

## Technical Report 04-25

### Carburettor Icing-probability

Monthly statistics generated from radiosonde data (WMO st. no. 06181, Jægersborg) using the "New Carburettor Icing-probability Chart"

Mette F. Nielsen, Kim Sarup, Mikael Scharling & Søren Brodersen





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## Content:

|  |    |
|--|----|
| Abstract .....   | 4  |
| Introduction.....  | 5  |
| Carburettor icing .....  | 5  |
| Data .....   | 6  |
| Methods.....   | 7  |
| Results .....  | 8  |
| Carburettor icing-probability at ground level (124.26 feet)..... | 9  |
| Carburettor icing-probability at 1250 feet .....                 | 10 |
| Carburettor icing-probability at 2500 feet .....                 | 11 |
| Carburettor icing-probability at 3750 feet .....                 | 12 |
| Carburettor icing-probability at 5000 feet .....                 | 13 |
| Carburettor icing-probability at 6250 feet .....                 | 14 |
| Carburettor icing-probability at 7500 feet .....                 | 15 |
| Summary.....   | 16 |
| Conclusions .....  | 17 |
| Comments and suggested recommendations .....                     | 17 |
| Comments .....   | 17 |
| Suggested recommendations.....                                   | 17 |
| References .....   | 19 |
| Previous reports.....  | 19 |
| Appendix A.....  | 20 |
| Appendix B.....  | 25 |
| Appendix C .....   | 28 |
| Appendix D.....  | 41 |

## Abstract

This report investigates and reports of the probability of carburettor icing, based on radiosonde data from WMO station no. 06181 Jægersborg, located 7 km north of Copenhagen.

The carburettor icing-probability has been calculated for 7 different heights including ground level based on measurements of temperature and dew point temperature. The carburettor icing-probability is determined by classifying observations into five icing-probability classes using *The New Carburettor Icing-Probability Chart* recommended by The Australian Transport Safety Bureau. Statistics have been generated for each month for nightly and daily measurements respectively.

The risk of serious and moderate carburettor icing is present at all heights throughout the year.

There are, however, variations with height and seasonal differences. The probability of serious and moderate carburettor icing generally decreases with height, while the seasonal variation increases with peak values in July and August.

Except from at ground level no major difference in distribution of the icing probability is observed when comparing daily (12 UTC) and nightly (00 UTC) values.

## Introduction

This report is written at the request of the Danish Accident Investigation Board. The purpose of the report is to quantify the probability of aircraft carburettor icing in Denmark. The resulting statistics will hopefully contribute to improved flight safety.

The carburettor icing probability statistics are generated from radiosonde data using observations of temperature and dew point temperature from WMO st. no. 06181 at Jægersborg. The radiosonde is sent up daily at 00 UTC and 12 UTC. The risk of carburettor icing is estimated using *The New Carburettor Icing-Probability Chart* (figure 1). More than 20 years of radiosonde data are used (1980 to 2004) to generate statistics describing the icing-probability for each month, for the seven heights of 124.26 feet (ground level), 1250, 2500, 3750, 5000, 6250 and 7500 feet, at both 00 UTC and 12 UTC.

## Carburettor icing

Carburettor icing is the most common of several types of induction system icings. It occurs as a consequence of the sudden drop of temperature caused by the vaporization of the fuel and the pressure reduction in the carburettor venturi. The decline of temperature of up to 20-30 degrees Celsius causes the moist in the atmosphere to freeze, and the ice will gradually block the venturi tube. In extreme cases, at reduced power settings, the free movement of the throttle butterfly may be restricted. This will affect the fuel/air ratio and thereby progressively reduce the tractive force and eventually choke the engine.

Carburettor icing can occur at most temperatures likely to occur in Denmark. The probability of icing depends on both air temperature, air humidity, engine power and fuel type. The greatest risk and the most severe icing is found in air temperatures above freezing. The probability of icing increases with the relative humidity of the atmosphere. At reduced engine power there is a higher risk of carburettor icing caused by the lower intake temperature and the partly closed throttle valve. (Jørgensen, 2003; Civil Aviation Authority, 2000).

The probability of carburettor icing can be predicted from values of air temperature and dew point depression<sup>1</sup> by use of *The New carburettor Icing-Probability Chart* (figure 1).

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<sup>1</sup> Dew Point depression = temperature – dew point temperature.

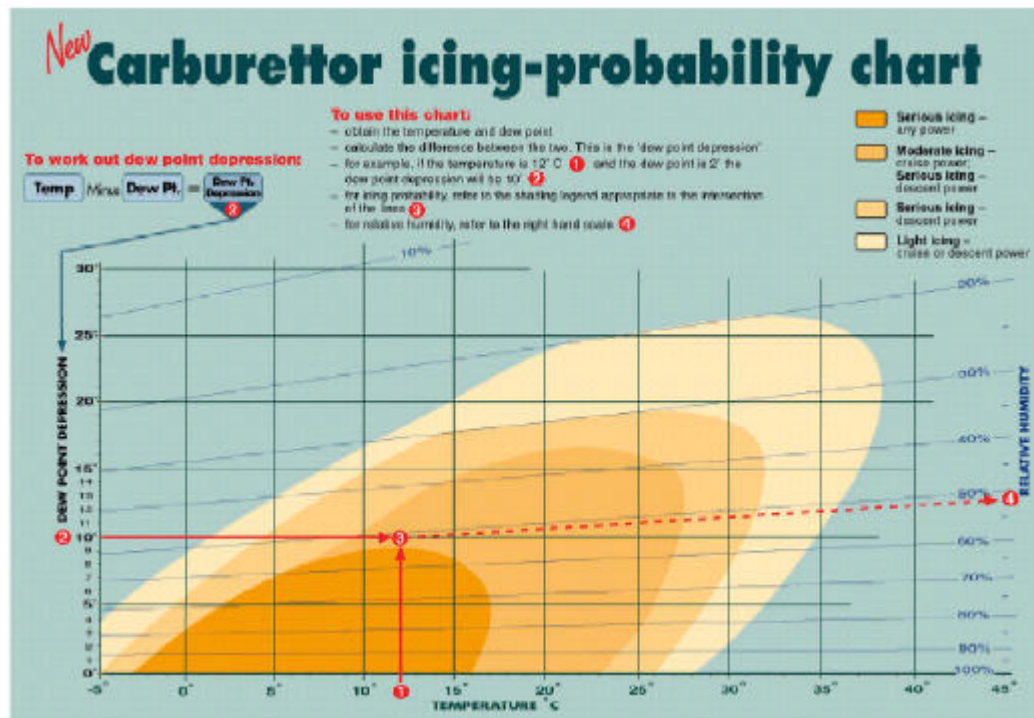
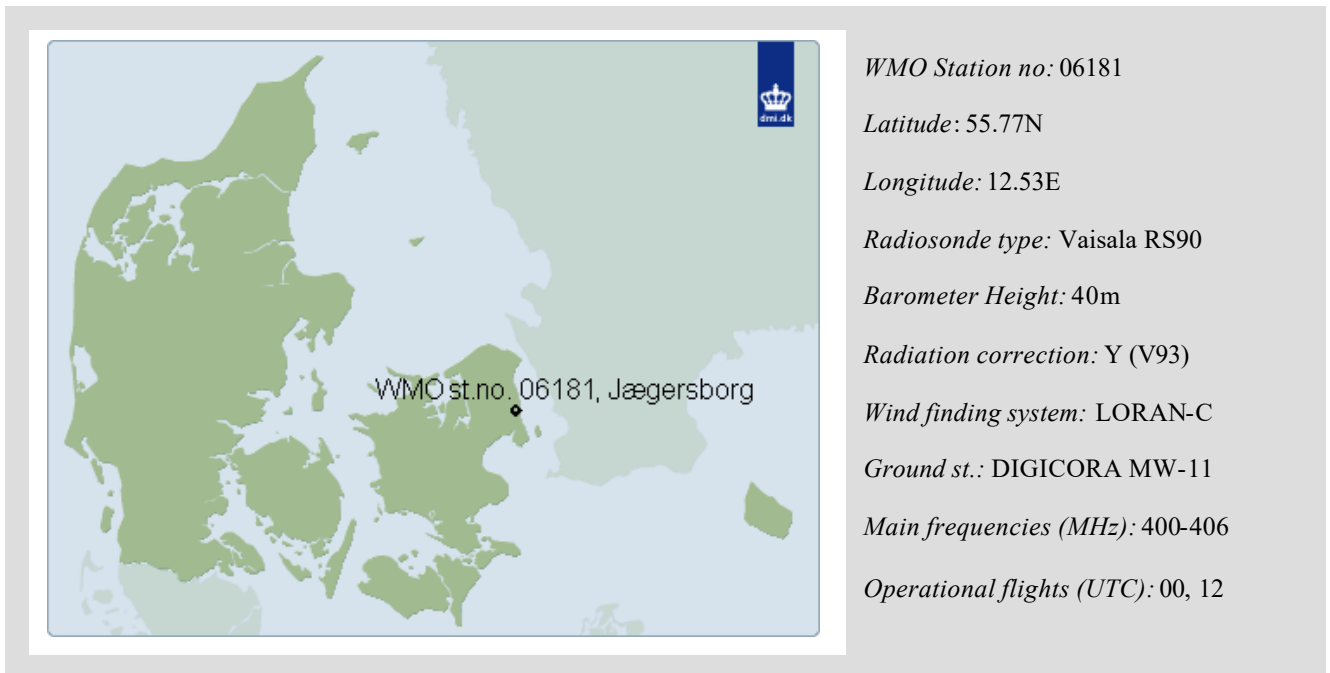


Figure 1: New carburettor icing-probability chart (Source: Watson (2004) at [http://www.atSB.gov.au/aviation/editorial/images/carb\\_icing.pdf](http://www.atSB.gov.au/aviation/editorial/images/carb_icing.pdf)).

## Data

The carburettor icing-probability is analysed using radiosonde and synoptic data from WMO station no. 06181 Jægersborg, located 7 km north of Copenhagen (map and details are shown in figure 2). The radiosonde is sent up every day at 00 and 12 UTC. It monitors pressure, humidity and temperature at various levels in the atmosphere and software uses the hypsometric equation to relate each of these measurements to a geopotential height which, in this lower part of the atmosphere, is almost identical with the geometric height. Observations from a synoptic station at ground level are used to relate heights and observations to a sea level reference.

Temperature and dew point temperature have been registered at the radiosonde station since 1973. However, since data from the 1970's are lacking both ground observations and a suitable temporal resolution in the upper air measurements, only data from 1980 to 2004 (June) are used in this report.



**Figur 2:** Location and details of the WMO station no. 06181 radiosonde station.

## Methods

Statistics illustrating the carburettor icing-probability for each of 7 heights have been generated for each month, for nightly (00 UTC) and daily (12 UTC) measurements respectively. At ground level (126.24 feet) observed values are used, and at 1250, 2500, 3750, 5000, 6250 and 7500 feet values of temperature and dew point temperature has been estimated using linear interpolation using the statistical software SPSS.

*The New Carburettor Icing-Probability Chart* (figure 1) was used to categorize the data into the probability classes shown in table 1. The chart was vectorized from a bitmap image using WinChips software. Data were categorized according to the 5 different probability classes (polygons) using values of temperature (x) and dew point depression (y) as coordinates. The last step of this procedure was performed in ArcView 3.2.

| Carburettor icing-probability classes |   |
|---------------------------------------|---|
| <b>A</b>                              | Serious icing, any power                                    |
| <b>B</b>                              | Moderate icing, cruise power / Serious icing, descent power |
| <b>C</b>                              | Serious icing, descent power                                |
| <b>D</b>                              | Light icing, cruise or descent power                        |
| <b>E</b>                              | No icing  |

**Table 1:** Carburettor icing-probability classes. See figure 1 for reference.

There are two drawbacks of using *The New Carburettor Icing-Probability Chart* for this purpose. During winter and at levels above ground level the air temperature can easily drop below the lower limit of -5 degrees Celsius. A reasonable assumption would be that the polygon representation class D ought to be extended to -8 degrees. Instead of modifying the graph it was decided to use the graph in its current form, as no information on the creation of the graph was available. Consequently some of the observations currently classified as class E (No icing) should probably have

been classified as class D (Light icing). An updated version of this report based on a carburettor icing-probability chart modified to suit the Danish winter climate is expected by early spring 2005.

Also, *The New Carburettor Icing-Probability Chart* refers to conditions near MSL (Mean Sea Level). At higher levels the relative pressure reduction caused by induction is expected to be less than at ground level. This means that the risk of carburettor icing will be correspondingly less. However the extent of this effect is unknown and is therefore not considered in this report.

In a few cases missing values of temperature and dew point temperatures in heights below 1250 feet will cause errors in the interpolated values since the interpolation routine in SPSS will automatically generate an interpolated value from the nearest previous and preceding observed value. In those few cases where no observations are available in heights less than 1250 feet, the temperature and dew point temperature at 1250 feet will be calculated using the last observation from the previous date (in a height of ca. 7 km). Hence the estimation of both temperature and dew point temperature will be much too low. This error will affect heights lower than that of the first measured value. These erroneous data are very few and easy to spot since they are all located in the lower left area of the plot. They all fall into the category of class E (no icing). It is unlikely that they would have fallen into class E if the interpolated values had been correct since the probability of carburettor icing in 1250 feet is generally high. The number of erroneous values is much too low (<0,1%) to affect the overall results.

## Results

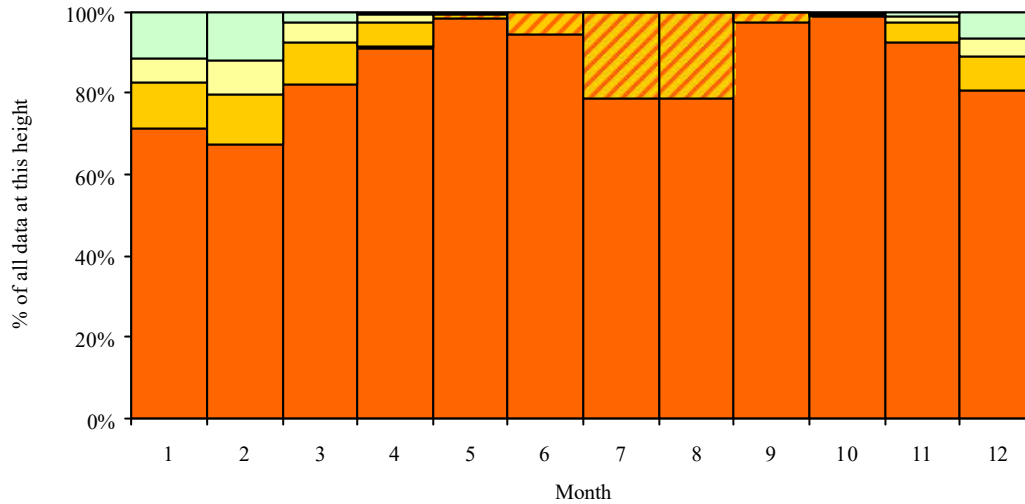
In this section the resulting statistics are briefly described in regard to variation with height, season and in respect to daily and nightly values. The statistics are presented in both graphs and tables. In this section fourteen bar charts are shown representing each of the seven heights for daily (12 UTC) and nightly (00 UTC) values respectively. The bar charts illustrates the relative distribution of the five carburettor icing-probability classes for each month.

In Appendix A the frequencies of the five icing-probability classes are listed in both counts and percentage. In these tables the data are grouped according to month before heights. In order to ease overall comparison the yearly variations are summarized in Appendix B (See also tables 2a & 2b and 3a & 3b).

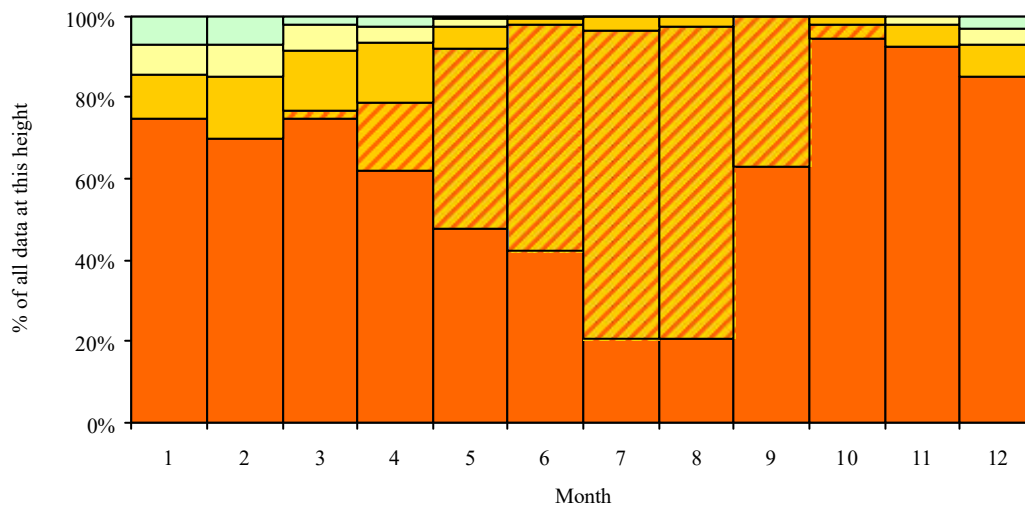


Carburettor icing-probability at ground level (124.26 feet)

124.26 feet - 00 UTC



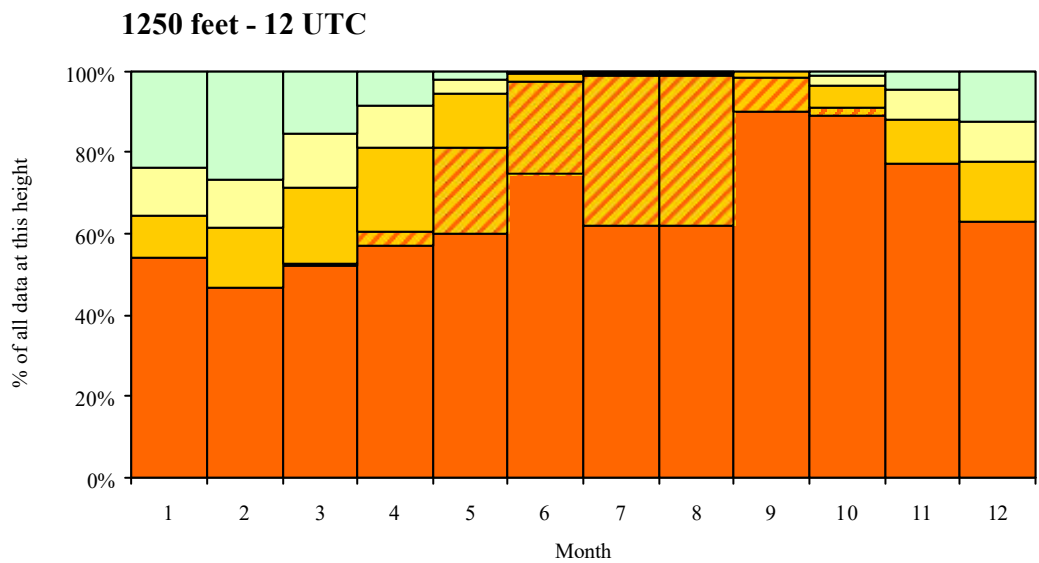
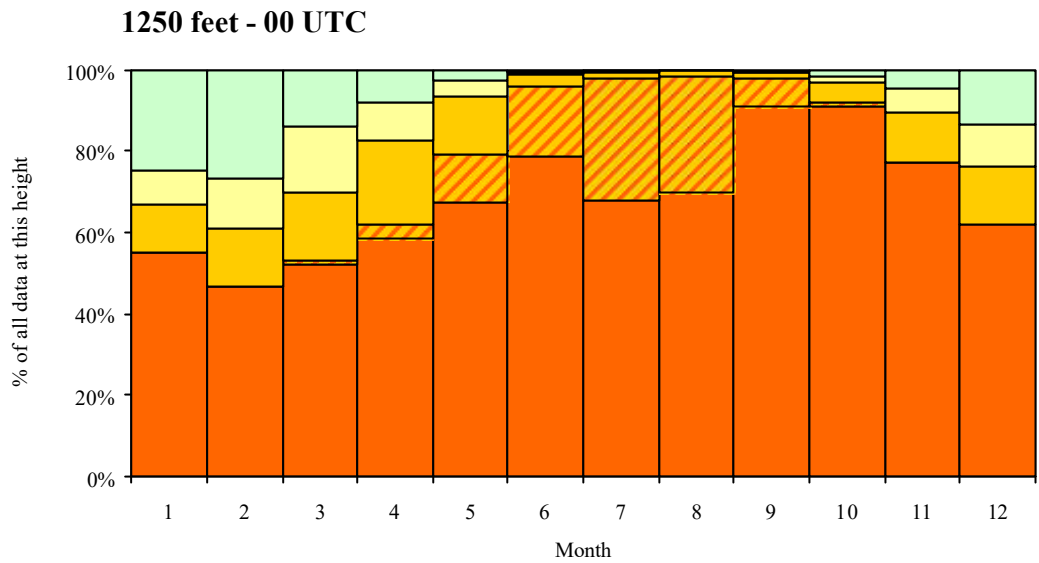
124.26 feet - 12 UTC



CARBURETTOR ICING-PROBABILITY CLASSES

- A** Serious icing, any power
- B** Moderate icing, cruise power / Serious icing, descent power
- C** Serious icing, descent power
- D** Light icing, cruise or descent power
- E** No icing

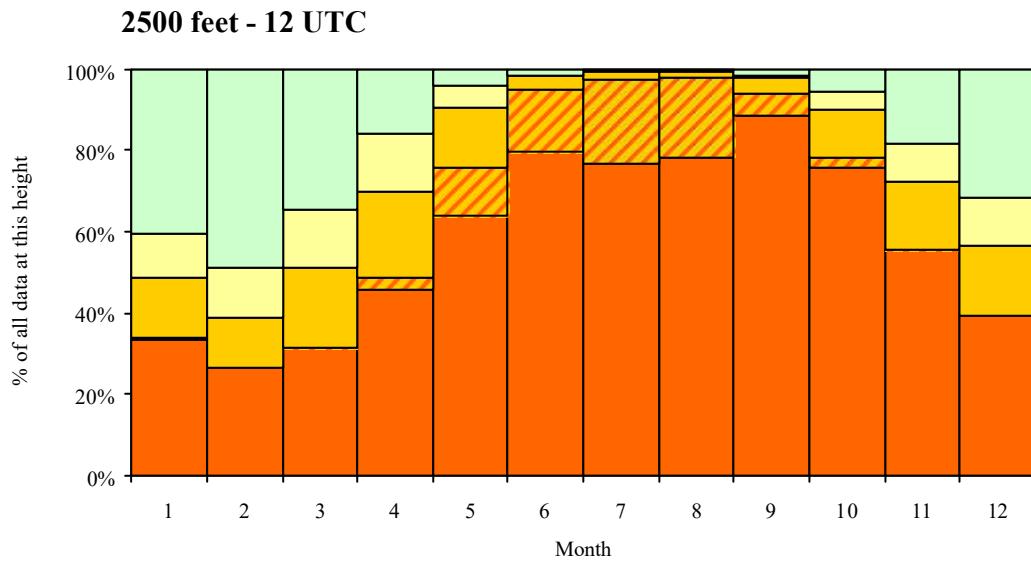
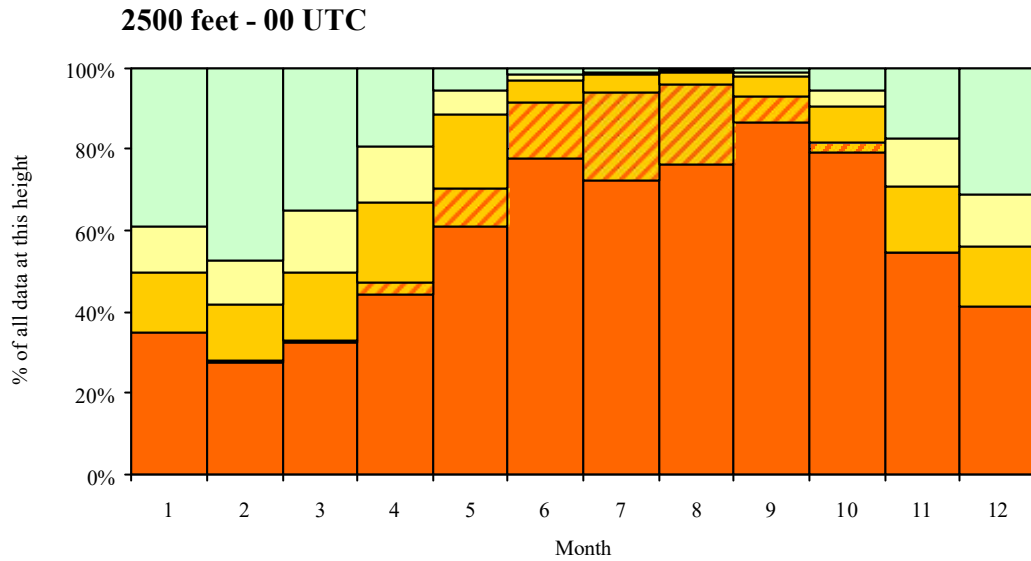
### Carburettor icing-probability at 1250 feet



**CARBURETTOR ICING-PROBABILITY CLASSES**

- A** Serious icing, any power
- B** Moderate icing, cruise power / Serious icing, descent power
- C** Serious icing, descent power
- D** Light icing, cruise or descent power
- E** No icing

### Carburettor icing-probability at 2500 feet

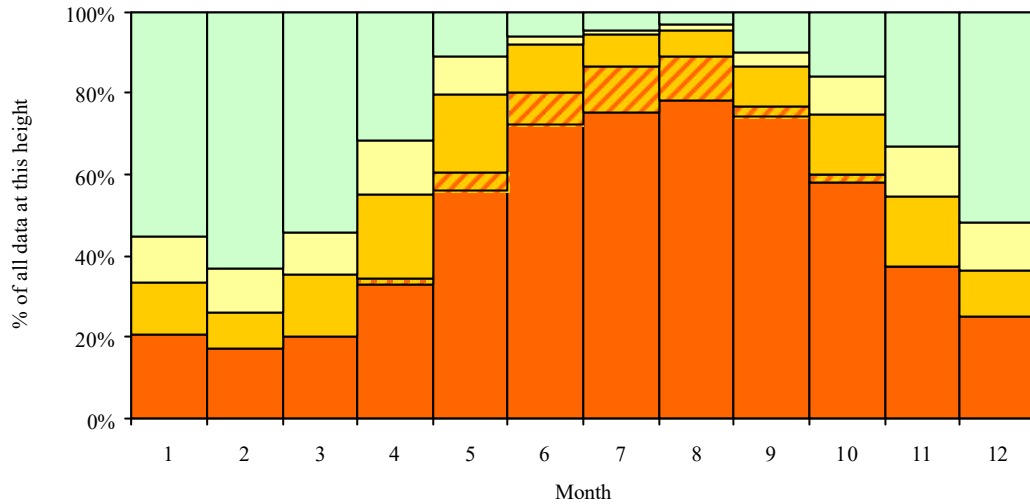


**CARBURETTOR ICING-PROBABILITY CLASSES**

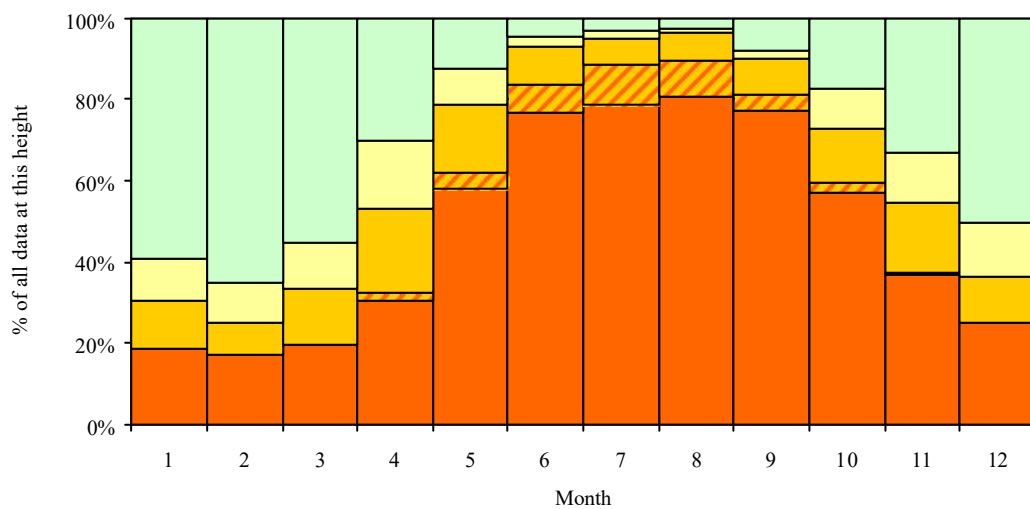
- A** Serious icing, any power
- B** Moderate icing, cruise power / Serious icing, descent power
- C** Serious icing, descent power
- D** Light icing, cruise or descent power
- E** No icing

**Carburettor icing-probability at 3750 feet**

**3750 feet - 00 UTC**



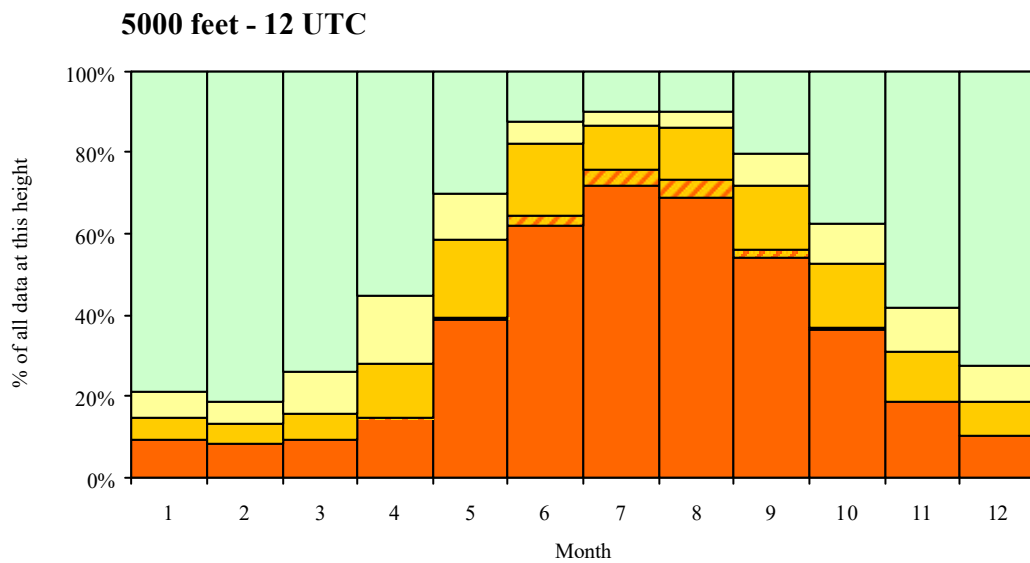
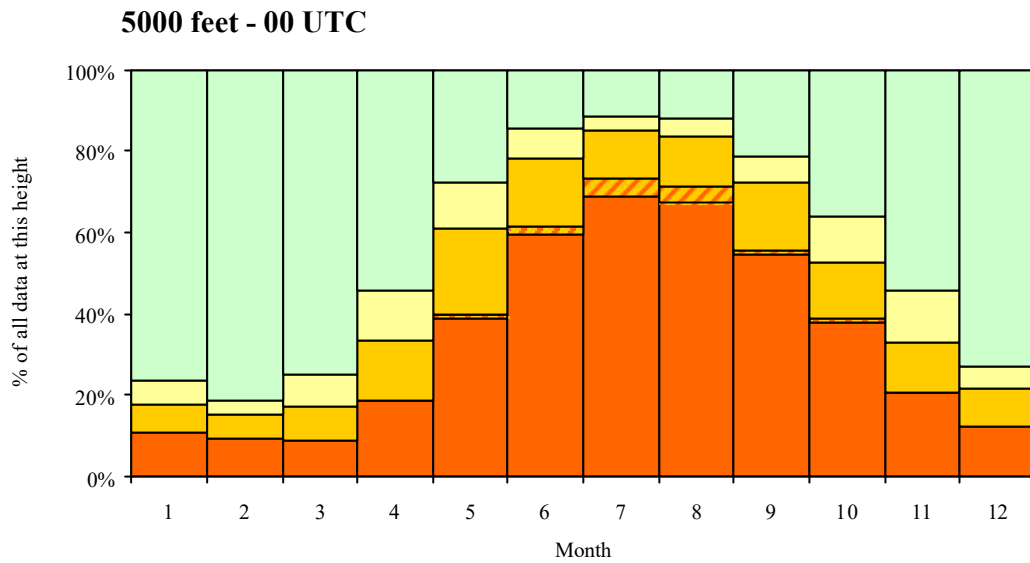
**3750 feet - 12 UTC**



**CARBURETTOR ICING-PROBABILITY CLASSES**

- A** Serious icing, any power
- B** Moderate icing, cruise power / Serious icing, descent power
- C** Serious icing, descent power
- D** Light icing, cruise or descent power
- E** No icing

### Carburettor icing-probability at 5000 feet

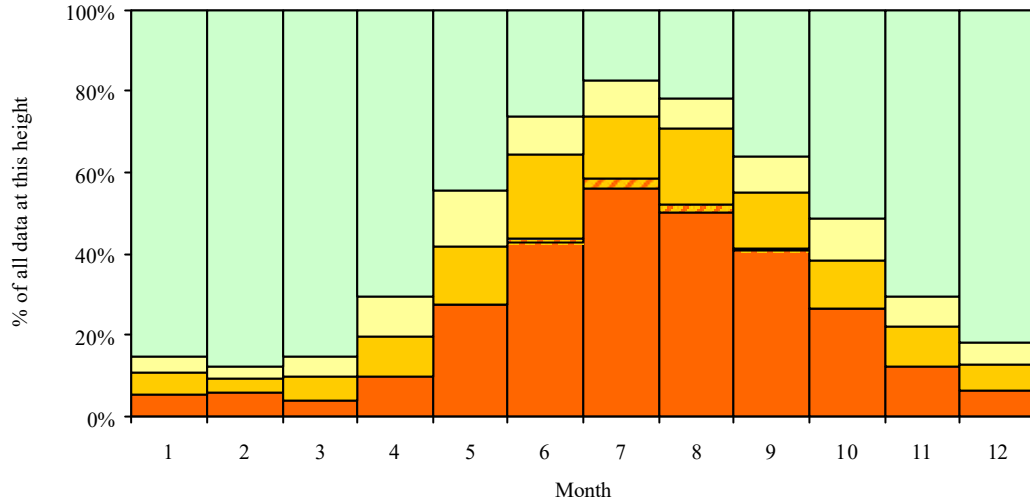


**CARBURETTOR ICING-PROBABILITY CLASSES**

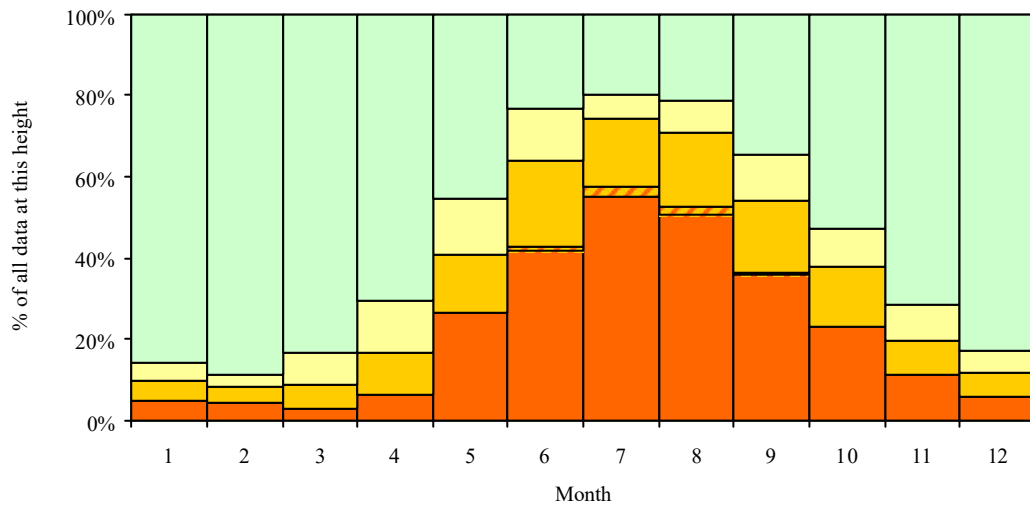
- A** Serious icing, any power
- B** Moderate icing, cruise power / Serious icing, descent power
- C** Serious icing, descent power
- D** Light icing, cruise or descent power
- E** No icing

### Carburettor icing-probability at 6250 feet

6250 feet - 00 UTC



6250 feet - 12 UTC

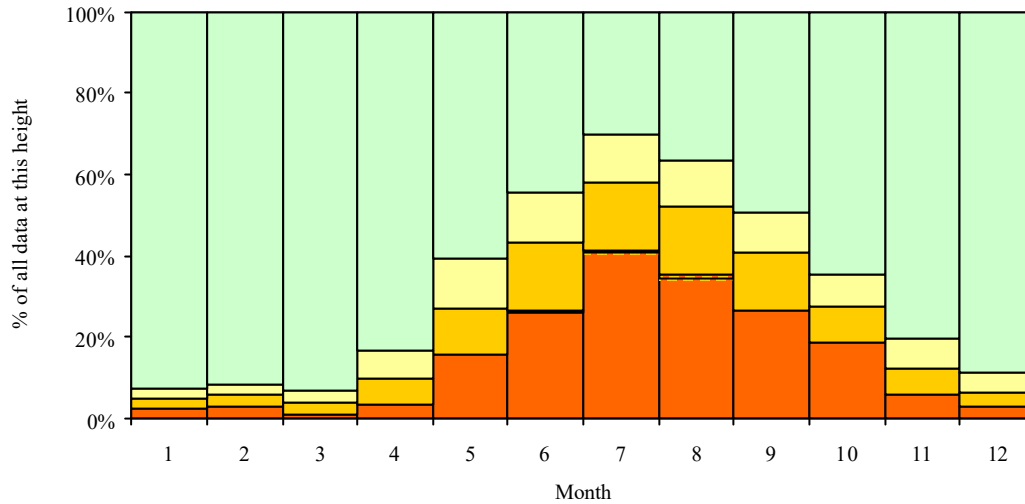


**CARBURETTOR ICING-PROBABILITY CLASSES**

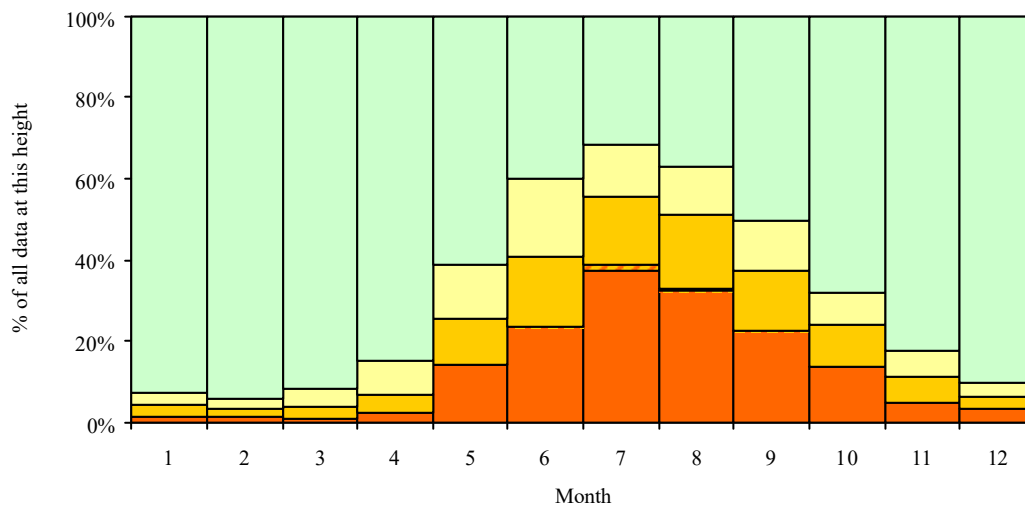
- A** Serious icing, any power
- B** Moderate icing, cruise power / Serious icing, descent power
- C** Serious icing, descent power
- D** Light icing, cruise or descent power
- E** No icing

### Carburettor icing-probability at 7500 feet

7500 feet - 00 UTC



7500 feet - 12 UTC



#### CARBURETTOR ICING-PROBABILITY CLASSES

- A** Serious icing, any power
- B** Moderate icing, cruise power / Serious icing, descent power
- C** Serious icing, descent power
- D** Light icing, cruise or descent power
- E** No icing

## Summary

In this section the results are briefly described on the basis of the generated charts and tables. To give a simplified overview the icing-probability classes A, B and C have been grouped to describe the risk of serious and moderate carburettor icing.

The risk of serious/moderate icing (Class A-C) is present at all heights throughout the year. There are, however, variations with height and seasonal differences. On average the carburettor icing-probability decreases with height. Generally the probability of carburettor icing is highest during the summer months due to the higher level of humidity in the air. The seasonal variation is most distinct in and above 2500 feet.

At ground level and at 1250 feet there is a very high probability of serious/moderate carburettor icing throughout the year (median > 90%) with only minor seasonal variations. At 2500 and 3750 feet the probability of serious/moderate icing is decreasing but still relatively high (median > 60%) and the seasonal variation more pronounced resulting in a bell shaped monthly distribution with peak values in July and August. At 5000, 6250 and 7500 feet the risk of serious/moderate icing gradually decreases while the season variation increases, making the bell shaped distribution even more pronounced. At 7500 feet the median has dropped to below 20%, with monthly values ranging from 3 to 50%.

| Class A - 00 UTC |     |     |        |      |      |
|------------------|-----|-----|--------|------|------|
| Height (feet)    | max | min | median | mean | stdv |
| 124.26           | 99  | 68  | 87     | 86   | 11   |
| 1250             | 91  | 47  | 68     | 68   | 14   |
| 2500             | 87  | 28  | 58     | 57   | 21   |
| 3750             | 78  | 17  | 47     | 47   | 24   |
| 5000             | 69  | 9   | 29     | 34   | 24   |
| 6250             | 56  | 4   | 19     | 24   | 19   |
| 7500             | 41  | 1   | 11     | 15   | 14   |

| Class A - 12 UTC |     |     |        |      |      |
|------------------|-----|-----|--------|------|------|
| Height (feet)    | max | min | median | mean | stdv |
| 124.26           | 94  | 21  | 67     | 62   | 25   |
| 1250             | 90  | 47  | 62     | 66   | 14   |
| 2500             | 88  | 27  | 60     | 58   | 22   |
| 3750             | 81  | 17  | 47     | 48   | 26   |
| 5000             | 72  | 8   | 28     | 34   | 25   |
| 6250             | 55  | 3   | 17     | 22   | 19   |
| 7500             | 38  | 1   | 9      | 13   | 13   |

**Table 2a & 2b:** Descriptive statistics summarizing the monthly values (%) of Class A (serious icing, any power).

| Class A+B+C - 00 UTC |     |     |        |      |      |
|----------------------|-----|-----|--------|------|------|
| Height (feet)        | max | min | median | mean | stdv |
| 124.26               | 100 | 80  | 99     | 95   | 7    |
| 1250                 | 100 | 61  | 92     | 86   | 14   |
| 2500                 | 99  | 42  | 80     | 76   | 22   |
| 3750                 | 95  | 26  | 65     | 64   | 26   |
| 5000                 | 85  | 15  | 43     | 48   | 28   |
| 6250                 | 74  | 9   | 30     | 36   | 25   |
| 7500                 | 58  | 4   | 20     | 24   | 20   |

| Class A+B+C - 12 UTC |     |     |        |      |      |
|----------------------|-----|-----|--------|------|------|
| Height (feet)        | max | min | median | mean | stdv |
| 124.26               | 100 | 85  | 98     | 95   | 6    |
| 1250                 | 100 | 62  | 91     | 86   | 14   |
| 2500                 | 99  | 39  | 81     | 76   | 23   |
| 3750                 | 96  | 25  | 64     | 63   | 28   |
| 5000                 | 87  | 14  | 42     | 47   | 30   |
| 6250                 | 74  | 8   | 29     | 35   | 26   |
| 7500                 | 55  | 3   | 18     | 23   | 19   |

**Table 3a & 3b:** In this table Class A, B & C are summed to provide an overview of the frequency of serious and moderate icing-probability (all in %).

The relative distribution of the five probability classes are generally similar when comparing results for each height based on daily (12 UTC) and nightly (00 UTC) observations respectively. The only marked difference is at ground level (124.26 feet) during the months April to October. In these months the relative distribution of probability Class A and B differs significantly. At 00 UTC the risk of serious icing 'at any power' (Class A) is present in averagely 86% of the time when viewing the year as a whole with monthly values ranging from 68-99% (see table 2a & 2b). The highest frequencies are found in spring and autumn, but the seasonal variation is generally low.



At 12 UTC the average frequency of Class A is significantly lower (62%) and the variation in the monthly values much higher (21-94%) as seen in table 2a & 2b (numbers highlighted in bold). Especially during the months April to September the share of values classified at Class A are significantly lower at 12 UTC than at 00 UTC. The share of values classified as Class B are correspondingly higher during these months, and when Class A, B & C are grouped this difference between night and day is much less marked (see table 3a & 3b first row).

## Conclusions

The risk of serious/moderate carburettor icing is present at all heights throughout the year. There are, however, variations with height and seasonal differences. The probability of serious/moderate carburettor icing generally decreases with height, while the monthly variation increases. At ground level the probability of serious/moderate icing is very high (median > 95%) and the monthly variation low (80-100%). At 7500 feet the probability of serious/moderate icing has decreased to an average of 20% (median) ranging from 3 to 57%. The seasonal variation is most pronounced in and above 2500 feet. Generally the probability of carburettor icing is highest during the summer months, the distribution of monthly values becoming increasingly bell shaped with height, generally with peak values in July and August.

Except from at ground level no major difference in distribution of the icing probability is observed when comparing daily (12 UTC) and nightly (00 UTC) values.

*The New Carburettor Icing-Probability Chart* is designed to consider air temperatures between -5 and 45° C. As described on page 7 this may have an effect on the classification of observations representing air temperatures below -5 ° C: the frequency of class D (Light icing) may be higher, and the frequency of class E (No icing) correspondingly lower, than suggested in this analysis. This will be dealt with in a later version of this report.

## Comments and suggested recommendations

By Søren Brodersen

### Comments

The finding that the probability of carburettor icing is highest during the summer months is important, as the majority of the pilot community would probably have expected the reverse tendency.

Also, it is worth noting that the probability class “No Icing” exclusively relates to the risk of Carburettor icing, as the air temperature falls below ca. -10 ° C. In these cases the relative humidity may well be up to 100%, indicating that clouds or precipitation is present at temperatures below 0 ° C.

Using data at 00 UTC and 12 UTC exclusively should not lead to the impression, that 00 UTC represents night flying, and 12 UTC represents daytime flying. In general, the 00 UTC sounding represents morning weather conditions better than the 12 UTC sounding.

### Suggested recommendations

This report concludes, that weather conditions favourable for carburettor icing are present at virtually all the time, especially at low levels and levels in which take-off and landing procedures are executed or prolonged VFR-cruising over land takes place.

The use of the carburettor icing chart requires knowledge of air temperature and dew point and these data are only available (to the pilot) at ground levels. Forecasting air temperature and dew point at various flight levels is not possible, as variations in three dimensions and time are very complex. Therefore, the pilot focus should not be on the temperature, the dew point, the relative humidity nor the carburettor icing chart. The focus should primarily be on timely and routinely monitoring engine performance (RPM & Manifold Pressure) followed by proper and consequent use of carburettor heating.

The leaflet PISTON ENGINE ICING provided by UK-CAA (Civil Aviation Authority, 2000) gives recommendations of pilot procedures in order to minimize the risk of carburettor icing. The leaflet can be found at the URL :

[http://www.caa.co.uk/docs/33/SRG\\_GAD\\_SSL14.PDF](http://www.caa.co.uk/docs/33/SRG_GAD_SSL14.PDF)

A summary of the leaflet is provided in Appendix D.

## References

Civil Aviation Authority (2000). *Civil Aviation Safety Sense 14A*. Piston Engine Icing. Westward documedia Limited, Cheltenham UK.

Jørgensen, Knud (2003) Karburatoris. *OY-SIK* (2) 2003 p.14-18. Statens Lufthavnsvæsen. (Danish Civil Aviation Administration).

GASIL (4) Dec. 2002, p.35. *Carburettor icing – it's the humidity!*

Watson, M. (2004) "New carburettor icing-probability chart" in *Melting moments: understanding carburettor icing*. Editorial, Australian Transport Safety Bureau (ATSB), the Australian Government. [http://www.atsb.gov.au/aviation/editorial/images/carb\\_icing.pdf](http://www.atsb.gov.au/aviation/editorial/images/carb_icing.pdf)

## Previous reports

Previous reports from the Danish Meteorological Institute can be found on:  
<http://www.dmi.dk/dmi/dmi-publikationer.htm>

## Appendix A

The following tables list the frequencies of the analysed data categorized into the 5 carburettor icing probability classes. The first two tables (A1 & A2) list the frequencies in counts at 00 UTC and 12 UTC respectively. The next two tables (A3 & A4) list the corresponding frequencies in percentages. For explanation of probability classes and methods see the section “Methods” in the report.

| Frequencies (counts) – 00 UTC |        |     |     |     |     |     |       |
|-------------------------------|--------|-----|-----|-----|-----|-----|-------|
| Probability class             |        | A   | B   | C   | D   | E   | Total |
| Month                         | Height |     |     |     |     |     |       |
| 1                             | 124.26 | 503 | 0   | 79  | 42  | 81  | 705   |
|                               | 1250   | 416 | 1   | 87  | 63  | 186 | 753   |
|                               | 2500   | 263 | 0   | 113 | 83  | 294 | 753   |
|                               | 3750   | 157 | 0   | 96  | 85  | 415 | 753   |
|                               | 5000   | 81  | 0   | 54  | 44  | 574 | 753   |
|                               | 6250   | 42  | 0   | 39  | 29  | 643 | 753   |
|                               | 7500   | 17  | 0   | 22  | 17  | 697 | 753   |
| 2                             | 124.26 | 442 | 0   | 80  | 53  | 79  | 654   |
|                               | 1250   | 325 | 1   | 97  | 85  | 186 | 694   |
|                               | 2500   | 193 | 1   | 96  | 76  | 328 | 694   |
|                               | 3750   | 121 | 0   | 60  | 75  | 438 | 694   |
|                               | 5000   | 65  | 0   | 41  | 25  | 563 | 694   |
|                               | 6250   | 41  | 0   | 23  | 20  | 610 | 694   |
|                               | 7500   | 22  | 0   | 20  | 16  | 636 | 694   |
| 3                             | 124.26 | 593 | 0   | 73  | 35  | 20  | 721   |
|                               | 1250   | 398 | 7   | 128 | 123 | 105 | 761   |
|                               | 2500   | 248 | 4   | 127 | 117 | 265 | 761   |
|                               | 3750   | 153 | 0   | 115 | 82  | 411 | 761   |
|                               | 5000   | 69  | 0   | 62  | 61  | 569 | 761   |
|                               | 6250   | 30  | 0   | 44  | 37  | 650 | 761   |
|                               | 7500   | 6   | 0   | 25  | 21  | 709 | 761   |
| 4                             | 124.26 | 621 | 4   | 42  | 14  | 2   | 683   |
|                               | 1250   | 428 | 27  | 150 | 70  | 58  | 733   |
|                               | 2500   | 326 | 21  | 143 | 101 | 142 | 733   |
|                               | 3750   | 243 | 9   | 151 | 98  | 232 | 733   |
|                               | 5000   | 138 | 1   | 105 | 91  | 398 | 733   |
|                               | 6250   | 72  | 0   | 74  | 69  | 518 | 733   |
|                               | 7500   | 26  | 0   | 45  | 52  | 610 | 733   |
| 5                             | 124.26 | 715 | 6   | 4   | 0   | 0   | 725   |
|                               | 1250   | 517 | 92  | 109 | 28  | 20  | 766   |
|                               | 2500   | 468 | 71  | 140 | 43  | 44  | 766   |
|                               | 3750   | 429 | 34  | 148 | 70  | 85  | 766   |
|                               | 5000   | 298 | 6   | 164 | 88  | 210 | 766   |
|                               | 6250   | 211 | 1   | 108 | 105 | 341 | 766   |
|                               | 7500   | 120 | 0   | 87  | 95  | 464 | 766   |
| 6                             | 124.26 | 661 | 37  | 0   | 0   | 0   | 698   |
|                               | 1250   | 584 | 125 | 22  | 6   | 3   | 740   |
|                               | 2500   | 574 | 102 | 43  | 9   | 12  | 740   |
|                               | 3750   | 534 | 61  | 85  | 16  | 44  | 740   |
|                               | 5000   | 440 | 16  | 123 | 55  | 106 | 740   |
|                               | 6250   | 315 | 8   | 155 | 67  | 195 | 740   |
|                               | 7500   | 194 | 2   | 125 | 92  | 327 | 740   |

(table continued on the next page)

| Frequencies (counts) – 12 UTC |        |     |     |     |     |     |       |
|-------------------------------|--------|-----|-----|-----|-----|-----|-------|
| Probability class             |        | A   | B   | C   | D   | E   | Total |
| Month                         | Height |     |     |     |     |     |       |
| 1                             | 124.26 | 544 | 0   | 78  | 56  | 49  | 727   |
|                               | 1250   | 414 | 0   | 82  | 89  | 182 | 767   |
|                               | 2500   | 258 | 2   | 113 | 85  | 309 | 767   |
|                               | 3750   | 145 | 0   | 89  | 78  | 455 | 767   |
|                               | 5000   | 70  | 0   | 45  | 48  | 604 | 767   |
|                               | 6250   | 37  | 0   | 37  | 34  | 659 | 767   |
|                               | 7500   | 13  | 0   | 20  | 23  | 711 | 767   |
| 2                             | 124.26 | 465 | 0   | 102 | 53  | 46  | 666   |
|                               | 1250   | 328 | 0   | 104 | 82  | 188 | 702   |
|                               | 2500   | 188 | 0   | 86  | 86  | 342 | 702   |
|                               | 3750   | 122 | 0   | 54  | 68  | 458 | 702   |
|                               | 5000   | 57  | 0   | 38  | 37  | 570 | 702   |
|                               | 6250   | 30  | 0   | 29  | 19  | 624 | 702   |
|                               | 7500   | 9   | 0   | 15  | 17  | 661 | 702   |
| 3                             | 124.26 | 538 | 12  | 108 | 46  | 14  | 718   |
|                               | 1250   | 398 | 5   | 141 | 104 | 116 | 764   |
|                               | 2500   | 240 | 2   | 149 | 108 | 265 | 764   |
|                               | 3750   | 151 | 1   | 103 | 88  | 421 | 764   |
|                               | 5000   | 70  | 0   | 49  | 80  | 565 | 764   |
|                               | 6250   | 22  | 0   | 47  | 57  | 638 | 764   |
|                               | 7500   | 9   | 0   | 21  | 32  | 702 | 764   |
| 4                             | 124.26 | 433 | 117 | 100 | 28  | 18  | 696   |
|                               | 1250   | 423 | 28  | 152 | 76  | 63  | 742   |
|                               | 2500   | 340 | 22  | 158 | 106 | 116 | 742   |
|                               | 3750   | 227 | 13  | 154 | 126 | 222 | 742   |
|                               | 5000   | 109 | 2   | 98  | 123 | 410 | 742   |
|                               | 6250   | 46  | 0   | 80  | 95  | 521 | 742   |
|                               | 7500   | 20  | 0   | 30  | 64  | 628 | 742   |
| 5                             | 124.26 | 345 | 319 | 41  | 14  | 3   | 722   |
|                               | 1250   | 462 | 160 | 101 | 29  | 14  | 766   |
|                               | 2500   | 489 | 92  | 113 | 42  | 30  | 766   |
|                               | 3750   | 444 | 31  | 130 | 68  | 93  | 766   |
|                               | 5000   | 299 | 4   | 147 | 87  | 229 | 766   |
|                               | 6250   | 203 | 0   | 111 | 103 | 349 | 766   |
|                               | 7500   | 108 | 1   | 89  | 100 | 468 | 766   |
| 6                             | 124.26 | 295 | 391 | 10  | 3   | 0   | 699   |
|                               | 1250   | 552 | 170 | 15  | 0   | 3   | 740   |
|                               | 2500   | 589 | 115 | 23  | 2   | 11  | 740   |
|                               | 3750   | 568 | 52  | 69  | 17  | 34  | 740   |
|                               | 5000   | 459 | 18  | 133 | 39  | 91  | 740   |
|                               | 6250   | 309 | 8   | 158 | 92  | 173 | 740   |
|                               | 7500   | 174 | 3   | 125 | 141 | 297 | 740   |

(table continued on the next page)

| <b>Frequencies (counts – continued) – 00 UTC</b> |        |     |     |     |    |     |       |
|--|--------|-----|-----|-----|----|-----|-------|
| Probability class                                |        | A   | B   | C   | D  | E   | Total |
| Month  | Height |     |     |     |    |     |       |
| 7  | 124.26 | 553 | 149 | 0   | 0  | 1   | 703   |
|  | 1250   | 512 | 226 | 11  | 2  | 1   | 752   |
|  | 2500   | 546 | 161 | 32  | 6  | 7   | 752   |
|  | 3750   | 568 | 83  | 58  | 10 | 33  | 752   |
|  | 5000   | 519 | 32  | 90  | 27 | 84  | 752   |
|  | 6250   | 423 | 18  | 116 | 66 | 129 | 752   |
|  | 7500   | 306 | 5   | 125 | 88 | 228 | 752   |
| 8  | 124.26 | 544 | 145 | 0   | 0  | 1   | 690   |
|  | 1250   | 509 | 211 | 8   | 1  | 1   | 730   |
|  | 2500   | 557 | 143 | 22  | 5  | 3   | 730   |
|  | 3750   | 573 | 79  | 44  | 13 | 21  | 730   |
|  | 5000   | 491 | 29  | 90  | 35 | 85  | 730   |
|  | 6250   | 367 | 13  | 137 | 53 | 160 | 730   |
|  | 7500   | 251 | 6   | 124 | 81 | 268 | 730   |
| 9  | 124.26 | 647 | 15  | 0   | 0  | 1   | 663   |
|  | 1250   | 643 | 51  | 10  | 2  | 2   | 708   |
|  | 2500   | 614 | 45  | 35  | 6  | 8   | 708   |
|  | 3750   | 525 | 20  | 69  | 23 | 71  | 708   |
|  | 5000   | 387 | 7   | 118 | 45 | 151 | 708   |
|  | 6250   | 288 | 5   | 96  | 64 | 255 | 708   |
|  | 7500   | 187 | 0   | 104 | 67 | 350 | 708   |
| 10   | 124.26 | 643 | 0   | 4   | 2  | 0   | 649   |
|  | 1250   | 661 | 7   | 35  | 11 | 10  | 724   |
|  | 2500   | 575 | 15  | 67  | 26 | 41  | 724   |
|  | 3750   | 420 | 13  | 109 | 67 | 115 | 724   |
|  | 5000   | 275 | 5   | 101 | 82 | 261 | 724   |
|  | 6250   | 192 | 2   | 83  | 77 | 370 | 724   |
|  | 7500   | 136 | 0   | 63  | 56 | 469 | 724   |
| 11   | 124.26 | 584 | 0   | 33  | 9  | 6   | 632   |
|  | 1250   | 543 | 1   | 85  | 41 | 33  | 703   |
|  | 2500   | 384 | 2   | 114 | 83 | 120 | 703   |
|  | 3750   | 263 | 2   | 120 | 85 | 233 | 703   |
|  | 5000   | 144 | 1   | 88  | 89 | 381 | 703   |
|  | 6250   | 86  | 0   | 69  | 54 | 494 | 703   |
|  | 7500   | 43  | 0   | 43  | 52 | 565 | 703   |
| 12   | 124.26 | 518 | 0   | 53  | 28 | 42  | 641   |
|  | 1250   | 445 | 0   | 103 | 74 | 94  | 716   |
|  | 2500   | 295 | 0   | 106 | 92 | 223 | 716   |
|  | 3750   | 180 | 0   | 82  | 84 | 370 | 716   |
|  | 5000   | 88  | 0   | 68  | 39 | 521 | 716   |
|  | 6250   | 46  | 0   | 46  | 38 | 586 | 716   |
|  | 7500   | 23  | 0   | 23  | 35 | 635 | 716   |

| <b>Frequencies (counts - continued) – 12 UTC</b> |        |     |     |     |    |     |       |
|--|--------|-----|-----|-----|----|-----|-------|
| Probability class                                |        | A   | B   | C   | D  | E   | Total |
| Month  | Height |     |     |     |    |     |       |
| 7  | 124.26 | 144 | 531 | 24  | 1  | 0   | 700   |
|  | 1250   | 465 | 275 | 5   | 2  | 2   | 749   |
|  | 2500   | 575 | 156 | 13  | 4  | 1   | 749   |
|  | 3750   | 588 | 77  | 47  | 16 | 21  | 749   |
|  | 5000   | 540 | 27  | 82  | 26 | 74  | 749   |
|  | 6250   | 413 | 18  | 126 | 44 | 148 | 749   |
|  | 7500   | 282 | 9   | 124 | 98 | 236 | 749   |
| 8  | 124.26 | 144 | 531 | 16  | 1  | 0   | 692   |
|  | 1250   | 459 | 271 | 4   | 1  | 2   | 737   |
|  | 2500   | 576 | 148 | 9   | 2  | 2   | 737   |
|  | 3750   | 595 | 66  | 49  | 7  | 20  | 737   |
|  | 5000   | 508 | 32  | 96  | 28 | 73  | 737   |
|  | 6250   | 373 | 15  | 135 | 56 | 158 | 737   |
|  | 7500   | 239 | 5   | 134 | 88 | 271 | 737   |
| 9  | 124.26 | 419 | 243 | 0   | 0  | 1   | 663   |
|  | 1250   | 639 | 58  | 12  | 0  | 0   | 709   |
|  | 2500   | 627 | 41  | 25  | 6  | 10  | 709   |
|  | 3750   | 547 | 29  | 62  | 13 | 58  | 709   |
|  | 5000   | 384 | 15  | 111 | 56 | 143 | 709   |
|  | 6250   | 254 | 5   | 126 | 80 | 244 | 709   |
|  | 7500   | 160 | 2   | 104 | 88 | 355 | 709   |
| 10   | 124.26 | 621 | 25  | 11  | 1  | 0   | 658   |
|  | 1250   | 657 | 13  | 41  | 16 | 8   | 735   |
|  | 2500   | 557 | 20  | 85  | 33 | 40  | 735   |
|  | 3750   | 421 | 17  | 98  | 71 | 128 | 735   |
|  | 5000   | 269 | 3   | 114 | 74 | 275 | 735   |
|  | 6250   | 170 | 0   | 110 | 66 | 389 | 735   |
|  | 7500   | 100 | 1   | 75  | 60 | 499 | 735   |
| 11   | 124.26 | 592 | 1   | 32  | 14 | 0   | 639   |
|  | 1250   | 552 | 0   | 78  | 52 | 32  | 714   |
|  | 2500   | 396 | 2   | 119 | 68 | 129 | 714   |
|  | 3750   | 264 | 4   | 124 | 85 | 237 | 714   |
|  | 5000   | 134 | 0   | 88  | 77 | 415 | 714   |
|  | 6250   | 81  | 0   | 61  | 61 | 511 | 714   |
|  | 7500   | 37  | 0   | 44  | 46 | 587 | 714   |
| 12   | 124.26 | 549 | 0   | 49  | 26 | 19  | 643   |
|  | 1250   | 459 | 0   | 105 | 72 | 91  | 727   |
|  | 2500   | 285 | 0   | 126 | 88 | 228 | 727   |
|  | 3750   | 184 | 0   | 82  | 97 | 364 | 727   |
|  | 5000   | 75  | 0   | 62  | 65 | 525 | 727   |
|  | 6250   | 44  | 0   | 41  | 40 | 602 | 727   |
|  | 7500   | 24  | 0   | 23  | 24 | 656 | 727   |

| <b>Frequencies (%) – 00 UTC</b> |               |          |          |          |          |          |              |
|---------------------------------|---------------|----------|----------|----------|----------|----------|--------------|
| <i>Probability class</i>        |               | <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> | <i>E</i> | <i>Total</i> |
| <i>Month</i>                    | <i>Height</i> |          |          |          |          |          |              |
| 1                               | 124.26        | 71,3     | 0,0      | 11,2     | 6,0      | 11,5     | 100          |
|                                 | 1250          | 55,2     | 0,1      | 11,6     | 8,4      | 24,7     | 100          |
|                                 | 2500          | 34,9     | 0,0      | 15,0     | 11,0     | 39,0     | 100          |
|                                 | 3750          | 20,8     | 0,0      | 12,7     | 11,3     | 55,1     | 100          |
|                                 | 5000          | 10,8     | 0,0      | 7,2      | 5,8      | 76,2     | 100          |
|                                 | 6250          | 5,6      | 0,0      | 5,2      | 3,9      | 85,4     | 100          |
|                                 | 7500          | 2,3      | 0,0      | 2,9      | 2,3      | 92,6     | 100          |
| 2                               | 124.26        | 67,6     | 0,0      | 12,2     | 8,1      | 12,1     | 100          |
|                                 | 1250          | 46,8     | 0,1      | 14,0     | 12,2     | 26,8     | 100          |
|                                 | 2500          | 27,8     | 0,1      | 13,8     | 11,0     | 47,3     | 100          |
|                                 | 3750          | 17,4     | 0,0      | 8,6      | 10,8     | 63,1     | 100          |
|                                 | 5000          | 9,4      | 0,0      | 5,9      | 3,6      | 81,1     | 100          |
|                                 | 6250          | 5,9      | 0,0      | 3,3      | 2,9      | 87,9     | 100          |
|                                 | 7500          | 3,2      | 0,0      | 2,9      | 2,3      | 91,6     | 100          |
| 3                               | 124.26        | 82,2     | 0,0      | 10,1     | 4,9      | 2,8      | 100          |
|                                 | 1250          | 52,3     | 0,9      | 16,8     | 16,2     | 13,8     | 100          |
|                                 | 2500          | 32,6     | 0,5      | 16,7     | 15,4     | 34,8     | 100          |
|                                 | 3750          | 20,1     | 0,0      | 15,1     | 10,8     | 54,0     | 100          |
|                                 | 5000          | 9,1      | 0,0      | 8,1      | 8,0      | 74,8     | 100          |
|                                 | 6250          | 3,9      | 0,0      | 5,8      | 4,9      | 85,4     | 100          |
|                                 | 7500          | 0,8      | 0,0      | 3,3      | 2,8      | 93,2     | 100          |
| 4                               | 124.26        | 90,9     | 0,6      | 6,1      | 2,0      | 0,3      | 100          |
|                                 | 1250          | 58,4     | 3,7      | 20,5     | 9,5      | 7,9      | 100          |
|                                 | 2500          | 44,5     | 2,9      | 19,5     | 13,8     | 19,4     | 100          |
|                                 | 3750          | 33,2     | 1,2      | 20,6     | 13,4     | 31,7     | 100          |
|                                 | 5000          | 18,8     | 0,1      | 14,3     | 12,4     | 54,3     | 100          |
|                                 | 6250          | 9,8      | 0,0      | 10,1     | 9,4      | 70,7     | 100          |
|                                 | 7500          | 3,5      | 0,0      | 6,1      | 7,1      | 83,2     | 100          |
| 5                               | 124.26        | 98,6     | 0,8      | 0,6      | 0,0      | 0,0      | 100          |
|                                 | 1250          | 67,5     | 12,0     | 14,2     | 3,7      | 2,6      | 100          |
|                                 | 2500          | 61,1     | 9,3      | 18,3     | 5,6      | 5,7      | 100          |
|                                 | 3750          | 56,0     | 4,4      | 19,3     | 9,1      | 11,1     | 100          |
|                                 | 5000          | 38,9     | 0,8      | 21,4     | 11,5     | 27,4     | 100          |
|                                 | 6250          | 27,5     | 0,1      | 14,1     | 13,7     | 44,5     | 100          |
|                                 | 7500          | 15,7     | 0,0      | 11,4     | 12,4     | 60,6     | 100          |
| 6                               | 124.26        | 94,7     | 5,3      | 0,0      | 0,0      | 0,0      | 100          |
|                                 | 1250          | 78,9     | 16,9     | 3,0      | 0,8      | 0,4      | 100          |
|                                 | 2500          | 77,6     | 13,8     | 5,8      | 1,2      | 1,6      | 100          |
|                                 | 3750          | 72,2     | 8,2      | 11,5     | 2,2      | 5,9      | 100          |
|                                 | 5000          | 59,5     | 2,2      | 16,6     | 7,4      | 14,3     | 100          |
|                                 | 6250          | 42,6     | 1,1      | 20,9     | 9,1      | 26,4     | 100          |
|                                 | 7500          | 26,2     | 0,3      | 16,9     | 12,4     | 44,2     | 100          |

(table continued on the next page)

| <b>Frequencies (%) – 12 UTC</b> |               |          |          |          |          |          |              |
|---------------------------------|---------------|----------|----------|----------|----------|----------|--------------|
| <i>Probability class</i>        |               | <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> | <i>E</i> | <i>Total</i> |
| <i>Month</i>                    | <i>Height</i> |          |          |          |          |          |              |
| 1                               | 124.26        | 74,8     | 0,0      | 10,7     | 7,7      | 6,7      | 100          |
|                                 | 1250          | 54,0     | 0,0      | 10,7     | 11,6     | 23,7     | 100          |
|                                 | 2500          | 33,6     | 0,3      | 14,7     | 11,1     | 40,3     | 100          |
|                                 | 3750          | 18,9     | 0,0      | 11,6     | 10,2     | 59,3     | 100          |
|                                 | 5000          | 9,1      | 0,0      | 5,9      | 6,3      | 78,7     | 100          |
|                                 | 6250          | 4,8      | 0,0      | 4,8      | 4,4      | 85,9     | 100          |
|                                 | 7500          | 1,7      | 0,0      | 2,6      | 3,0      | 92,7     | 100          |
| 2                               | 124.26        | 69,8     | 0,0      | 15,3     | 8,0      | 6,9      | 100          |
|                                 | 1250          | 46,7     | 0,0      | 14,8     | 11,7     | 26,8     | 100          |
|                                 | 2500          | 26,8     | 0,0      | 12,3     | 12,3     | 48,7     | 100          |
|                                 | 3750          | 17,4     | 0,0      | 7,7      | 9,7      | 65,2     | 100          |
|                                 | 5000          | 8,1      | 0,0      | 5,4      | 5,3      | 81,2     | 100          |
|                                 | 6250          | 4,3      | 0,0      | 4,1      | 2,7      | 88,9     | 100          |
|                                 | 7500          | 1,3      | 0,0      | 2,1      | 2,4      | 94,2     | 100          |
| 3                               | 124.26        | 74,9     | 1,7      | 15,0     | 6,4      | 1,9      | 100          |
|                                 | 1250          | 52,1     | 0,7      | 18,5     | 13,6     | 15,2     | 100          |
|                                 | 2500          | 31,4     | 0,3      | 19,5     | 14,1     | 34,7     | 100          |
|                                 | 3750          | 19,8     | 0,1      | 13,5     | 11,5     | 55,1     | 100          |
|                                 | 5000          | 9,2      | 0,0      | 6,4      | 10,5     | 74,0     | 100          |
|                                 | 6250          | 2,9      | 0,0      | 6,2      | 7,5      | 83,5     | 100          |
|                                 | 7500          | 1,2      | 0,0      | 2,7      | 4,2      | 91,9     | 100          |
| 4                               | 124.26        | 62,2     | 16,8     | 14,4     | 4,0      | 2,6      | 100          |
|                                 | 1250          | 57,0     | 3,8      | 20,5     | 10,2     | 8,5      | 100          |
|                                 | 2500          | 45,8     | 3,0      | 21,3     | 14,3     | 15,6     | 100          |
|                                 | 3750          | 30,6     | 1,8      | 20,8     | 17,0     | 29,9     | 100          |
|                                 | 5000          | 14,7     | 0,3      | 13,2     | 16,6     | 55,3     | 100          |
|                                 | 6250          | 6,2      | 0,0      | 10,8     | 12,8     | 70,2     | 100          |
|                                 | 7500          | 2,7      | 0,0      | 4,0      | 8,6      | 84,6     | 100          |
| 5                               | 124.26        | 47,8     | 44,2     | 5,7      | 1,9      | 0,4      | 100          |
|                                 | 1250          | 60,3     | 20,9     | 13,2     | 3,8      | 1,8      | 100          |
|                                 | 2500          | 63,8     | 12,0     | 14,8     | 5,5      | 3,9      | 100          |
|                                 | 3750          | 58,0     | 4,0      | 17,0     | 8,9      | 12,1     | 100          |
|                                 | 5000          | 39,0     | 0,5      | 19,2     | 11,4     | 29,9     | 100          |
|                                 | 6250          | 26,5     | 0,0      | 14,5     | 13,4     | 45,6     | 100          |
|                                 | 7500          | 14,1     | 0,1      | 11,6     | 13,1     | 61,1     | 100          |
| 6                               | 124.26        | 42,2     | 55,9     | 1,4      | 0,4      | 0,0      | 100          |
|                                 | 1250          | 74,6     | 23,0     | 2,0      | 0,0      | 0,4      | 100          |
|                                 | 2500          | 79,6     | 15,5     | 3,1      | 0,3      | 1,5      | 100          |
|                                 | 3750          | 76,8     | 7,0      | 9,3      | 2,3      | 4,6      | 100          |
|                                 | 5000          | 62,0     | 2,4      | 18,0     | 5,3      | 12,3     | 100          |
|                                 | 6250          | 41,8     | 1,1      | 21,4     | 12,4     | 23,4     | 100          |
|                                 | 7500          | 23,5     | 0,4      | 16,9     | 19,1     | 40,1     | 100          |

(table continued on the next page)

| <b>Frequencies (% - continued) – 00 UTC</b> |               |          |          |          |          |          |              |
|---|---------------|----------|----------|----------|----------|----------|--------------|
| <i>Probability class</i>                    |               | <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> | <i>E</i> | <i>Total</i> |
| <i>Month</i>                                | <i>Height</i> |          |          |          |          |          |              |
| 7   | 124.26        | 78,7     | 21,2     | 0,0      | 0,0      | 0,1      | 100          |
|   | 1250          | 68,1     | 30,1     | 1,5      | 0,3      | 0,1      | 100          |
|   | 2500          | 72,6     | 21,4     | 4,3      | 0,8      | 0,9      | 100          |
|   | 3750          | 75,5     | 11,0     | 7,7      | 1,3      | 4,4      | 100          |
|   | 5000          | 69,0     | 4,3      | 12,0     | 3,6      | 11,2     | 100          |
|   | 6250          | 56,3     | 2,4      | 15,4     | 8,8      | 17,2     | 100          |
|   | 7500          | 40,7     | 0,7      | 16,6     | 11,7     | 30,3     | 100          |
| 8   | 124.26        | 78,8     | 21,0     | 0,0      | 0,0      | 0,1      | 100          |
|   | 1250          | 69,7     | 28,9     | 1,1      | 0,1      | 0,1      | 100          |
|   | 2500          | 76,3     | 19,6     | 3,0      | 0,7      | 0,4      | 100          |
|   | 3750          | 78,5     | 10,8     | 6,0      | 1,8      | 2,9      | 100          |
|   | 5000          | 67,3     | 4,0      | 12,3     | 4,8      | 11,6     | 100          |
|   | 6250          | 50,3     | 1,8      | 18,8     | 7,3      | 21,9     | 100          |
|   | 7500          | 34,4     | 0,8      | 17,0     | 11,1     | 36,7     | 100          |
| 9   | 124.26        | 97,6     | 2,3      | 0,0      | 0,0      | 0,2      | 100          |
|   | 1250          | 90,8     | 7,2      | 1,4      | 0,3      | 0,3      | 100          |
|   | 2500          | 86,7     | 6,4      | 4,9      | 0,8      | 1,1      | 100          |
|   | 3750          | 74,2     | 2,8      | 9,7      | 3,2      | 10,0     | 100          |
|   | 5000          | 54,7     | 1,0      | 16,7     | 6,4      | 21,3     | 100          |
|   | 6250          | 40,7     | 0,7      | 13,6     | 9,0      | 36,0     | 100          |
|   | 7500          | 26,4     | 0,0      | 14,7     | 9,5      | 49,4     | 100          |
| 10  | 124.26        | 99,1     | 0,0      | 0,6      | 0,3      | 0,0      | 100          |
|   | 1250          | 91,3     | 1,0      | 4,8      | 1,5      | 1,4      | 100          |
|   | 2500          | 79,4     | 2,1      | 9,3      | 3,6      | 5,7      | 100          |
|   | 3750          | 58,0     | 1,8      | 15,1     | 9,3      | 15,9     | 100          |
|   | 5000          | 38,0     | 0,7      | 14,0     | 11,3     | 36,0     | 100          |
|   | 6250          | 26,5     | 0,3      | 11,5     | 10,6     | 51,1     | 100          |
|   | 7500          | 18,8     | 0,0      | 8,7      | 7,7      | 64,8     | 100          |
| 11  | 124.26        | 92,4     | 0,0      | 5,2      | 1,4      | 0,9      | 100          |
|   | 1250          | 77,2     | 0,1      | 12,1     | 5,8      | 4,7      | 100          |
|   | 2500          | 54,6     | 0,3      | 16,2     | 11,8     | 17,1     | 100          |
|   | 3750          | 37,4     | 0,3      | 17,1     | 12,1     | 33,1     | 100          |
|   | 5000          | 20,5     | 0,1      | 12,5     | 12,7     | 54,2     | 100          |
|   | 6250          | 12,2     | 0,0      | 9,8      | 7,7      | 70,3     | 100          |
|   | 7500          | 6,1      | 0,0      | 6,1      | 7,4      | 80,4     | 100          |
| 12  | 124.26        | 80,8     | 0,0      | 8,3      | 4,4      | 6,6      | 100          |
|   | 1250          | 62,2     | 0,0      | 14,4     | 10,3     | 13,1     | 100          |
|   | 2500          | 41,2     | 0,0      | 14,8     | 12,8     | 31,1     | 100          |
|   | 3750          | 25,1     | 0,0      | 11,5     | 11,7     | 51,7     | 100          |
|   | 5000          | 12,3     | 0,0      | 9,5      | 5,4      | 72,8     | 100          |
|   | 6250          | 6,4      | 0,0      | 6,4      | 5,3      | 81,8     | 100          |
|   | 7500          | 3,2      | 0,0      | 3,2      | 4,9      | 88,7     | 100          |

| <b>Frequencies (% - continued) – 12 UTC</b> |               |          |          |          |          |          |              |
|---|---------------|----------|----------|----------|----------|----------|--------------|
| <i>Probability class</i>                    |               | <i>A</i> | <i>B</i> | <i>C</i> | <i>D</i> | <i>E</i> | <i>Total</i> |
| <i>Month</i>                                | <i>Height</i> |          |          |          |          |          |              |
| 7   | 124.26        | 20,6     | 75,9     | 3,4      | 0,1      | 0,0      | 100          |
|   | 1250          | 62,1     | 36,7     | 0,7      | 0,3      | 0,3      | 100          |
|   | 2500          | 76,8     | 20,8     | 1,7      | 0,5      | 0,1      | 100          |
|   | 3750          | 78,5     | 10,3     | 6,3      | 2,1      | 2,8      | 100          |
|   | 5000          | 72,1     | 3,6      | 10,9     | 3,5      | 9,9      | 100          |
|   | 6250          | 55,1     | 2,4      | 16,8     | 5,9      | 19,8     | 100          |
|   | 7500          | 37,7     | 1,2      | 16,6     | 13,1     | 31,5     | 100          |
| 8   | 124.26        | 20,8     | 76,7     | 2,3      | 0,1      | 0,0      | 100          |
|   | 1250          | 62,3     | 36,8     | 0,5      | 0,1      | 0,3      | 100          |
|   | 2500          | 78,2     | 20,1     | 1,2      | 0,3      | 0,3      | 100          |
|   | 3750          | 80,7     | 9,0      | 6,6      | 0,9      | 2,7      | 100          |
|   | 5000          | 68,9     | 4,3      | 13,0     | 3,8      | 9,9      | 100          |
|   | 6250          | 50,6     | 2,0      | 18,3     | 7,6      | 21,4     | 100          |
|   | 7500          | 32,4     | 0,7      | 18,2     | 11,9     | 36,8     | 100          |
| 9   | 124.26        | 63,2     | 36,7     | 0,0      | 0,0      | 0,2      | 100          |
|   | 1250          | 90,1     | 8,2      | 1,7      | 0,0      | 0,0      | 100          |
|   | 2500          | 88,4     | 5,8      | 3,5      | 0,8      | 1,4      | 100          |
|   | 3750          | 77,2     | 4,1      | 8,7      | 1,8      | 8,2      | 100          |
|   | 5000          | 54,2     | 2,1      | 15,7     | 7,9      | 20,2     | 100          |
|   | 6250          | 35,8     | 0,7      | 17,8     | 11,3     | 34,4     | 100          |
|   | 7500          | 22,6     | 0,3      | 14,7     | 12,4     | 50,1     | 100          |
| 10  | 124.26        | 94,4     | 3,8      | 1,7      | 0,2      | 0,0      | 100          |
|   | 1250          | 89,4     | 1,8      | 5,6      | 2,2      | 1,1      | 100          |
|   | 2500          | 75,8     | 2,7      | 11,6     | 4,5      | 5,4      | 100          |
|   | 3750          | 57,3     | 2,3      | 13,3     | 9,7      | 17,4     | 100          |
|   | 5000          | 36,6     | 0,4      | 15,5     | 10,1     | 37,4     | 100          |
|   | 6250          | 23,1     | 0,0      | 15,0     | 9,0      | 52,9     | 100          |
|   | 7500          | 13,6     | 0,1      | 10,2     | 8,2      | 67,9     | 100          |
| 11  | 124.26        | 92,6     | 0,2      | 5,0      | 2,2      | 0,0      | 100          |
|   | 1250          | 77,3     | 0,0      | 10,9     | 7,3      | 4,5      | 100          |
|   | 2500          | 55,5     | 0,3      | 16,7     | 9,5      | 18,1     | 100          |
|   | 3750          | 37,0     | 0,6      | 17,4     | 11,9     | 33,2     | 100          |
|   | 5000          | 18,8     | 0,0      | 12,3     | 10,8     | 58,1     | 100          |
|   | 6250          | 11,3     | 0,0      | 8,5      | 8,5      | 71,6     | 100          |
|   | 7500          | 5,2      | 0,0      | 6,2      | 6,4      | 82,2     | 100          |
| 12  | 124.26        | 85,4     | 0,0      | 7,6      | 4,0      | 3,0      | 100          |
|   | 1250          | 63,1     | 0,0      | 14,4     | 9,9      | 12,5     | 100          |
|   | 2500          | 39,2     | 0,0      | 17,3     | 12,1     | 31,4     | 100          |
|   | 3750          | 25,3     | 0,0      | 11,3     | 13,3     | 50,1     | 100          |
|   | 5000          | 10,3     | 0,0      | 8,5      | 8,9      | 72,2     | 100          |
|   | 6250          | 6,1      | 0,0      | 5,6      | 5,5      | 82,8     | 100          |
|   | 7500          | 3,3      | 0,0      | 3,2      | 3,3      | 90,2     | 100          |



## Appendix B

Summary statistics (max., min., mean, median and std. var.) of monthly values (all in %) for each of the five probability classes and class A, B & C summarized. Tables to the left are based on nightly values (00 UTC) and tables on the right on daily values (12 UTC). For explanation of probability classes and methods see the section “Methods” in the report.

| <b>Class A - 00 UTC</b> |            |            |               |             |             |  |
|-------------------------|------------|------------|---------------|-------------|-------------|--|
| <i>height</i>           | <i>max</i> | <i>min</i> | <i>median</i> | <i>mean</i> | <i>stdv</i> |  |
| 124.26                  | 99         | 68         | 87            | 86          | 11          |  |
| 1250                    | 91         | 47         | 68            | 68          | 14          |  |
| 2500                    | 87         | 28         | 58            | 57          | 21          |  |
| 3750                    | 78         | 17         | 47            | 47          | 24          |  |
| 5000                    | 69         | 9          | 29            | 34          | 24          |  |
| 6250                    | 56         | 4          | 19            | 24          | 19          |  |
| 7500                    | 41         | 1          | 11            | 15          | 14          |  |

| <b>Class A - 12 UTC</b> |            |            |               |             |             |  |
|-------------------------|------------|------------|---------------|-------------|-------------|--|
| <i>height</i>           | <i>max</i> | <i>min</i> | <i>median</i> | <i>mean</i> | <i>stdv</i> |  |
| 124.26                  | 94         | 21         | 67            | 62          | 25          |  |
| 1250                    | 90         | 47         | 62            | 66          | 14          |  |
| 2500                    | 88         | 27         | 60            | 58          | 22          |  |
| 3750                    | 81         | 17         | 47            | 48          | 26          |  |
| 5000                    | 72         | 8          | 28            | 34          | 25          |  |
| 6250                    | 55         | 3          | 17            | 22          | 19          |  |
| 7500                    | 38         | 1          | 9             | 13          | 13          |  |

| <b>Class B - 00 UTC</b> |            |            |               |             |             |  |
|-------------------------|------------|------------|---------------|-------------|-------------|--|
| <i>height</i>           | <i>max</i> | <i>min</i> | <i>median</i> | <i>mean</i> | <i>stdv</i> |  |
| 124.26                  | 21         | 0          | 0             | 4           | 8           |  |
| 1250                    | 30         | 0          | 2             | 8           | 11          |  |
| 2500                    | 21         | 0          | 2             | 6           | 8           |  |
| 3750                    | 11         | 0          | 2             | 3           | 4           |  |
| 5000                    | 4          | 0          | 0             | 1           | 2           |  |
| 6250                    | 2          | 0          | 0             | 1           | 1           |  |
| 7500                    | 1          | 0          | 0             | 0           | 0           |  |

| <b>Class B - 12 UTC</b> |            |            |               |             |             |  |
|-------------------------|------------|------------|---------------|-------------|-------------|--|
| <i>height</i>           | <i>max</i> | <i>min</i> | <i>median</i> | <i>mean</i> | <i>stdv</i> |  |
| 124.26                  | 77         | 0          | 10            | 26          | 31          |  |
| 1250                    | 37         | 0          | 3             | 11          | 14          |  |
| 2500                    | 21         | 0          | 3             | 7           | 8           |  |
| 3750                    | 10         | 0          | 2             | 3           | 4           |  |
| 5000                    | 4          | 0          | 0             | 1           | 2           |  |
| 6250                    | 2          | 0          | 0             | 1           | 1           |  |
| 7500                    | 1          | 0          | 0             | 0           | 0           |  |

| <b>Class C - 00 UTC</b> |            |            |               |             |             |  |
|-------------------------|------------|------------|---------------|-------------|-------------|--|
| <i>height</i>           | <i>max</i> | <i>min</i> | <i>median</i> | <i>mean</i> | <i>stdv</i> |  |
| 124.26                  | 12         | 0          | 3             | 5           | 5           |  |
| 1250                    | 20         | 1          | 12            | 10          | 7           |  |
| 2500                    | 20         | 3          | 14            | 12          | 6           |  |
| 3750                    | 21         | 6          | 12            | 13          | 5           |  |
| 5000                    | 21         | 3          | 11            | 11          | 6           |  |
| 6250                    | 18         | 3          | 10            | 10          | 5           |  |
| 7500                    | 17         | 3          | 7             | 9           | 6           |  |

| <b>Class C - 12 UTC</b> |            |            |               |             |             |  |
|-------------------------|------------|------------|---------------|-------------|-------------|--|
| <i>height</i>           | <i>max</i> | <i>min</i> | <i>median</i> | <i>mean</i> | <i>stdv</i> |  |
| 124.26                  | 15         | 0          | 5             | 7           | 6           |  |
| 1250                    | 20         | 1          | 11            | 9           | 7           |  |
| 2500                    | 21         | 1          | 13            | 11          | 7           |  |
| 3750                    | 21         | 6          | 11            | 12          | 5           |  |
| 5000                    | 19         | 5          | 13            | 12          | 5           |  |
| 6250                    | 21         | 4          | 13            | 12          | 6           |  |
| 7500                    | 18         | 2          | 8             | 9           | 6           |  |

| <b>Class D - 00 UTC</b> |            |            |               |             |             |  |
|-------------------------|------------|------------|---------------|-------------|-------------|--|
| <i>height</i>           | <i>max</i> | <i>min</i> | <i>median</i> | <i>mean</i> | <i>stdv</i> |  |
| 124.26                  | 8          | 0          | 1             | 2           | 3           |  |
| 1250                    | 16         | 0          | 5             | 6           | 5           |  |
| 2500                    | 15         | 1          | 8             | 7           | 6           |  |
| 3750                    | 13         | 1          | 10            | 8           | 5           |  |
| 5000                    | 13         | 4          | 7             | 8           | 3           |  |
| 6250                    | 14         | 3          | 8             | 8           | 3           |  |
| 7500                    | 12         | 2          | 8             | 8           | 4           |  |

| <b>Class D - 12 UTC</b> |            |            |               |             |             |  |
|-------------------------|------------|------------|---------------|-------------|-------------|--|
| <i>height</i>           | <i>max</i> | <i>min</i> | <i>median</i> | <i>mean</i> | <i>stdv</i> |  |
| 124.26                  | 8          | 0          | 2             | 3           | 3           |  |
| 1250                    | 14         | 0          | 6             | 6           | 5           |  |
| 2500                    | 14         | 0          | 8             | 7           | 6           |  |
| 3750                    | 17         | 1          | 10            | 8           | 5           |  |
| 5000                    | 17         | 3          | 8             | 8           | 4           |  |
| 6250                    | 13         | 3          | 8             | 8           | 3           |  |
| 7500                    | 19         | 2          | 8             | 9           | 5           |  |

| <b>Class E - 00 UTC</b> |            |            |               |             |             |  |
|-------------------------|------------|------------|---------------|-------------|-------------|--|
| <i>height</i>           | <i>max</i> | <i>min</i> | <i>median</i> | <i>mean</i> | <i>stdv</i> |  |
| 124.26                  | 12         | 0          | 0             | 3           | 5           |  |
| 1250                    | 27         | 0          | 4             | 8           | 10          |  |
| 2500                    | 47         | 0          | 11            | 17          | 17          |  |
| 3750                    | 63         | 3          | 24            | 28          | 23          |  |
| 5000                    | 81         | 11         | 45            | 45          | 27          |  |
| 6250                    | 88         | 17         | 61            | 57          | 27          |  |
| 7500                    | 93         | 30         | 73            | 68          | 23          |  |

| <b>Class E - 12 UTC</b> |            |            |               |             |             |  |
|-------------------------|------------|------------|---------------|-------------|-------------|--|
| <i>height</i>           | <i>max</i> | <i>min</i> | <i>median</i> | <i>mean</i> | <i>stdv</i> |  |
| 124.26                  | 7          | 0          | 0             | 2           | 3           |  |
| 1250                    | 27         | 0          | 3             | 8           | 10          |  |
| 2500                    | 49         | 0          | 11            | 17          | 18          |  |
| 3750                    | 65         | 3          | 24            | 28          | 24          |  |
| 5000                    | 81         | 10         | 46            | 45          | 28          |  |
| 6250                    | 89         | 20         | 62            | 57          | 27          |  |
| 7500                    | 94         | 32         | 75            | 69          | 24          |  |

| <b>Class A+B+C - 00 UTC</b> |            |            |               |             |             |
|-----------------------------|------------|------------|---------------|-------------|-------------|
| <i>height</i>               | <i>max</i> | <i>min</i> | <i>median</i> | <i>mean</i> | <i>stdv</i> |
| 124.26                      | 100        | 80         | 99            | 95          | 7           |
| 1250                        | 100        | 61         | 92            | 86          | 14          |
| 2500                        | 99         | 42         | 80            | 76          | 22          |
| 3750                        | 95         | 26         | 65            | 64          | 26          |
| 5000                        | 85         | 15         | 43            | 48          | 28          |
| 6250                        | 74         | 9          | 30            | 36          | 25          |
| 7500                        | 58         | 4          | 20            | 24          | 20          |

| <b>Class A+B+C - 12 UTC</b> |            |            |               |             |             |
|-----------------------------|------------|------------|---------------|-------------|-------------|
| <i>height</i>               | <i>max</i> | <i>min</i> | <i>median</i> | <i>mean</i> | <i>stdv</i> |
| 124.26                      | 100        | 85         | 98            | 95          | 6           |
| 1250                        | 100        | 62         | 91            | 86          | 14          |
| 2500                        | 99         | 39         | 81            | 76          | 23          |
| 3750                        | 96         | 25         | 64            | 63          | 28          |
| 5000                        | 87         | 14         | 42            | 47          | 30          |
| 6250                        | 74         | 8          | 29            | 35          | 26          |
| 7500                        | 55         | 3          | 18            | 23          | 19          |



## Appendix C

Summary statistics (05, 25, 50, 75, 95 & 99 percentiles) of temperature, dew point temperature and dew point depression for nightly (00 UTC) and daily values (12 UTC).

| Temperature 00 UTC |        |       |       |        |      |      |      |         |
|--------------------|--------|-------|-------|--------|------|------|------|---------|
| Month              | Height | P 05  | P 25  | Median | P 75 | P 95 | P 99 | Valid N |
| 1                  | 124.26 | -9,0  | -2,3  | 0,8    | 3,2  | 6,3  | 8,0  | N=705   |
|                    | 1250   | -8,5  | -3,5  | -0,3   | 2,5  | 5,3  | 7,4  | N=753   |
|                    | 2500   | -10,3 | -5,2  | -1,7   | 1,1  | 5,3  | 8,2  | N=753   |
|                    | 3750   | -11,9 | -6,5  | -3,2   | 0,1  | 5,0  | 7,5  | N=753   |
|                    | 5000   | -13,9 | -8,7  | -5,3   | -1,8 | 3,8  | 5,8  | N=753   |
|                    | 6250   | -16,2 | -10,6 | -7,0   | -3,3 | 1,8  | 3,9  | N=753   |
|                    | 7500   | -19,0 | -12,9 | -8,9   | -5,1 | -0,5 | 2,6  | N=753   |
| 2                  | 124.26 | -7,1  | -2,7  | -0,1   | 3,0  | 6,5  | 9,0  | N=654   |
|                    | 1250   | -8,4  | -4,1  | -1,0   | 1,8  | 5,7  | 8,6  | N=694   |
|                    | 2500   | -10,6 | -5,9  | -2,5   | 0,2  | 5,8  | 8,3  | N=694   |
|                    | 3750   | -11,9 | -7,2  | -3,8   | -0,2 | 4,8  | 7,7  | N=694   |
|                    | 5000   | -14,3 | -9,5  | -6,0   | -2,2 | 3,2  | 6,4  | N=694   |
|                    | 6250   | -16,1 | -11,5 | -7,8   | -3,7 | 1,4  | 4,9  | N=694   |
|                    | 7500   | -18,6 | -13,8 | -10,0  | -5,6 | -0,6 | 1,8  | N=694   |
| 3                  | 124.26 | -3,3  | -0,5  | 1,6    | 3,8  | 7,2  | 9,0  | N=721   |
|                    | 1250   | -5,0  | -2,1  | 0,8    | 3,4  | 7,0  | 9,8  | N=761   |
|                    | 2500   | -7,6  | -4,4  | -1,6   | 1,7  | 6,3  | 9,7  | N=761   |
|                    | 3750   | -9,5  | -5,9  | -3,0   | 0,3  | 5,1  | 8,1  | N=761   |
|                    | 5000   | -12,2 | -8,6  | -5,3   | -1,8 | 2,9  | 6,9  | N=761   |
|                    | 6250   | -14,8 | -10,3 | -6,9   | -3,6 | 0,9  | 5,0  | N=761   |
|                    | 7500   | -17,1 | -12,6 | -9,2   | -5,4 | -1,1 | 1,9  | N=761   |
| 4                  | 124.26 | 0,0   | 3,0   | 4,6    | 7,0  | 10,4 | 13,2 | N=683   |
|                    | 1250   | -1,2  | 1,7   | 4,1    | 7,1  | 12,3 | 18,5 | N=733   |
|                    | 2500   | -4,5  | -1,0  | 2,0    | 5,3  | 10,4 | 17,2 | N=733   |
|                    | 3750   | -6,8  | -2,9  | 0,3    | 3,6  | 9,1  | 14,1 | N=733   |
|                    | 5000   | -10,2 | -5,9  | -2,5   | 1,0  | 5,9  | 8,9  | N=733   |
|                    | 6250   | -12,9 | -7,9  | -4,3   | -0,8 | 3,6  | 6,3  | N=733   |
|                    | 7500   | -15,7 | -10,2 | -6,5   | -3,0 | 1,1  | 3,8  | N=733   |
| 5                  | 124.26 | 4,5   | 7,0   | 9,4    | 11,4 | 13,8 | 15,6 | N=725   |
|                    | 1250   | 3,0   | 6,2   | 9,0    | 11,9 | 16,0 | 18,5 | N=766   |
|                    | 2500   | 0,1   | 3,6   | 6,9    | 10,4 | 15,1 | 17,2 | N=766   |
|                    | 3750   | -1,8  | 1,8   | 4,7    | 8,5  | 12,6 | 14,2 | N=766   |
|                    | 5000   | -5,2  | -1,2  | 2,2    | 5,4  | 9,3  | 10,9 | N=766   |
|                    | 6250   | -7,2  | -3,0  | 0,1    | 3,6  | 7,2  | 8,7  | N=766   |
|                    | 7500   | -10,0 | -5,1  | -2,2   | 1,1  | 4,4  | 6,6  | N=766   |
| 6                  | 124.26 | 8,2   | 10,8  | 12,2   | 14,2 | 17,0 | 18,6 | N=698   |
|                    | 1250   | 7,0   | 9,3   | 11,3   | 14,0 | 18,6 | 21,1 | N=740   |
|                    | 2500   | 3,5   | 6,3   | 8,8    | 12,1 | 16,9 | 20,1 | N=740   |
|                    | 3750   | 1,9   | 4,5   | 7,0    | 10,0 | 14,4 | 17,0 | N=740   |
|                    | 5000   | -1,0  | 1,6   | 4,2    | 7,2  | 11,3 | 14,1 | N=740   |
|                    | 6250   | -3,3  | -0,5  | 2,3    | 5,4  | 9,5  | 12,3 | N=740   |
|                    | 7500   | -5,8  | -2,8  | -0,1   | 3,3  | 7,2  | 9,9  | N=740   |

(table continued on the next page)

| <b>Temperature 00 UTC (continued)</b> |               |             |             |               |             |             |             |                |
|---------------------------------------|---------------|-------------|-------------|---------------|-------------|-------------|-------------|----------------|
| <i>Month</i>                          | <i>Height</i> | <i>P 05</i> | <i>P 25</i> | <i>Median</i> | <i>P 75</i> | <i>P 95</i> | <i>P 99</i> | <i>Valid N</i> |
| 7                                     | 124.26        | 11,0        | 13,0        | 14,6          | 16,2        | 19,2        | 21,4        | N=702          |
|                                       | 1250          | 9,4         | 11,6        | 13,7          | 16,5        | 20,3        | 23,2        | N=752          |
|                                       | 2500          | 6,3         | 9,0         | 11,6          | 14,8        | 18,9        | 21,6        | N=752          |
|                                       | 3750          | 4,4         | 7,1         | 9,5           | 12,4        | 16,7        | 18,5        | N=752          |
|                                       | 5000          | 1,5         | 4,1         | 6,4           | 9,3         | 13,2        | 15,0        | N=752          |
|                                       | 6250          | -0,9        | 2,2         | 4,5           | 7,6         | 11,4        | 13,1        | N=752          |
|                                       | 7500          | -3,3        | 0,0         | 2,3           | 5,4         | 8,8         | 10,7        | N=752          |
| 8                                     | 124.26        | 10,6        | 12,6        | 14,5          | 16,4        | 18,6        | 20,0        | N=690          |
|                                       | 1250          | 9,7         | 11,7        | 13,9          | 16,7        | 20,5        | 22,5        | N=730          |
|                                       | 2500          | 6,6         | 8,8         | 11,4          | 15,0        | 18,9        | 21,0        | N=730          |
|                                       | 3750          | 4,6         | 6,7         | 9,5           | 12,6        | 15,9        | 18,7        | N=730          |
|                                       | 5000          | 1,2         | 3,9         | 6,6           | 9,6         | 12,6        | 15,0        | N=730          |
|                                       | 6250          | -0,9        | 2,2         | 4,9           | 7,7         | 11,0        | 13,1        | N=730          |
|                                       | 7500          | -3,4        | -0,1        | 2,7           | 5,5         | 8,6         | 9,9         | N=730          |
| 9                                     | 124.26        | 7,4         | 10,0        | 11,6          | 13,2        | 15,6        | 17,6        | N=663          |
|                                       | 1250          | 6,5         | 9,0         | 10,6          | 12,4        | 16,4        | 18,5        | N=708          |
|                                       | 2500          | 3,5         | 6,1         | 8,1           | 10,2        | 14,9        | 16,9        | N=708          |
|                                       | 3750          | 1,3         | 4,1         | 6,2           | 8,5         | 13,0        | 15,8        | N=708          |
|                                       | 5000          | -1,6        | 1,2         | 3,5           | 6,4         | 10,6        | 12,6        | N=708          |
|                                       | 6250          | -3,4        | -0,5        | 2,1           | 4,9         | 9,3         | 11,5        | N=708          |
|                                       | 7500          | -6,0        | -2,6        | 0,1           | 3,0         | 6,7         | 9,4         | N=708          |
| 10                                    | 124.26        | 2,2         | 5,8         | 8,6           | 10,7        | 13,1        | 14,7        | N=649          |
|                                       | 1250          | 1,8         | 5,0         | 7,3           | 9,6         | 12,8        | 16,3        | N=724          |
|                                       | 2500          | -1,1        | 2,6         | 5,0           | 7,8         | 12,5        | 16,1        | N=724          |
|                                       | 3750          | -3,1        | 0,7         | 3,3           | 6,8         | 10,9        | 14,7        | N=724          |
|                                       | 5000          | -6,0        | -2,0        | 1,0           | 4,8         | 9,0         | 12,7        | N=724          |
|                                       | 6250          | -8,1        | -4,0        | -0,5          | 3,2         | 7,5         | 10,3        | N=724          |
|                                       | 7500          | -10,7       | -6,1        | -2,4          | 1,4         | 5,0         | 7,6         | N=724          |
| 11                                    | 124.26        | -1,7        | 2,0         | 4,4           | 6,8         | 9,1         | 10,8        | N=632          |
|                                       | 1250          | -3,0        | 0,6         | 3,2           | 5,3         | 8,0         | 10,2        | N=703          |
|                                       | 2500          | -5,7        | -1,8        | 0,9           | 3,7         | 7,4         | 10,8        | N=703          |
|                                       | 3750          | -7,5        | -3,4        | -0,5          | 2,7         | 7,3         | 10,1        | N=703          |
|                                       | 5000          | -10,3       | -5,7        | -2,9          | 0,8         | 5,8         | 8,8         | N=703          |
|                                       | 6250          | -12,5       | -7,6        | -4,3          | -0,7        | 4,1         | 6,7         | N=703          |
|                                       | 7500          | -14,2       | -9,6        | -6,4          | -2,3        | 1,8         | 4,7         | N=703          |
| 12                                    | 124.26        | -5,7        | -0,7        | 1,6           | 4,2         | 7,4         | 9,3         | N=641          |
|                                       | 1250          | -5,9        | -2,2        | 0,3           | 2,8         | 6,3         | 8,2         | N=716          |
|                                       | 2500          | -8,2        | -4,0        | -1,3          | 1,6         | 5,7         | 8,4         | N=716          |
|                                       | 3750          | -9,8        | -5,6        | -2,8          | 0,6         | 5,3         | 8,4         | N=716          |
|                                       | 5000          | -12,9       | -8,1        | -4,8          | -1,4        | 3,9         | 6,8         | N=716          |
|                                       | 6250          | -15,2       | -9,9        | -6,4          | -2,8        | 2,6         | 4,9         | N=716          |
|                                       | 7500          | -17,5       | -12,2       | -8,3          | -4,4        | 0,5         | 2,7         | N=716          |

| <b>Temperature 12 UTC</b> |               |             |             |               |             |             |             |                |
|---------------------------|---------------|-------------|-------------|---------------|-------------|-------------|-------------|----------------|
| <i>Month</i>              | <i>Height</i> | <i>P 05</i> | <i>P 25</i> | <i>Median</i> | <i>P 75</i> | <i>P 95</i> | <i>P 99</i> | <i>Valid N</i> |
| 1                         | 124.26        | -5,5        | -1,1        | 1,6           | 4,2         | 7,0         | 8,9         | N=727          |
|                           | 1250          | -8,0        | -3,4        | -0,1          | 2,4         | 5,4         | 7,6         | N=767          |
|                           | 2500          | -10,1       | -4,9        | -1,9          | 0,8         | 5,6         | 9,1         | N=767          |
|                           | 3750          | -11,4       | -6,4        | -3,3          | -0,1        | 5,5         | 7,5         | N=767          |
|                           | 5000          | -13,9       | -8,8        | -5,6          | -1,7        | 3,8         | 6,2         | N=767          |
|                           | 6250          | -15,8       | -10,8       | -7,2          | -3,2        | 2,3         | 4,4         | N=767          |
|                           | 7500          | -18,3       | -13,3       | -9,2          | -5,2        | 0,0         | 3,0         | N=767          |
| 2                         | 124.26        | -5,1        | -1,1        | 1,4           | 4,2         | 8,2         | 10,8        | N=666          |
|                           | 1250          | -8,4        | -4,0        | -0,9          | 2,4         | 6,0         | 8,6         | N=702          |
|                           | 2500          | -10,6       | -6,1        | -2,4          | 0,8         | 5,8         | 9,1         | N=702          |
|                           | 3750          | -12,3       | -7,2        | -3,7          | -0,1        | 5,3         | 8,5         | N=702          |
|                           | 5000          | -13,8       | -9,7        | -5,9          | -1,8        | 3,8         | 6,7         | N=702          |
|                           | 6250          | -16,0       | -11,4       | -7,7          | -3,0        | 2,2         | 5,2         | N=702          |
|                           | 7500          | -18,4       | -13,7       | -9,8          | -5,1        | 0,3         | 3,3         | N=702          |
| 3                         | 124.26        | -0,9        | 1,8         | 4,2           | 6,6         | 10,8        | 13,8        | N=718          |
|                           | 1250          | -4,8        | -1,8        | 1,0           | 3,6         | 7,4         | 10,1        | N=764          |
|                           | 2500          | -7,6        | -4,3        | -1,6          | 1,6         | 6,1         | 10,0        | N=764          |
|                           | 3750          | -9,5        | -6,0        | -3,0          | 0,4         | 4,9         | 7,9         | N=764          |
|                           | 5000          | -12,4       | -8,4        | -5,1          | -1,5        | 3,2         | 6,8         | N=764          |
|                           | 6250          | -14,6       | -10,3       | -6,8          | -3,1        | 1,6         | 4,8         | N=764          |
|                           | 7500          | -16,8       | -12,5       | -9,0          | -5,3        | -0,7        | 2,6         | N=764          |
| 4                         | 124.26        | 2,8         | 6,2         | 9,0           | 12,0        | 16,9        | 22,4        | N=696          |
|                           | 1250          | -1,1        | 2,4         | 4,6           | 7,8         | 12,5        | 18,9        | N=742          |
|                           | 2500          | -4,8        | -0,9        | 1,9           | 5,5         | 10,5        | 16,2        | N=742          |
|                           | 3750          | -7,1        | -3,0        | -0,1          | 3,5         | 8,4         | 13,0        | N=742          |
|                           | 5000          | -10,7       | -6,0        | -2,4          | 0,7         | 5,9         | 8,9         | N=742          |
|                           | 6250          | -13,0       | -7,9        | -4,3          | -1,1        | 4,2         | 6,2         | N=742          |
|                           | 7500          | -15,6       | -10,4       | -6,5          | -3,1        | 1,9         | 4,2         | N=742          |
| 5                         | 124.26        | 7,8         | 11,8        | 14,6          | 17,8        | 22,0        | 24,0        | N=722          |
|                           | 1250          | 4,2         | 7,3         | 9,7           | 12,8        | 16,7        | 19,0        | N=766          |
|                           | 2500          | 0,4         | 3,9         | 7,0           | 10,3        | 14,7        | 17,6        | N=766          |
|                           | 3750          | -1,9        | 1,5         | 4,7           | 8,0         | 12,1        | 14,3        | N=766          |
|                           | 5000          | -5,3        | -1,4        | 2,0           | 5,3         | 8,7         | 10,8        | N=766          |
|                           | 6250          | -7,4        | -3,2        | 0,3           | 3,5         | 6,6         | 8,8         | N=766          |
|                           | 7500          | -10,1       | -5,3        | -1,9          | 1,3         | 4,4         | 6,7         | N=766          |
| 6                         | 124.26        | 11,6        | 14,4        | 17,0          | 19,8        | 24,6        | 27,4        | N=699          |
|                           | 1250          | 8,0         | 10,2        | 12,4          | 15,0        | 19,4        | 23,2        | N=740          |
|                           | 2500          | 3,9         | 6,7         | 9,2           | 12,3        | 16,8        | 20,6        | N=740          |
|                           | 3750          | 1,9         | 4,5         | 6,8           | 9,8         | 14,1        | 17,1        | N=740          |
|                           | 5000          | -1,5        | 1,5         | 3,9           | 6,8         | 10,7        | 13,8        | N=740          |
|                           | 6250          | -3,5        | -0,7        | 2,3           | 5,1         | 9,0         | 12,1        | N=740          |
|                           | 7500          | -5,8        | -2,9        | 0,2           | 2,7         | 6,8         | 9,7         | N=740          |

(table continued on the next page)

| <b>Temperature 12 UTC (continued)</b> |               |             |             |               |             |             |             |                |
|---------------------------------------|---------------|-------------|-------------|---------------|-------------|-------------|-------------|----------------|
| <i>Month</i>                          | <i>Height</i> | <i>P 05</i> | <i>P 25</i> | <i>Median</i> | <i>P 75</i> | <i>P 95</i> | <i>P 99</i> | <i>Valid N</i> |
| 7                                     | 124.26        | 14,2        | 17,0        | 19,4          | 22,2        | 26,4        | 28,4        | N=700          |
|                                       | 1250          | 10,4        | 12,7        | 14,8          | 17,2        | 21,6        | 23,7        | N=749          |
|                                       | 2500          | 6,3         | 9,2         | 11,5          | 14,7        | 18,9        | 21,7        | N=749          |
|                                       | 3750          | 4,3         | 7,0         | 9,1           | 11,8        | 16,3        | 18,3        | N=749          |
|                                       | 5000          | 1,2         | 4,0         | 6,4           | 9,1         | 13,0        | 15,2        | N=749          |
|                                       | 6250          | -0,7        | 2,1         | 4,5           | 7,4         | 11,0        | 13,1        | N=749          |
|                                       | 7500          | -3,1        | -0,2        | 2,3           | 5,1         | 9,0         | 12,5        | N=749          |
| 8                                     | 124.26        | 14,6        | 16,8        | 19,0          | 21,6        | 25,8        | 28,0        | N=692          |
|                                       | 1250          | 10,9        | 12,7        | 14,7          | 17,6        | 21,3        | 24,1        | N=737          |
|                                       | 2500          | 6,6         | 9,2         | 11,6          | 14,9        | 18,9        | 22,0        | N=737          |
|                                       | 3750          | 4,5         | 6,8         | 9,0           | 12,2        | 15,5        | 19,6        | N=737          |
|                                       | 5000          | 1,0         | 3,6         | 6,5           | 9,4         | 12,4        | 15,5        | N=737          |
|                                       | 6250          | -1,2        | 1,9         | 4,8           | 7,7         | 10,7        | 13,0        | N=737          |
|                                       | 7500          | -3,6        | -0,3        | 2,5           | 5,3         | 8,6         | 10,7        | N=737          |
| 9                                     | 124.26        | 11,2        | 13,6        | 15,2          | 17,2        | 20,6        | 22,8        | N=663          |
|                                       | 1250          | 7,5         | 9,9         | 11,4          | 13,2        | 16,7        | 19,1        | N=709          |
|                                       | 2500          | 4,0         | 6,5         | 8,2           | 10,4        | 15,1        | 17,7        | N=709          |
|                                       | 3750          | 1,5         | 4,1         | 6,1           | 8,5         | 13,1        | 15,8        | N=709          |
|                                       | 5000          | -1,6        | 1,3         | 3,5           | 6,5         | 11,1        | 13,1        | N=709          |
|                                       | 6250          | -3,6        | -0,5        | 2,1           | 5,0         | 9,5         | 11,2        | N=709          |
|                                       | 7500          | -5,8        | -2,7        | 0,2           | 3,1         | 7,2         | 9,5         | N=709          |
| 10                                    | 124.26        | 5,4         | 8,8         | 10,8          | 12,8        | 16,0        | 18,8        | N=658          |
|                                       | 1250          | 1,6         | 5,4         | 7,8           | 9,9         | 13,0        | 16,1        | N=735          |
|                                       | 2500          | -1,3        | 2,3         | 4,9           | 7,7         | 12,7        | 16,8        | N=735          |
|                                       | 3750          | -3,2        | 0,5         | 3,2           | 6,2         | 11,4        | 15,2        | N=735          |
|                                       | 5000          | -6,6        | -2,1        | 1,1           | 4,8         | 9,5         | 12,5        | N=735          |
|                                       | 6250          | -8,5        | -3,8        | -0,4          | 3,3         | 8,0         | 10,4        | N=735          |
|                                       | 7500          | -10,6       | -6,0        | -2,2          | 1,6         | 5,5         | 8,2         | N=735          |
| 11                                    | 124.26        | 0,4         | 3,6         | 6,0           | 8,0         | 10,4        | 11,7        | N=639          |
|                                       | 1250          | -2,7        | 0,7         | 3,4           | 5,5         | 8,0         | 10,0        | N=714          |
|                                       | 2500          | -5,7        | -1,9        | 0,9           | 3,8         | 7,5         | 10,2        | N=714          |
|                                       | 3750          | -7,3        | -3,4        | -0,4          | 2,5         | 6,9         | 9,8         | N=714          |
|                                       | 5000          | -10,3       | -5,6        | -2,5          | 0,6         | 5,3         | 7,6         | N=714          |
|                                       | 6250          | -12,3       | -7,2        | -4,2          | -0,8        | 3,7         | 6,6         | N=714          |
|                                       | 7500          | -14,5       | -9,7        | -6,1          | -2,5        | 1,9         | 4,9         | N=714          |
| 12                                    | 124.26        | -3,5        | 0,4         | 2,6           | 4,8         | 8,0         | 10,0        | N=643          |
|                                       | 1250          | -6,3        | -1,8        | 0,6           | 3,1         | 6,0         | 8,5         | N=727          |
|                                       | 2500          | -8,6        | -3,9        | -1,1          | 1,3         | 5,3         | 8,1         | N=727          |
|                                       | 3750          | -10,2       | -5,5        | -2,4          | 0,4         | 4,8         | 7,4         | N=727          |
|                                       | 5000          | -12,9       | -7,9        | -4,6          | -1,3        | 3,8         | 6,4         | N=727          |
|                                       | 6250          | -15,0       | -9,9        | -6,2          | -2,7        | 2,3         | 5,1         | N=727          |
|                                       | 7500          | -17,2       | -12,1       | -8,2          | -4,4        | 0,3         | 3,6         | N=727          |



| <b>Dew point temperature 00 UTC</b> |               |             |             |               |             |             |             |                |
|-------------------------------------|---------------|-------------|-------------|---------------|-------------|-------------|-------------|----------------|
| <i>Month</i>                        | <i>Height</i> | <i>P 05</i> | <i>P 25</i> | <i>Median</i> | <i>P 75</i> | <i>P 95</i> | <i>P 99</i> | <i>Valid N</i> |
| 1                                   | 124.26        | -11,2       | -4,1        | -0,1          | 1,9         | 5,3         | 6,9         | N=705          |
|                                     | 1250          | -15,7       | -7,6        | -2,6          | 0,4         | 3,9         | 6,2         | N=753          |
|                                     | 2500          | -23,5       | -10,5       | -5,3          | -1,6        | 2,9         | 4,9         | N=753          |
|                                     | 3750          | -28,2       | -14,8       | -8,5          | -4,0        | 1,4         | 4,1         | N=753          |
|                                     | 5000          | -32,8       | -21,2       | -12,7         | -6,9        | -1,0        | 2,0         | N=753          |
|                                     | 6250          | -35,9       | -24,2       | -16,1         | -9,8        | -3,0        | 0,5         | N=753          |
|                                     | 7500          | -39,8       | -27,7       | -19,2         | -12,5       | -4,7        | -1,1        | N=753          |
| 2                                   | 124.26        | -10,2       | -4,2        | -1,1          | 1,9         | 4,9         | 7,9         | N=654          |
|                                     | 1250          | -14,2       | -7,8        | -3,6          | -0,1        | 4,1         | 6,6         | N=694          |
|                                     | 2500          | -22,3       | -11,7       | -6,6          | -2,6        | 2,8         | 6,2         | N=694          |
|                                     | 3750          | -28,7       | -16,3       | -10,0         | -5,1        | 1,3         | 4,6         | N=694          |
|                                     | 5000          | -34,0       | -22,5       | -14,2         | -8,4        | -0,8        | 1,9         | N=694          |
|                                     | 6250          | -38,7       | -26,2       | -17,6         | -11,4       | -2,8        | 0,9         | N=694          |
|                                     | 7500          | -42,4       | -29,4       | -21,2         | -14,2       | -4,4        | -1,1        | N=694          |
| 3                                   | 124.26        | -6,9        | -2,3        | -0,1          | 1,9         | 5,9         | 7,8         | N=721          |
|                                     | 1250          | -11,7       | -6,1        | -2,5          | 0,4         | 4,2         | 6,4         | N=761          |
|                                     | 2500          | -19,7       | -9,4        | -5,4          | -2,0        | 2,2         | 4,4         | N=761          |
|                                     | 3750          | -27,7       | -13,2       | -8,1          | -3,8        | 0,6         | 3,3         | N=761          |
|                                     | 5000          | -33,2       | -20,7       | -12,2         | -6,8        | -1,6        | 0,4         | N=761          |
|                                     | 6250          | -38,2       | -25,2       | -15,7         | -9,4        | -3,6        | -1,3        | N=761          |
|                                     | 7500          | -40,7       | -28,4       | -18,9         | -12,0       | -5,8        | -3,4        | N=761          |
| 4                                   | 124.26        | -4,1        | -0,1        | 2,7           | 4,9         | 7,9         | 9,9         | N=683          |
|                                     | 1250          | -10,1       | -4,1        | -0,6          | 2,2         | 6,1         | 8,0         | N=733          |
|                                     | 2500          | -13,4       | -6,8        | -3,1          | 0,3         | 4,6         | 7,5         | N=733          |
|                                     | 3750          | -17,7       | -9,6        | -4,8          | -1,1        | 3,0         | 5,9         | N=733          |
|                                     | 5000          | -26,3       | -14,3       | -8,1          | -4,1        | 0,4         | 3,3         | N=733          |
|                                     | 6250          | -32,9       | -19,2       | -11,7         | -6,4        | -1,2        | 1,5         | N=733          |
|                                     | 7500          | -36,3       | -22,7       | -14,7         | -9,1        | -3,6        | -0,8        | N=733          |
| 5                                   | 124.26        | 0,8         | 3,9         | 6,0           | 8,9         | 10,9        | 12,9        | N=725          |
|                                     | 1250          | -5,4        | -0,1        | 2,9           | 5,9         | 9,1         | 11,4        | N=766          |
|                                     | 2500          | -8,1        | -2,4        | 0,9           | 3,9         | 7,8         | 9,9         | N=766          |
|                                     | 3750          | -11,1       | -4,6        | -1,1          | 2,3         | 6,4         | 8,7         | N=766          |
|                                     | 5000          | -19,9       | -8,6        | -3,8          | -0,2        | 3,9         | 6,5         | N=766          |
|                                     | 6250          | -28,1       | -13,3       | -7,1          | -2,4        | 2,1         | 5,4         | N=766          |
|                                     | 7500          | -32,6       | -18,2       | -10,3         | -5,1        | -0,3        | 3,1         | N=766          |
| 6                                   | 124.26        | 5,0         | 7,9         | 9,9           | 11,7        | 14,9        | 16,3        | N=698          |
|                                     | 1250          | 0,6         | 4,4         | 6,5           | 8,9         | 11,9        | 14,4        | N=740          |
|                                     | 2500          | -2,4        | 1,6         | 4,0           | 6,4         | 10,4        | 12,8        | N=740          |
|                                     | 3750          | -8,0        | -0,8        | 1,9           | 4,4         | 8,6         | 10,7        | N=740          |
|                                     | 5000          | -15,9       | -4,5        | -1,3          | 1,8         | 6,2         | 8,6         | N=740          |
|                                     | 6250          | -21,9       | -9,1        | -3,8          | -0,3        | 4,4         | 7,3         | N=740          |
|                                     | 7500          | -28,2       | -13,7       | -6,6          | -2,7        | 2,4         | 4,9         | N=740          |

(table continued on the next page)

| <b>Dew point temperature 00 UTC (continued)</b> |               |             |             |               |             |             |             |                |
|---|---------------|-------------|-------------|---------------|-------------|-------------|-------------|----------------|
| <i>Month</i>                                    | <i>Height</i> | <i>P 05</i> | <i>P 25</i> | <i>Median</i> | <i>P 75</i> | <i>P 95</i> | <i>P 99</i> | <i>Valid N</i> |
| 7   | 124.26        | 7,9         | 10,6        | 11,9          | 13,9        | 16,9        | 18,0        | N=702          |
|   | 1250          | 2,9         | 6,4         | 8,8           | 10,9        | 13,9        | 15,9        | N=752          |
|   | 2500          | -0,2        | 3,9         | 6,3           | 8,7         | 12,2        | 14,2        | N=752          |
|   | 3750          | -5,0        | 1,3         | 4,0           | 6,9         | 9,9         | 12,4        | N=752          |
|   | 5000          | -13,0       | -2,1        | 1,1           | 3,9         | 7,9         | 10,0        | N=752          |
|   | 6250          | -17,2       | -5,6        | -1,4          | 1,9         | 5,6         | 8,1         | N=752          |
|   | 7500          | -22,0       | -9,8        | -4,1          | -0,5        | 2,9         | 5,6         | N=752          |
| 8   | 124.26        | 7,9         | 10,1        | 11,9          | 13,9        | 16,9        | 17,9        | N=690          |
|   | 1250          | 3,8         | 6,9         | 8,9           | 11,1        | 14,2        | 15,9        | N=730          |
|   | 2500          | 0,9         | 4,2         | 6,4           | 8,9         | 11,9        | 14,4        | N=730          |
|   | 3750          | -4,1        | 1,6         | 4,2           | 6,9         | 10,3        | 12,6        | N=730          |
|   | 5000          | -12,7       | -2,9        | 0,6           | 4,0         | 7,6         | 10,3        | N=730          |
|   | 6250          | -18,6       | -6,8        | -2,3          | 1,6         | 5,6         | 8,1         | N=730          |
|   | 7500          | -23,7       | -11,3       | -5,1          | -1,1        | 3,3         | 5,4         | N=730          |
| 9   | 124.26        | 4,9         | 7,9         | 9,9           | 11,9        | 13,9        | 15,5        | N=663          |
|   | 1250          | 0,9         | 4,4         | 6,9           | 8,9         | 11,9        | 13,9        | N=708          |
|   | 2500          | -2,7        | 1,6         | 4,0           | 6,6         | 9,9         | 11,9        | N=708          |
|   | 3750          | -13,2       | -1,6        | 1,6           | 4,6         | 8,1         | 10,4        | N=708          |
|   | 5000          | -22,1       | -6,4        | -1,7          | 1,6         | 5,4         | 7,8         | N=708          |
|   | 6250          | -26,0       | -12,5       | -4,4          | -0,3        | 3,4         | 5,1         | N=708          |
|   | 7500          | -29,5       | -16,9       | -7,7          | -2,8        | 1,4         | 3,1         | N=708          |
| 10  | 124.26        | -0,1        | 4,0         | 6,9           | 9,8         | 12,4        | 12,9        | N=649          |
|   | 1250          | -3,8        | 1,3         | 4,4           | 7,4         | 10,4        | 12,3        | N=724          |
|   | 2500          | -9,6        | -1,6        | 1,6           | 4,7         | 8,9         | 10,4        | N=724          |
|   | 3750          | -18,7       | -5,6        | -1,1          | 2,7         | 6,9         | 8,9         | N=724          |
|   | 5000          | -25,1       | -11,7       | -4,9          | -0,6        | 4,4         | 6,7         | N=724          |
|   | 6250          | -29,2       | -16,2       | -8,1          | -2,4        | 2,9         | 5,4         | N=724          |
|   | 7500          | -33,2       | -20,3       | -11,8         | -4,6        | 0,6         | 3,2         | N=724          |
| 11  | 124.26        | -4,1        | -0,1        | 2,9           | 5,6         | 7,9         | 9,9         | N=632          |
|   | 1250          | -8,6        | -2,6        | 0,9           | 3,4         | 6,4         | 8,4         | N=703          |
|   | 2500          | -13,9       | -6,1        | -2,4          | 0,6         | 4,9         | 7,6         | N=703          |
|   | 3750          | -22,7       | -9,1        | -4,6          | -1,1        | 3,4         | 6,2         | N=703          |
|   | 5000          | -29,6       | -14,7       | -8,1          | -3,8        | 0,7         | 4,4         | N=703          |
|   | 6250          | -32,7       | -20,2       | -11,9         | -6,0        | -0,8        | 2,9         | N=703          |
|   | 7500          | -37,2       | -23,2       | -15,7         | -8,6        | -2,7        | 0,5         | N=703          |
| 12  | 124.26        | -8,1        | -2,1        | 0,7           | 2,9         | 6,5         | 7,9         | N=641          |
|   | 1250          | -11,5       | -5,1        | -1,6          | 1,1         | 5,0         | 7,1         | N=716          |
|   | 2500          | -22,7       | -8,4        | -4,5          | -1,1        | 3,2         | 6,1         | N=716          |
|   | 3750          | -27,9       | -12,9       | -7,6          | -3,1        | 2,4         | 5,0         | N=716          |
|   | 5000          | -32,4       | -18,4       | -11,7         | -6,3        | 0,1         | 3,2         | N=716          |
|   | 6250          | -36,6       | -22,9       | -15,5         | -8,6        | -2,1        | 1,2         | N=716          |
|   | 7500          | -39,7       | -26,2       | -18,2         | -11,3       | -4,1        | -0,9        | N=716          |

| <b>Dew point temperature 12 UTC</b> |               |             |             |               |             |             |             |                |
|-------------------------------------|---------------|-------------|-------------|---------------|-------------|-------------|-------------|----------------|
| <i>Month</i>                        | <i>Height</i> | <i>P 05</i> | <i>P 25</i> | <i>Median</i> | <i>P 75</i> | <i>P 95</i> | <i>P 99</i> | <i>Valid N</i> |
| 1                                   | 124.26        | -9,5        | -3,1        | -0,1          | 2,3         | 5,5         | 6,9         | N=727          |
|                                     | 1250          | -15,2       | -7,6        | -2,6          | 0,4         | 3,6         | 5,9         | N=767          |
|                                     | 2500          | -23,4       | -10,9       | -5,6          | -1,8        | 2,4         | 4,4         | N=767          |
|                                     | 3750          | -29,0       | -16,2       | -9,1          | -4,3        | 0,9         | 3,0         | N=767          |
|                                     | 5000          | -35,7       | -22,4       | -13,7         | -7,8        | -1,5        | 0,9         | N=767          |
|                                     | 6250          | -38,2       | -26,5       | -17,7         | -10,2       | -3,1        | -0,4        | N=767          |
|                                     | 7500          | -40,7       | -29,2       | -20,5         | -13,7       | -5,5        | -2,3        | N=767          |
| 2                                   | 124.26        | -9,1        | -4,1        | -1,1          | 1,9         | 5,9         | 7,8         | N=666          |
|                                     | 1250          | -14,7       | -8,1        | -3,6          | -0,1        | 4,4         | 5,9         | N=702          |
|                                     | 2500          | -22,9       | -12,2       | -7,1          | -2,7        | 2,6         | 5,0         | N=702          |
|                                     | 3750          | -28,1       | -17,2       | -10,4         | -5,2        | 1,1         | 4,0         | N=702          |
|                                     | 5000          | -33,2       | -21,7       | -14,3         | -8,6        | -1,6        | 1,4         | N=702          |
|                                     | 6250          | -36,5       | -25,7       | -17,5         | -11,2       | -3,4        | -0,8        | N=702          |
|                                     | 7500          | -39,2       | -28,8       | -20,7         | -14,2       | -6,1        | -2,9        | N=702          |
| 3                                   | 124.26        | -7,1        | -2,1        | 0,2           | 2,9         | 6,9         | 7,9         | N=718          |
|                                     | 1250          | -11,7       | -6,6        | -2,6          | 0,4         | 4,4         | 5,9         | N=764          |
|                                     | 2500          | -18,6       | -9,6        | -5,3          | -2,1        | 2,6         | 4,7         | N=764          |
|                                     | 3750          | -27,4       | -14,3       | -8,4          | -4,0        | 0,9         | 3,3         | N=764          |
|                                     | 5000          | -34,1       | -20,7       | -12,7         | -7,1        | -2,1        | 0,7         | N=764          |
|                                     | 6250          | -38,2       | -24,7       | -16,3         | -9,5        | -3,8        | -0,7        | N=764          |
|                                     | 7500          | -41,5       | -28,7       | -19,7         | -11,9       | -5,8        | -2,9        | N=764          |
| 4                                   | 124.26        | -6,1        | -0,1        | 2,9           | 5,9         | 8,9         | 11,9        | N=696          |
|                                     | 1250          | -10,3       | -4,1        | -0,6          | 2,4         | 5,9         | 8,9         | N=742          |
|                                     | 2500          | -12,5       | -6,4        | -2,6          | 0,2         | 4,1         | 6,9         | N=742          |
|                                     | 3750          | -19,2       | -9,1        | -5,1          | -1,7        | 2,5         | 4,9         | N=742          |
|                                     | 5000          | -27,7       | -14,7       | -8,6          | -4,8        | -0,5        | 2,9         | N=742          |
|                                     | 6250          | -32,3       | -18,8       | -11,9         | -7,1        | -2,4        | 1,3         | N=742          |
|                                     | 7500          | -36,9       | -23,2       | -15,2         | -9,6        | -4,4        | -1,4        | N=742          |
| 5                                   | 124.26        | -0,1        | 3,9         | 6,9           | 9,9         | 12,9        | 13,9        | N=722          |
|                                     | 1250          | -5,1        | 0,4         | 2,9           | 6,1         | 9,0         | 11,4        | N=766          |
|                                     | 2500          | -7,1        | -1,6        | 1,2           | 4,2         | 7,4         | 8,9         | N=766          |
|                                     | 3750          | -13,9       | -4,4        | -0,9          | 2,3         | 5,9         | 7,9         | N=766          |
|                                     | 5000          | -21,7       | -9,1        | -4,2          | -0,6        | 3,4         | 5,9         | N=766          |
|                                     | 6250          | -28,0       | -13,9       | -7,1          | -2,7        | 1,6         | 4,6         | N=766          |
|                                     | 7500          | -31,7       | -18,8       | -10,3         | -5,3        | -0,6        | 2,2         | N=766          |
| 6                                   | 124.26        | 4,9         | 7,9         | 10,6          | 12,4        | 15,9        | 17,8        | N=699          |
|                                     | 1250          | 0,9         | 4,3         | 6,8           | 8,9         | 12,3        | 14,4        | N=740          |
|                                     | 2500          | -1,1        | 1,9         | 4,5           | 6,9         | 10,2        | 12,2        | N=740          |
|                                     | 3750          | -6,1        | -0,4        | 2,1           | 4,4         | 8,2         | 10,3        | N=740          |
|                                     | 5000          | -15,3       | -4,1        | -1,1          | 1,5         | 5,7         | 7,8         | N=740          |
|                                     | 6250          | -20,5       | -7,6        | -3,8          | -0,4        | 3,9         | 6,0         | N=740          |
|                                     | 7500          | -24,7       | -11,7       | -6,8          | -3,1        | 1,6         | 3,5         | N=740          |

(table continued on the next page)

| <b>Dew point temperature 12 UTC (continued)</b> |               |             |             |               |             |             |             |                |
|---|---------------|-------------|-------------|---------------|-------------|-------------|-------------|----------------|
| <i>Month</i>                                    | <i>Height</i> | <i>P 05</i> | <i>P 25</i> | <i>Median</i> | <i>P 75</i> | <i>P 95</i> | <i>P 99</i> | <i>Valid N</i> |
| 7   | 124.26        | 7,6         | 10,9        | 12,9          | 14,9        | 17,6        | 19,9        | N=700          |
|   | 1250          | 3,4         | 6,7         | 8,9           | 10,9        | 13,6        | 15,6        | N=749          |
|   | 2500          | 1,7         | 4,7         | 6,9           | 8,6         | 11,7        | 13,8        | N=749          |
|   | 3750          | -4,0        | 1,9         | 4,4           | 6,6         | 9,9         | 11,7        | N=749          |
|   | 5000          | -12,7       | -1,8        | 0,9           | 3,5         | 6,9         | 8,9         | N=749          |
|   | 6250          | -18,5       | -5,6        | -1,6          | 1,3         | 5,1         | 7,5         | N=749          |
|   | 7500          | -22,9       | -10,5       | -4,6          | -1,3        | 2,9         | 6,0         | N=749          |
| 8   | 124.26        | 7,9         | 10,8        | 12,9          | 14,9        | 17,3        | 19,2        | N=692          |
|   | 1250          | 3,9         | 6,9         | 8,9           | 10,9        | 13,9        | 16,1        | N=737          |
|   | 2500          | 1,6         | 4,6         | 6,9           | 9,2         | 12,2        | 14,2        | N=737          |
|   | 3750          | -3,1        | 1,9         | 4,4           | 7,2         | 10,1        | 12,6        | N=737          |
|   | 5000          | -12,4       | -2,4        | 0,6           | 3,9         | 7,4         | 9,7         | N=737          |
|   | 6250          | -16,7       | -6,1        | -2,1          | 1,2         | 5,4         | 7,7         | N=737          |
|   | 7500          | -22,5       | -12,2       | -5,3          | -1,6        | 2,9         | 4,9         | N=737          |
| 9   | 124.26        | 4,6         | 8,0         | 10,2          | 12,2        | 14,9        | 16,8        | N=663          |
|   | 1250          | 0,9         | 4,6         | 6,9           | 9,1         | 11,9        | 13,9        | N=709          |
|   | 2500          | -2,2        | 1,9         | 4,3           | 6,9         | 9,7         | 11,9        | N=709          |
|   | 3750          | -10,2       | -1,1        | 1,9           | 4,4         | 7,9         | 9,8         | N=709          |
|   | 5000          | -20,4       | -6,4        | -1,8          | 1,2         | 5,5         | 6,9         | N=709          |
|   | 6250          | -24,7       | -11,2       | -4,6          | -1,1        | 3,2         | 5,2         | N=709          |
|   | 7500          | -28,2       | -16,7       | -7,6          | -3,2        | 1,1         | 2,7         | N=709          |
| 10  | 124.26        | 0,9         | 4,9         | 6,9           | 9,9         | 12,9        | 14,9        | N=658          |
|   | 1250          | -3,9        | 0,9         | 4,4           | 7,3         | 10,2        | 11,7        | N=735          |
|   | 2500          | -8,4        | -1,8        | 1,2           | 4,4         | 8,2         | 10,7        | N=735          |
|   | 3750          | -18,3       | -6,1        | -1,1          | 2,2         | 6,6         | 9,8         | N=735          |
|   | 5000          | -26,2       | -11,7       | -5,1          | -1,1        | 4,4         | 7,1         | N=735          |
|   | 6250          | -29,7       | -16,9       | -8,6          | -3,1        | 2,4         | 6,4         | N=735          |
|   | 7500          | -32,7       | -21,0       | -12,6         | -5,6        | -0,1        | 3,7         | N=735          |
| 11  | 124.26        | -4,1        | 0,5         | 3,9           | 5,9         | 8,5         | 9,9         | N=639          |
|   | 1250          | -8,1        | -2,6        | 0,9           | 3,7         | 6,7         | 8,4         | N=714          |
|   | 2500          | -14,2       | -6,1        | -2,4          | 0,9         | 4,9         | 6,9         | N=714          |
|   | 3750          | -22,5       | -10,2       | -4,6          | -1,1        | 3,1         | 5,9         | N=714          |
|   | 5000          | -30,2       | -16,0       | -9,1          | -4,3        | 0,6         | 3,4         | N=714          |
|   | 6250          | -33,5       | -20,6       | -13,2         | -6,4        | -1,1        | 1,9         | N=714          |
|   | 7500          | -36,2       | -24,2       | -16,6         | -9,1        | -3,1        | -0,1        | N=714          |
| 12  | 124.26        | -6,1        | -1,8        | 0,9           | 3,9         | 5,9         | 8,9         | N=643          |
|   | 1250          | -11,1       | -5,1        | -1,6          | 1,4         | 4,9         | 7,2         | N=727          |
|   | 2500          | -19,7       | -8,6        | -4,6          | -1,1        | 3,4         | 5,7         | N=727          |
|   | 3750          | -27,2       | -13,0       | -7,3          | -3,1        | 1,9         | 4,7         | N=727          |
|   | 5000          | -34,0       | -18,7       | -11,9         | -6,6        | -0,8        | 2,3         | N=727          |
|   | 6250          | -37,8       | -23,2       | -15,2         | -9,1        | -2,5        | 1,5         | N=727          |
|   | 7500          | -39,0       | -26,2       | -18,5         | -11,4       | -4,5        | -0,6        | N=727          |

| <b>Dew point depression 00 UTC</b> |               |             |             |               |             |             |             |                |
|------------------------------------|---------------|-------------|-------------|---------------|-------------|-------------|-------------|----------------|
| <i>Month</i>                       | <i>Height</i> | <i>P 05</i> | <i>P 25</i> | <i>Median</i> | <i>P 75</i> | <i>P 95</i> | <i>P 99</i> | <i>Valid N</i> |
| 1                                  | 124.26        | -0,1        | 0,5         | 1,1           | 2,0         | 3,9         | 5,7         | N=705          |
|                                    | 1250          | 0,1         | 0,8         | 1,8           | 3,9         | 10,4        | 26,5        | N=753          |
|                                    | 2500          | 0,0         | 0,9         | 2,4           | 6,4         | 19,4        | 35,6        | N=753          |
|                                    | 3750          | 0,0         | 1,2         | 3,9           | 9,8         | 25,5        | 37,9        | N=753          |
|                                    | 5000          | 0,1         | 1,6         | 5,8           | 14,4        | 28,6        | 37,1        | N=753          |
|                                    | 6250          | 0,2         | 2,2         | 8,0           | 16,0        | 29,6        | 35,4        | N=753          |
|                                    | 7500          | 0,4         | 2,5         | 8,9           | 17,3        | 30,3        | 36,0        | N=753          |
| 2                                  | 124.26        | 0,0         | 0,6         | 1,2           | 2,3         | 4,2         | 6,0         | N=654          |
|                                    | 1250          | 0,2         | 0,9         | 2,1           | 4,0         | 9,7         | 19,0        | N=694          |
|                                    | 2500          | 0,0         | 1,0         | 2,7           | 6,7         | 20,5        | 30,1        | N=694          |
|                                    | 3750          | 0,0         | 1,3         | 4,3           | 12,0        | 26,6        | 33,6        | N=694          |
|                                    | 5000          | 0,1         | 1,8         | 6,8           | 16,3        | 29,3        | 36,1        | N=694          |
|                                    | 6250          | 0,3         | 2,5         | 8,8           | 17,6        | 31,4        | 38,4        | N=694          |
|                                    | 7500          | 0,3         | 3,0         | 10,4          | 19,7        | 32,2        | 39,0        | N=694          |
| 3                                  | 124.26        | 0,1         | 0,8         | 1,7           | 2,9         | 4,9         | 7,0         | N=721          |
|                                    | 1250          | 0,3         | 1,3         | 2,8           | 5,2         | 11,0        | 17,8        | N=761          |
|                                    | 2500          | 0,1         | 1,3         | 3,3           | 7,0         | 17,6        | 32,2        | N=761          |
|                                    | 3750          | 0,1         | 1,5         | 4,0           | 9,5         | 24,5        | 35,3        | N=761          |
|                                    | 5000          | 0,1         | 1,7         | 5,5           | 15,2        | 29,4        | 37,6        | N=761          |
|                                    | 6250          | 0,4         | 2,3         | 7,5           | 17,5        | 32,5        | 41,8        | N=761          |
|                                    | 7500          | 0,4         | 2,7         | 8,7           | 18,7        | 32,5        | 42,3        | N=761          |
| 4                                  | 124.26        | 0,1         | 1,1         | 2,1           | 3,8         | 7,0         | 9,6         | N=683          |
|                                    | 1250          | 0,4         | 2,2         | 4,8           | 8,5         | 14,6        | 19,4        | N=733          |
|                                    | 2500          | 0,2         | 2,0         | 5,0           | 9,0         | 15,6        | 21,4        | N=733          |
|                                    | 3750          | 0,2         | 2,0         | 5,0           | 9,3         | 17,7        | 33,2        | N=733          |
|                                    | 5000          | 0,2         | 2,0         | 4,8           | 10,5        | 25,2        | 37,1        | N=733          |
|                                    | 6250          | 0,2         | 2,1         | 5,8           | 12,7        | 29,3        | 38,5        | N=733          |
|                                    | 7500          | 0,3         | 2,3         | 6,8           | 15,0        | 30,4        | 39,1        | N=733          |
| 5                                  | 124.26        | 0,3         | 1,3         | 2,7           | 4,4         | 7,3         | 9,0         | N=725          |
|                                    | 1250          | 0,6         | 3,0         | 5,5           | 9,5         | 15,6        | 20,5        | N=766          |
|                                    | 2500          | 0,4         | 2,8         | 5,6           | 9,8         | 15,5        | 24,0        | N=766          |
|                                    | 3750          | 0,4         | 2,8         | 5,5           | 9,3         | 16,6        | 28,0        | N=766          |
|                                    | 5000          | 0,3         | 2,3         | 5,3           | 9,5         | 24,2        | 33,7        | N=766          |
|                                    | 6250          | 0,4         | 2,5         | 5,9           | 12,9        | 28,1        | 35,5        | N=766          |
|                                    | 7500          | 0,3         | 2,6         | 7,0           | 16,6        | 30,5        | 37,2        | N=766          |
| 6                                  | 124.26        | 0,5         | 1,3         | 2,3           | 3,5         | 6,0         | 7,1         | N=698          |
|                                    | 1250          | 0,8         | 2,5         | 4,4           | 7,2         | 13,8        | 17,5        | N=740          |
|                                    | 2500          | 0,4         | 2,3         | 4,5           | 7,9         | 14,3        | 21,5        | N=740          |
|                                    | 3750          | 0,5         | 2,4         | 4,6           | 8,5         | 16,8        | 32,2        | N=740          |
|                                    | 5000          | 0,4         | 2,0         | 4,8           | 8,8         | 22,3        | 34,2        | N=740          |
|                                    | 6250          | 0,3         | 2,2         | 5,4           | 10,9        | 26,3        | 37,0        | N=740          |
|                                    | 7500          | 0,3         | 2,2         | 5,6           | 13,5        | 28,9        | 36,8        | N=740          |

(table continued on the next page)

| Dew point depression 00 UTC (continued) |        |      |      |        |      |      |      |         |
|---|--------|------|------|--------|------|------|------|---------|
| Month                                   | Height | P 05 | P 25 | Median | P 75 | P 95 | P 99 | Valid N |
| 7                                       | 124.26 | 0,5  | 1,3  | 2,3    | 3,4  | 5,7  | 8,1  | N=702   |
|   | 1250   | 1,0  | 2,6  | 4,7    | 7,6  | 14,0 | 17,1 | N=752   |
|   | 2500   | 0,5  | 2,6  | 4,8    | 8,4  | 14,4 | 20,0 | N=752   |
|   | 3750   | 0,4  | 2,7  | 4,8    | 8,1  | 16,7 | 30,3 | N=752   |
|   | 5000   | 0,4  | 2,3  | 4,4    | 8,9  | 22,5 | 31,8 | N=752   |
|   | 6250   | 0,6  | 2,4  | 5,1    | 10,6 | 24,0 | 33,4 | N=752   |
|   | 7500   | 0,5  | 2,4  | 5,7    | 12,6 | 26,3 | 36,0 | N=752   |
| 8                                       | 124.26 | 0,5  | 1,1  | 1,9    | 3,1  | 5,3  | 7,0  | N=690   |
|   | 1250   | 1,0  | 2,9  | 4,7    | 7,3  | 12,7 | 16,1 | N=730   |
|   | 2500   | 0,7  | 2,9  | 4,7    | 7,7  | 13,2 | 18,1 | N=730   |
|   | 3750   | 0,7  | 2,8  | 4,6    | 7,5  | 14,4 | 22,5 | N=730   |
|   | 5000   | 0,7  | 2,7  | 5,0    | 9,5  | 20,7 | 27,1 | N=730   |
|   | 6250   | 0,7  | 2,9  | 5,7    | 12,6 | 24,3 | 31,7 | N=730   |
|   | 7500   | 0,5  | 2,8  | 7,4    | 14,4 | 27,1 | 36,7 | N=730   |
| 9                                       | 124.26 | 0,3  | 0,9  | 1,5    | 2,5  | 4,7  | 6,0  | N=663   |
|   | 1250   | 0,5  | 2,1  | 3,6    | 5,5  | 9,5  | 12,9 | N=708   |
|   | 2500   | 0,2  | 1,8  | 3,8    | 6,2  | 11,0 | 16,6 | N=708   |
|   | 3750   | 0,3  | 2,0  | 4,2    | 7,4  | 19,8 | 32,0 | N=708   |
|   | 5000   | 0,2  | 1,9  | 4,5    | 10,8 | 27,2 | 36,2 | N=708   |
|   | 6250   | 0,2  | 2,1  | 5,6    | 14,5 | 29,2 | 36,3 | N=708   |
|   | 7500   | 0,2  | 2,0  | 7,0    | 17,5 | 31,4 | 37,4 | N=708   |
| 10                                      | 124.26 | 0,1  | 0,7  | 1,1    | 2,1  | 4,2  | 6,1  | N=649   |
|   | 1250   | 0,4  | 1,5  | 2,7    | 4,6  | 7,9  | 11,9 | N=724   |
|   | 2500   | 0,1  | 1,5  | 3,1    | 5,4  | 12,9 | 27,2 | N=724   |
|   | 3750   | 0,1  | 1,6  | 3,6    | 8,0  | 22,0 | 31,6 | N=724   |
|   | 5000   | 0,1  | 1,5  | 4,3    | 12,2 | 27,8 | 36,3 | N=724   |
|   | 6250   | 0,1  | 1,7  | 6,5    | 14,7 | 30,0 | 36,8 | N=724   |
|   | 7500   | 0,2  | 2,1  | 7,9    | 17,3 | 31,2 | 38,5 | N=724   |
| 11                                      | 124.26 | 0,1  | 0,6  | 1,3    | 2,2  | 4,3  | 5,6  | N=632   |
|   | 1250   | 0,3  | 1,0  | 2,0    | 3,7  | 7,7  | 13,4 | N=703   |
|   | 2500   | 0,0  | 0,9  | 2,4    | 5,0  | 14,0 | 24,2 | N=703   |
|   | 3750   | 0,1  | 1,1  | 3,3    | 7,7  | 23,4 | 33,5 | N=703   |
|   | 5000   | 0,1  | 1,4  | 4,3    | 10,7 | 28,3 | 37,4 | N=703   |
|   | 6250   | 0,2  | 1,8  | 6,0    | 15,0 | 30,7 | 38,6 | N=703   |
|   | 7500   | 0,4  | 2,5  | 7,9    | 16,0 | 31,6 | 41,3 | N=703   |
| 12                                      | 124.26 | -0,1 | 0,5  | 1,1    | 2,0  | 4,1  | 7,3  | N=641   |
|   | 1250   | 0,1  | 0,7  | 1,7    | 3,2  | 8,4  | 15,2 | N=716   |
|   | 2500   | 0,0  | 0,7  | 2,2    | 5,7  | 19,7 | 33,8 | N=716   |
|   | 3750   | 0,1  | 1,0  | 3,4    | 9,6  | 25,4 | 35,7 | N=716   |
|   | 5000   | 0,2  | 1,3  | 5,4    | 13,3 | 28,3 | 35,9 | N=716   |
|   | 6250   | 0,3  | 1,7  | 7,6    | 15,9 | 30,9 | 37,0 | N=716   |
|   | 7500   | 0,4  | 2,3  | 8,6    | 17,2 | 30,3 | 38,3 | N=716   |

| <b>Dew point depression 12 UTC</b> |               |             |             |               |             |             |             |                |
|------------------------------------|---------------|-------------|-------------|---------------|-------------|-------------|-------------|----------------|
| <i>Month</i>                       | <i>Height</i> | <i>P 05</i> | <i>P 25</i> | <i>Median</i> | <i>P 75</i> | <i>P 95</i> | <i>P 99</i> | <i>Valid N</i> |
| 1                                  | 124.26        | 0,0         | 0,7         | 1,6           | 2,8         | 5,0         | 8,0         | N=727          |
|                                    | 1250          | 0,1         | 0,9         | 2,0           | 4,0         | 10,4        | 18,2        | N=767          |
|                                    | 2500          | 0,0         | 1,0         | 2,7           | 6,6         | 19,8        | 32,0        | N=767          |
|                                    | 3750          | 0,1         | 1,4         | 4,5           | 10,8        | 27,5        | 36,2        | N=767          |
|                                    | 5000          | 0,3         | 2,2         | 7,1           | 15,4        | 30,5        | 40,8        | N=767          |
|                                    | 6250          | 0,5         | 2,8         | 9,0           | 18,8        | 33,3        | 40,8        | N=767          |
|                                    | 7500          | 0,6         | 3,4         | 10,2          | 19,3        | 33,7        | 43,8        | N=767          |
| 2                                  | 124.26        | 0,0         | 1,1         | 2,2           | 3,7         | 6,9         | 8,0         | N=666          |
|                                    | 1250          | 0,2         | 1,1         | 2,2           | 4,3         | 10,1        | 22,0        | N=702          |
|                                    | 2500          | 0,0         | 0,9         | 2,9           | 7,5         | 21,0        | 31,1        | N=702          |
|                                    | 3750          | 0,1         | 1,4         | 4,6           | 12,5        | 26,4        | 35,0        | N=702          |
|                                    | 5000          | 0,3         | 2,1         | 6,9           | 16,3        | 29,9        | 38,0        | N=702          |
|                                    | 6250          | 0,3         | 3,0         | 8,6           | 17,7        | 31,0        | 37,7        | N=702          |
|                                    | 7500          | 0,7         | 3,6         | 9,8           | 19,5        | 31,3        | 41,8        | N=702          |
| 3                                  | 124.26        | 0,3         | 1,7         | 3,8           | 6,3         | 10,0        | 12,0        | N=718          |
|                                    | 1250          | 0,4         | 1,7         | 3,5           | 5,9         | 11,3        | 15,6        | N=764          |
|                                    | 2500          | 0,3         | 1,4         | 3,2           | 6,3         | 18,3        | 27,5        | N=764          |
|                                    | 3750          | 0,3         | 1,6         | 4,3           | 10,1        | 23,6        | 37,4        | N=764          |
|                                    | 5000          | 0,6         | 2,3         | 6,6           | 15,0        | 30,5        | 38,4        | N=764          |
|                                    | 6250          | 0,7         | 2,7         | 8,4           | 17,1        | 32,2        | 41,0        | N=764          |
|                                    | 7500          | 0,8         | 3,2         | 9,7           | 18,5        | 32,9        | 40,9        | N=764          |
| 4                                  | 124.26        | 0,7         | 3,9         | 7,0           | 9,7         | 15,0        | 18,4        | N=696          |
|                                    | 1250          | 0,6         | 2,9         | 5,7           | 9,1         | 14,5        | 18,0        | N=742          |
|                                    | 2500          | 0,3         | 2,0         | 4,8           | 8,2         | 14,4        | 18,8        | N=742          |
|                                    | 3750          | 0,4         | 2,1         | 4,7           | 8,7         | 19,3        | 35,1        | N=742          |
|                                    | 5000          | 0,4         | 2,1         | 5,1           | 10,8        | 26,3        | 34,5        | N=742          |
|                                    | 6250          | 0,7         | 2,7         | 6,1           | 13,4        | 29,3        | 36,6        | N=742          |
|                                    | 7500          | 0,9         | 2,9         | 7,4           | 15,8        | 30,8        | 38,3        | N=742          |
| 5                                  | 124.26        | 1,1         | 5,0         | 8,0           | 11,0        | 16,0        | 19,2        | N=722          |
|                                    | 1250          | 1,0         | 3,9         | 6,8           | 10,2        | 14,6        | 18,0        | N=766          |
|                                    | 2500          | 0,6         | 2,6         | 5,5           | 9,4         | 14,1        | 22,0        | N=766          |
|                                    | 3750          | 0,5         | 2,3         | 5,1           | 9,0         | 18,9        | 29,0        | N=766          |
|                                    | 5000          | 0,5         | 2,3         | 5,3           | 10,8        | 24,1        | 36,7        | N=766          |
|                                    | 6250          | 0,7         | 2,5         | 6,2           | 13,0        | 29,0        | 36,1        | N=766          |
|                                    | 7500          | 0,9         | 2,9         | 7,3           | 16,5        | 28,9        | 35,6        | N=766          |
| 6                                  | 124.26        | 1,1         | 4,3         | 7,0           | 9,1         | 14,2        | 17,0        | N=699          |
|                                    | 1250          | 1,2         | 3,5         | 5,6           | 8,3         | 13,0        | 15,6        | N=740          |
|                                    | 2500          | 0,6         | 2,4         | 4,3           | 7,5         | 13,0        | 17,8        | N=740          |
|                                    | 3750          | 0,5         | 2,2         | 4,2           | 7,5         | 15,1        | 26,0        | N=740          |
|                                    | 5000          | 0,4         | 2,0         | 4,4           | 8,0         | 22,0        | 32,8        | N=740          |
|                                    | 6250          | 0,5         | 2,1         | 4,9           | 10,3        | 25,5        | 35,1        | N=740          |
|                                    | 7500          | 0,4         | 2,5         | 5,7           | 12,2        | 27,2        | 36,1        | N=740          |

(table continued on the next page)

| Dew point depression 12 UTC (continued) |        |      |      |        |      |      |      |         |
|---|--------|------|------|--------|------|------|------|---------|
| Month                                   | Height | P 05 | P 25 | Median | P 75 | P 95 | P 99 | Valid N |
| 7                                       | 124.26 | 1,3  | 4,8  | 7,1    | 9,5  | 13,0 | 15,6 | N=700   |
|   | 1250   | 1,5  | 4,0  | 6,1    | 8,4  | 13,2 | 15,3 | N=749   |
|   | 2500   | 0,7  | 2,6  | 4,6    | 7,3  | 12,8 | 16,6 | N=749   |
|   | 3750   | 0,5  | 2,4  | 4,3    | 7,7  | 16,2 | 21,0 | N=749   |
|   | 5000   | 0,6  | 2,6  | 4,7    | 8,4  | 21,9 | 32,0 | N=749   |
|   | 6250   | 0,7  | 2,9  | 5,2    | 10,6 | 25,0 | 34,3 | N=749   |
|   | 7500   | 0,7  | 3,1  | 6,4    | 13,1 | 27,1 | 35,3 | N=749   |
| 8                                       | 124.26 | 1,3  | 4,7  | 6,9    | 9,0  | 12,2 | 16,1 | N=692   |
|   | 1250   | 1,6  | 4,3  | 6,1    | 8,2  | 12,3 | 15,4 | N=737   |
|   | 2500   | 0,7  | 2,7  | 4,7    | 7,1  | 12,4 | 14,9 | N=737   |
|   | 3750   | 0,6  | 2,3  | 4,4    | 7,1  | 15,4 | 24,1 | N=737   |
|   | 5000   | 0,6  | 2,4  | 4,8    | 8,6  | 19,8 | 31,7 | N=737   |
|   | 6250   | 0,7  | 2,8  | 5,8    | 11,7 | 24,2 | 32,5 | N=737   |
|   | 7500   | 0,8  | 3,0  | 6,8    | 14,8 | 26,2 | 36,0 | N=737   |
| 9                                       | 124.26 | 0,9  | 3,1  | 5,3    | 7,3  | 10,2 | 12,5 | N=663   |
|   | 1250   | 0,8  | 2,9  | 4,8    | 6,7  | 9,3  | 11,5 | N=709   |
|   | 2500   | 0,5  | 2,2  | 4,0    | 6,0  | 10,5 | 16,3 | N=709   |
|   | 3750   | 0,4  | 2,1  | 3,9    | 7,0  | 17,3 | 31,9 | N=709   |
|   | 5000   | 0,4  | 2,1  | 4,5    | 11,0 | 26,5 | 35,3 | N=709   |
|   | 6250   | 0,5  | 2,6  | 6,5    | 14,3 | 28,4 | 34,2 | N=709   |
|   | 7500   | 0,5  | 2,5  | 8,0    | 17,4 | 29,0 | 35,4 | N=709   |
| 10                                      | 124.26 | 0,3  | 1,9  | 3,5    | 5,1  | 7,3  | 9,9  | N=658   |
|   | 1250   | 0,5  | 1,8  | 3,2    | 5,0  | 8,5  | 12,0 | N=735   |
|   | 2500   | 0,3  | 1,5  | 3,2    | 5,6  | 14,0 | 21,6 | N=735   |
|   | 3750   | 0,2  | 1,6  | 3,7    | 8,0  | 22,8 | 33,9 | N=735   |
|   | 5000   | 0,2  | 2,0  | 4,8    | 12,4 | 27,7 | 37,9 | N=735   |
|   | 6250   | 0,2  | 2,4  | 6,9    | 15,6 | 30,2 | 39,8 | N=735   |
|   | 7500   | 0,3  | 3,2  | 9,5    | 17,8 | 31,2 | 38,2 | N=735   |
| 11                                      | 124.26 | 0,1  | 1,0  | 2,1    | 3,6  | 6,5  | 8,7  | N=639   |
|   | 1250   | 0,3  | 1,1  | 2,2    | 3,8  | 7,9  | 11,9 | N=714   |
|   | 2500   | 0,1  | 1,0  | 2,4    | 5,4  | 13,9 | 25,7 | N=714   |
|   | 3750   | 0,1  | 1,3  | 3,3    | 7,8  | 21,5 | 31,4 | N=714   |
|   | 5000   | 0,2  | 1,8  | 5,1    | 12,6 | 27,8 | 38,9 | N=714   |
|   | 6250   | 0,3  | 2,4  | 7,2    | 16,5 | 30,2 | 38,1 | N=714   |
|   | 7500   | 0,6  | 2,8  | 8,5    | 17,3 | 31,1 | 37,4 | N=714   |
| 12                                      | 124.26 | 0,1  | 0,6  | 1,5    | 2,5  | 4,7  | 8,4  | N=643   |
|   | 1250   | 0,1  | 0,8  | 1,7    | 3,5  | 8,1  | 17,7 | N=727   |
|   | 2500   | 0,0  | 0,8  | 2,1    | 5,5  | 17,9 | 33,6 | N=727   |
|   | 3750   | 0,1  | 1,2  | 3,4    | 9,5  | 23,6 | 37,5 | N=727   |
|   | 5000   | 0,2  | 1,9  | 6,3    | 13,6 | 29,6 | 39,9 | N=727   |
|   | 6250   | 0,2  | 2,3  | 7,5    | 16,0 | 30,1 | 39,3 | N=727   |
|   | 7500   | 0,4  | 2,8  | 8,8    | 17,5 | 31,0 | 39,6 | N=727   |





## Appendix D

The leaflet PISTON ENGINE ICING provided by UK-CAA (Civil Aviation Authority, 2000) gives recommendations of pilot procedures in order to minimize the risk of carburettor icing. The leaflet can be found at the URL :

[http://www.caa.co.uk/docs/33/SRG\\_GAD\\_SSL14.PDF](http://www.caa.co.uk/docs/33/SRG_GAD_SSL14.PDF)

A summary of the leaflet is provided here.

## PISTON ENGINE ICING (Civil Aviation Authority, 2000)

### SUMMARY

- Icing forms stealthily.
- Some aircraft/engine combinations are more susceptible than others.
- Icing may occur in warm humid conditions and is a possibility **at any time of the year in the UK.**
- Mogas makes carb icing more likely.
- Low power settings, such as in a descent or in the circuit, are more prone to give carb icing.
- Use full carb heat frequently when flying in conditions where carb icing is likely. Remember that the RPM gauge is your primary indication for a fixed pitch
- propeller; manifold pressure for variable pitch.
- Treat the carb heat as an ON/OFF control – either full hot or full cold.
- It takes time for the heat to work and the engine may run roughly while the ice is clearing.
- Timely use of appropriate procedures can PREVENT THIS PROBLEM.

### FINALLY:

In the event of carb heat system failure in flight:

- Keep out of icing conditions.
- Maintain high throttle setting – full throttle if possible.
- Weaken the mixture slightly.
- Land as soon as reasonably possible.

PREVENTION IS BETTER THAN CURE

## 5 PILOT PROCEDURES

### **a** *Maintenance*

Periodically check the carb heating system and controls for proper condition and operation. Pay particular attention to the condition of seals which may have deteriorated allowing the hot air to become diluted by cold air.

### **b** *Start Up*

Start up with the carb heat control in the **COLD** position.

### **c** *Taxying*

Generally, the use of carb heat is not recommended while taxiing because the air is usually unfiltered when in the **HOT** position. However, if it is necessary – USE IT.

### **d** *Ground Run-Up*

Check that there is a **significant** power decrease when hot air is selected (typically 75–100 rpm or 3–5" of manifold pressure) and that power is regained when cold air is reselected.

If it is suspected that ice is present, the hot position should be selected until the ice has cleared and normal power is restored.

### **e** *Immediately Prior to Take-Off*

Since icing can occur when taxiing with low power settings, or when the engine is idling, select carb heat ON for 5 seconds and then OFF, immediately before take off to clear any build-up. If the aircraft is kept waiting at the holding point in conditions of high humidity, it may be necessary to carry out the run-up drill more than once to clear ice which may have formed.

### **f** *Take-Off*

Take-off should **only** be commenced when you are sure the engine is developing full power. When at full power and as airspeed is building, you must check that the full throttle rpm and/or manifold pressure is as expected. **Carburettor heat must NOT be used during take-off** unless specifically authorized in the Flight Manual or Pilots Operating Handbook.

### **g** *Climb*

Be alert for symptoms of carb icing, especially when visible moisture is present or if conditions are in the high probability ranges in the chart.

### **h** *Cruise*

Monitor appropriate engine instruments for any changes which could indicate icing. Make a carb heat check at least every 10 minutes, (more frequently if conditions are conducive to icing). **Use full heat** and note the warning of para 4 (e), it may take up to 15 seconds to clear the ice and the engine will continue to run roughly as the ice melts and passes through the engine. If the icing is so severe that the engine has died, keep the hot air selected as residual heat in the rapidly cooling exhaust **may** be effective. In all cases, it is vital to select carb heat before any selector valves or linkages are frozen solid by an accumulation of ice around them. Avoid clouds as much as possible, note; that few piston engined aircraft are cleared for flight in icing conditions.

### **i** *Descent and Approach*

Carb icing is much more likely at reduced power, so select hot air **before, rather than after**, power is

reduced for the descent, and especially for a practice forced landing or a helicopter autorotation, ie, before the exhaust starts to cool. (This also allows a check that no ice is present and that the carb heat is still working.) Maintain FULL heat during long periods of flight with reduced power settings. At intervals of about 500 ft or more frequently if conditions require, increase power to cruise setting to warm the engine and to provide sufficient heat to melt any ice.

**j** *Downwind*

Ensure that the downwind check includes the following check:

- Note the RPM/Manifold Pressure
- Apply Full Carb heat for about 15 seconds and note the reduced indication.
- Return Carb heat to Cold. The RPM/Manifold Pressure will return to the earlier indication if there

was no icing. If it is higher – icing was present.

**k** *Base Leg and Final Approach*

Unless otherwise stated in the Pilot's Operating Handbook or Flight Manual, the HOT position should be selected on base leg when power is reduced. On some engine installations, to ensure better engine response and to permit a go-around to be initiated without delay, it is recommended that the carb heat be returned to COLD at about 200/300 ft on finals.

**l** *Go-around or Touch and Go*

Ensure the carb heat is COLD, ideally before, or simultaneously as power is applied for a go-around.

**m** *After Landing*

Return to the COLD setting before taxiing, if not already set COLD, (para k).