

Aviation Meteorological Forecaster Competency 2

Forecast Aeronautical Meteorological Phenomena and Parameters

Low-Level Significant weather chart

Freezing level height and Aircraft Icing

AMF AC 2.1.1, 2.1.8

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AIM OF THIS PRESENTATION

Before reviewing this presentation ensure to first consult the following theory presentation to enable better understanding:

RTC-PRE-080.3 AMF Competency 2 Forecast Aircraft Icing AC 2.1.8

At the end of this presentation, you will be able to:

- **Compile low level significant weather chart** and determine and place freezing level height and use it to demonstrate competency in **AMF AC 2.1.1, 2.1.8 and 2.2**
- Enable you to complete weekly quizzes related to Low level Significant weather charts using this presentation as an example.
- Be familiar with **Aviation Software** used to construct low- and high-level significant weather charts.
- Display temperature using the **Wingrids weather display system software .**



Low level significant weather chart

- Example Task for Case Study 20 Oct 2018:
Construct a low-level significant weather chart,
issued at 08Z, valid for 12Z

The following chart will be done during competency assessment:

- Fixed time prognostic chart valid at 12Z issued at 08Z
- All other charts valid at different times can be done similarly, the only difference is the time of validity and issue.
- All heights given in the chart are above mean sea level (a.m.s.l).

N.B: This is different to all other products relating the aerodrome which are above ground level (a.g.l).

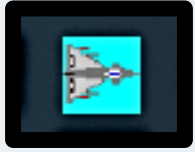
Type of Sig weather Chart issued	Time of Validity	Time of Issue
Low Level and High Level Chart	0000Z	2000Z
Low Level and High Level Chart	0300Z	2300Z
Low Level and High Level Chart	0600Z	0200Z
Low Level and High Level Chart	0900Z	0500Z
Low Level and High Level Chart	1200Z	0800Z
Low Level and High Level Chart	1500Z	1100Z
Low Level and High Level Chart	1800Z	1400Z
Low Level and High Level Chart	2100Z	1700Z



**South African
Weather Service**



Avian Software - How to open a new significant weather chart session



Open the avian software programme icon desktop shortcut on your PC. To open a new significant weather chart session for your practical task, complete the following 4 steps below, in sequence from 1 to 4

The screenshot shows the Avian software interface with three numbered steps highlighted in blue boxes:

- Step 1:** The 'Product' menu is open, showing a list of products.
- Step 2:** The 'Select Product' dialog box is open, with 'South Africa' selected in the list. The 'OK' button is circled in red.
- Step 3:** The 'Chart Parameters' dialog box is open, showing 'Date Valid' as 2018/10/20, 'Time' as 12, 'Date Issued' as 2018/10/20, 'Time' as 08, and 'Forecaster' as 'jhs'. The 'OK' button is circled in red.

N.B. If you loose your sigwx charts while busy working, you will have to re-open the programme and enter the exact same details you provided in step 3 to be able to retrieve it.

The screenshot shows the main Avian software interface with a map of South Africa. A blue box with the number '4' is placed over the map area, indicating the final step of the process.

Calculation and placement of freezing level heights on the low level sigwx chart (AMF AC 2.1.1 and 2.1.8)

Calculation

- Consult the latest available Tephigrams/AMDAR data – these will be sufficient to use at 12Z if there has been no airmass change.
- For areas where there are no Teph/Skew-T grams/AMDAR data, use the NWP model prognostic temperature forecasts to fill the gaps.
- Round values down to the lowest 500ft (5900 ft becomes 5500 ft and 5400 ft becomes 5000 ft).
- Freezing levels increase the further north you go – normally at 15°S to 20°S it is FL150 through out the year.
- The freezing level will always form the base height of any aircraft icing.

Placement

- An even spread across your chart is required to cover all possible flight routes.
- Stations FACT, FASB, FAUP, FAPE, FALE, FABL and FAIR must have values.
- Namibia, Botswana, Zimbabwe and Mozambique must have values.



Using AMDAR to obtain freezing level heights (AMF AC 2.1.1)

For this particular case study there was no AMDAR data available

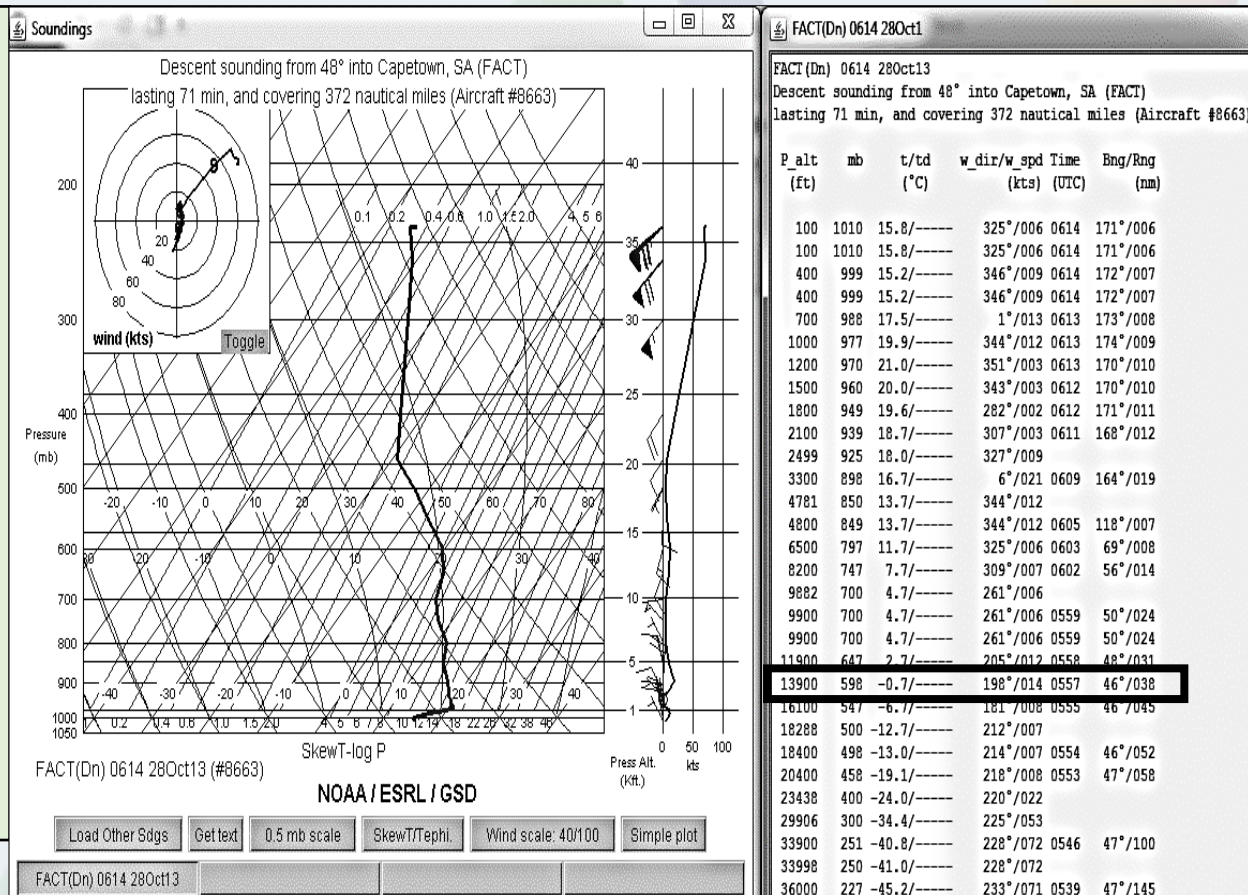
A substantial portion of upper-air wind and temperature information is obtained through the WMO aircraft meteorological data relay (AMDAR). The website to access the global AMDAR is:

<https://amdar.noaa.gov/java/>

User name: sAfrica

Password: SAP

Use the non-java option or say update Java later as the latest java does not work



In this particular case the freezing level height would be FL140

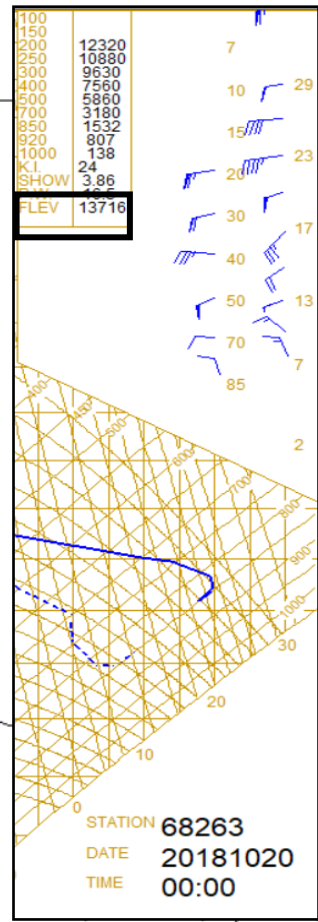
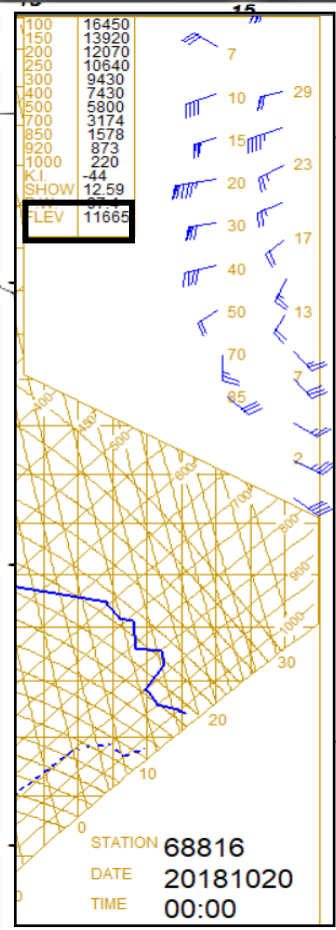
Using Tephigram's to obtain freezing level heights (AMF AC 2.1.1)

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File Edit Administration Product Import



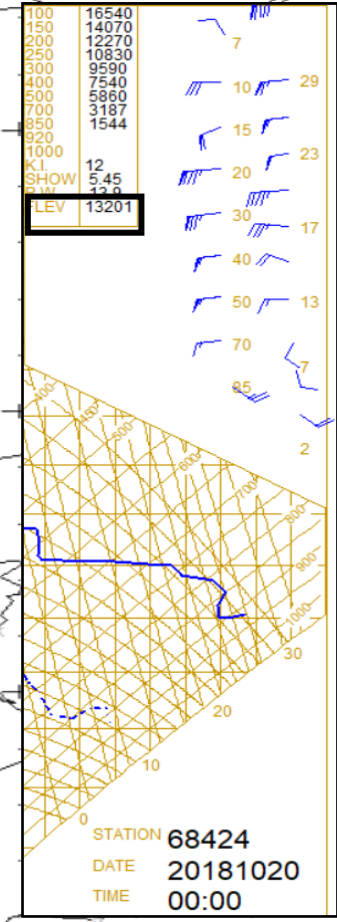
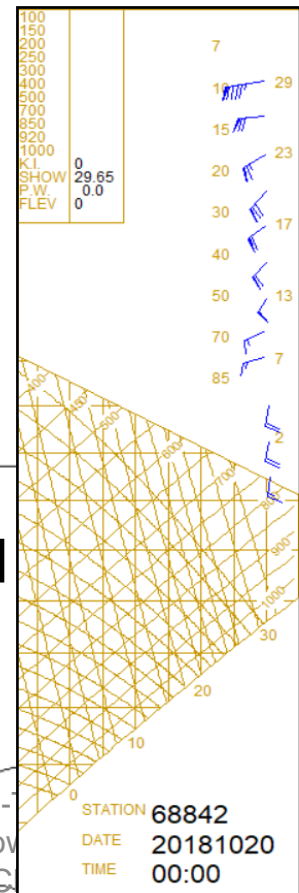
Select **1**, complete the popup at **2** with the freezing level height, then click ok at **3** and place on low level sigwx map



Text Entry

Enter text string

OK Cancel



2022/03/02

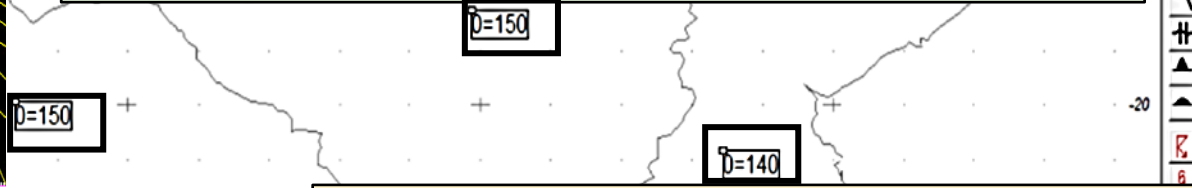
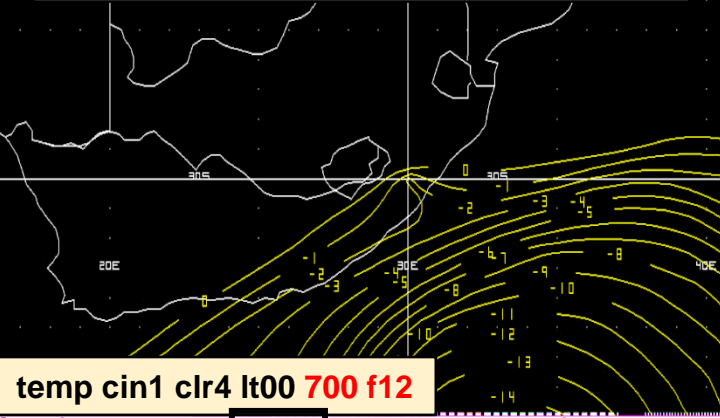
Templ ref: CRS-CC-PRES-
no:RTC-PRE-031.2_Low
Weather C



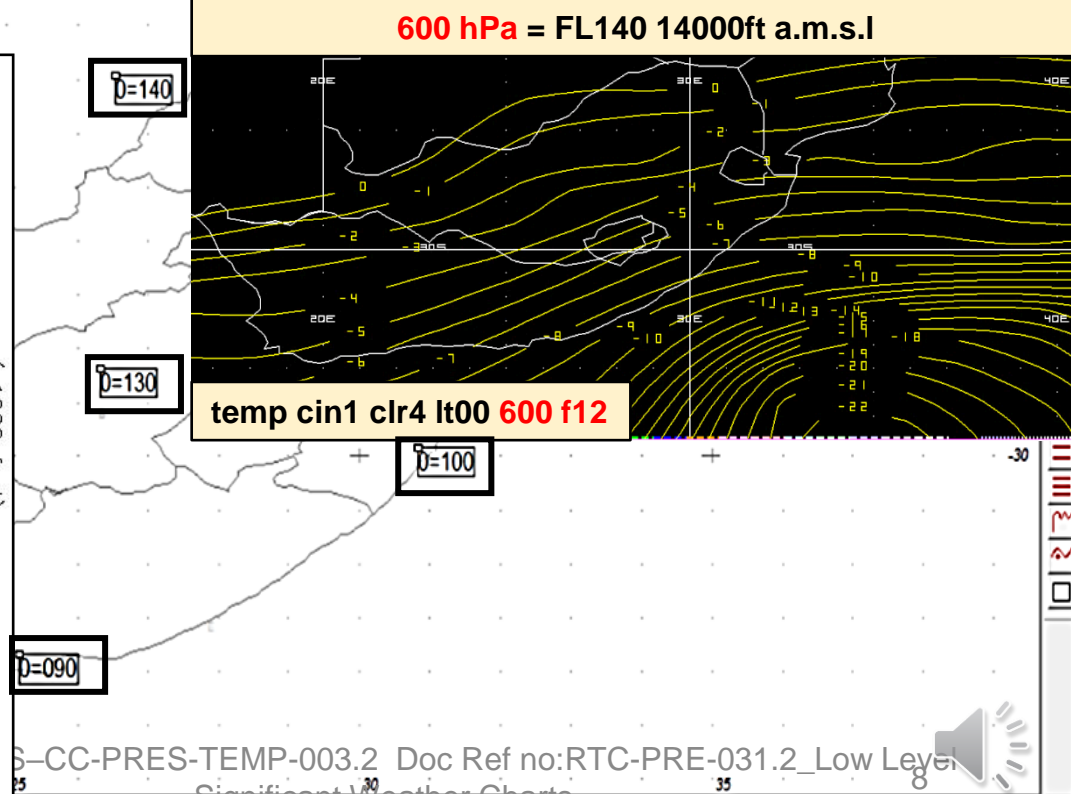
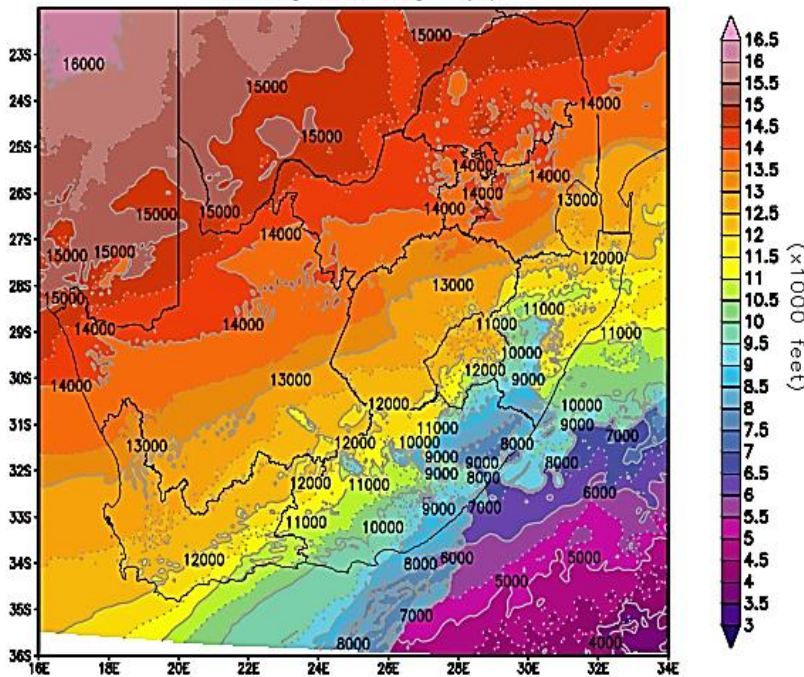
Using NWP to fill gaps and place freezing level height on low level sigwx chart (AMF AC 2.1.1)

700 hPa = FL100 = 10000ft a.m.s.l

Where there are no Tephi/AMDAR stations, use NWP to fill the gaps.
 Following the same procedure as the previous slide, the following freezing level heights can be placed on the low level significant weather chart using a good mix of actual and NWP data.



UM 4km horizontal resolution – SA4 Run:
Freezing level height (ft)



AIRCRAFT ICING (MOD or SEV)

AMF AC 2.1.8

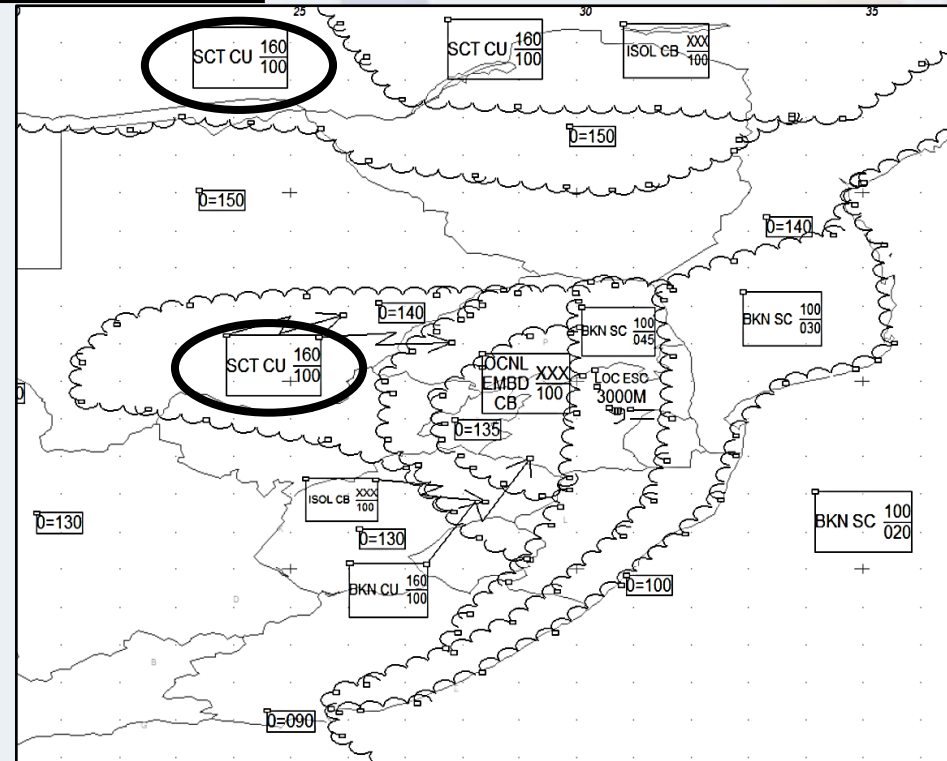
The icing symbol for the existence of icing in cloud is only used in cloud other than CB - cloud encircled which extends above the height of the freezing level.

In this chart the Cumulus cloud extends beyond the freezing level height of FL140 – base height of icing layer.

The cloud top height is the top of the icing layer – FL160.

Moderate or severe icing, if any, can thus only be forecast between FL140 and the cloud top of FL160.

Light icing is not significant, lets assume you are expecting at least moderate icing since it is a convective cloud (also need to look at icing decision tree)



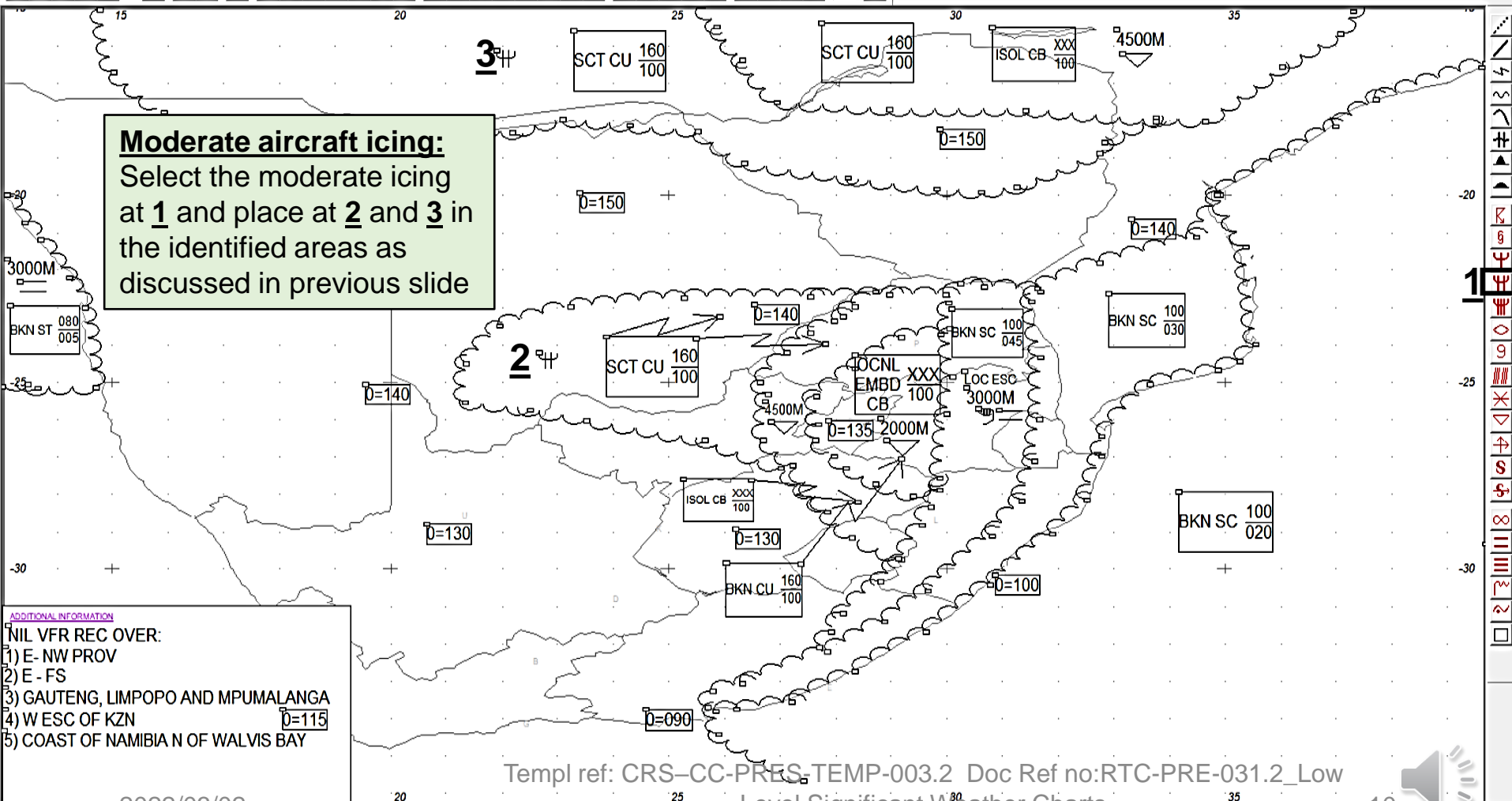
Cloud Family	Genera	Height limits	Ice formation
High	Cirrus (Ci) Cirrostratus (Cs) Cirrocumulus (Cc)	20000 ft and above 20000 ft and above 20000 ft and above	Nil to light Nil to light Nil to light
Medium	Alto cumulus (Ac) Altostratus (As)	8000 ft to 20000 ft 8000 ft to 20000 ft	Light to Moderate Nil to Light
Low	Nimbostratus (Ns) Stratus (St) Stratocumulus (Sc)	Surface to 8000 ft Surface to 8000 ft Surface to 8000 ft	Moderate to Severe at low level Nil to Light Usually Light
Vertical	Cumulus (Cu) Cumulonimbus (Cb)	2000 to 14000 ft Surface to 45000 ft and higher	Severe Severe



Depicting moderate aircraft icing on low level significant weather chart – AMF AC 2.1.8

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File Edit Administration Product Import



Templ ref: CRS-CC-PRES_TEMP-003.2 Doc Ref no:RTC-PRE-031.2_Low

Level Significant Weather Charts

2022/03/02

For Help, press F1

20/05/08 04H00

Click on entity to Move

Lon, Lat

References

- Latest edition of RTC-CN-020_Aviation Practical Course Notes
- RTC-PRE-080.3_AMF AC 3.1.4_3.1.5_3.2_Forecast and Warn of Hazardous Phenomena_Aircraft Icing

