer	FEW	1 - 2 Oktas	SCT	3 - 4 Oktas
		BKN	5 - 7 Oktas	OVC	Overcast

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

SIGNIFICANT WEATHER - CHART 1



SIGNIFICANT WEATHER - CHART 3



UPPER WINDS AND TEMPERATURES

