## Appendix D: Metrological Data

### D1: ANNUAL CLIMATOLOGICAL SUMMARY - 2009

Station: 502968/26411, FAIRBANKS INTL AP, Alaska
Elev. 432 ft. above sea level
Lat. 64°48'N, Lon. 147°53'W

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<th>Date</th>
<th>Temperature (° F)</th>
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<td>Precipitation (inches)</td>
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</table>

(blank) Not reported.
Occurred on one or more previous dates during the month. The date in the Date field is the last day of occurrence.
Used through December 1983 only.
A Accumulated amount. This value is a total that may include data from a previous month or months or year (for annual value).
B Adjusted Total. Monthly value totals based on proportional available data across the entire month.
E An estimated monthly or annual total.
X Monthly means or totals based on incomplete time series. 1 to 9 days are missing.
Annual means or totals include one or more months which had 1 to 9 days that were missing.
M  Used to indicate data element missing.
T  Trace of precipitation, snowfall, or snowdepth. The precipitation data value will = zero.
Elem->  Element Types are included to provide cross-reference for users of the NCDC CDO System.
Station  Station is identified by: CoopID/WBAN, Station Name, State.
    S  Precipitation amount is continuing to be accumulated. Total will be included in a subsequent monthly or yearly value.  
Example: Days 1-20 had 1.35 inches of precipitation, then a period of accumulation began.  
The element TPCP would then be 00135S and the total accumulated amount value appears in a subsequent monthly value. 
If TPCP = "M" there was no precipitation measured during the month.  
Flag is set to "S" and the total accumulated amount appears in a subsequent monthly value.
D2: JULY 28TH 2009
### D3: Fairbanks Upper Air Sounding, July 28, 2009 Supporting Data

70261 PAFA Fairbanks Observations at 12Z 28 Jul 2009

<table>
<thead>
<tr>
<th>PRES (hPa)</th>
<th>HGHT (m)</th>
<th>TEMP (°C)</th>
<th>DWPT (°C)</th>
<th>RELH (%)</th>
<th>MIXR (g/kg)</th>
<th>DRCT (deg)</th>
<th>SKNT (knot)</th>
<th>THTA (K)</th>
<th>THTE (K)</th>
<th>THTV (K)</th>
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Station information and sounding indices

Station identifier: PAFA
Station number: 70261
Observation time: 090728/1200
Station latitude: 64.81
Station longitude: -147.86
Station elevation: 138.0
Showalter index: 1.76
Lifted index: 1.78
LIFT computed using virtual temperature: 1.52
SWEAT index: 151.18
K index: 29.70
Cross totals index: 20.30
Vertical totals index: 28.30
Totals totals index: 48.60
Convective Available Potential Energy: 0.00
CAPE using virtual temperature: 0.00
Convective Inhibition: 0.00
CINS using virtual temperature: 0.00
Bulk Richardson Number: 0.00
Bulk Richardson Number using CAPV: 0.00
Temp [K] of the Lifted Condensation Level: 281.42
Pres [hPa] of the Lifted Condensation Level: 852.45
Mean mixed layer potential temperature: 294.58
Mean mixed layer mixing ratio: 8.12
1000 hPa to 500 hPa thickness: 5601.00
Precipitable water [mm] for entire sounding: 24.95

TTAA 78121 70261 99003 15245 09502 00159 16656 ///// 92829 17860 18014 85546
12658 19528 70140 00432 21034 50576 15773 19040 40741 25763 20545 30944 39957
21045 25066 50530 20550 20209 52161 20559 15396 47373 21042 10661 49972 20017
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D4: Code for Hourly Observations

04/11/2005

Surface Hourly Abbreviated Format

One header record followed by data records:

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<td>USAF = Air Force Catalog Station Number</td>
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<tr>
<td>08-12</td>
<td>WBAN = NCDC WBAN Number</td>
</tr>
<tr>
<td>14-25</td>
<td>YR--MODAHRMN = Year-Month-Day-Hour-Minute in Greenwich Mean Time (GMT)</td>
</tr>
<tr>
<td>27-29</td>
<td>DIR = Wind direction in compass degrees, 990 = variable, reported as '***' when air is calm (SPD will then be 000)</td>
</tr>
<tr>
<td>31-37</td>
<td>SPD &amp; GUS = Wind Speed &amp; Gust in miles per hour</td>
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<td>39-41</td>
<td>CLG = Cloud Ceiling--Lowest Opaque Layer with 5/8 or greater coverage, in hundreds of feet, 722 = unlimited</td>
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<tr>
<td>43-45</td>
<td>SKC = Sky cover -- CLR-Clear, SCT-Scattered-1/8 to 4/8, BKN-Broken-5/8 to 7/8, OVC-Overcast, OBS-Obscured, POB-Partial Obscuration</td>
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<td>47-47</td>
<td>L = Low Cloud Type, See Below</td>
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<tr>
<td>49-49</td>
<td>M = Middle Cloud Type, See Below</td>
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<td>51-51</td>
<td>H = High Cloud Type, See Below</td>
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<td>53-56</td>
<td>VSB = Visibility in statute miles to nearest tenth</td>
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Note: For some stations, visibility is reported only up to a maximum of 7 or 10 miles in METAR observations, but to higher values in synoptic observations, which causes the values to fluctuate from one data record to the next. Also, values originally reported as '10' may appear as '10.1' due to data being archived in metric units and converted back to English.

58-65  | WW WW WW = Present Weather--Listed Below |
| 67-67  | W = Past Weather Indicator, See Below |
| 69-77  | TEMP & DEWP = Temperature & Dew Point in Fahrenheit |
| 79-84  | SLP = Sea Level Pressure in millibars to nearest tenth |
| 86-90  | ALT = Altimeter setting in inches to nearest hundredth |
| 92-97  | STP = Station Pressure in millibars to nearest tenth |
| 99-101 | MAX = Maximum Temperature in Fahrenheit (Time Period Varies) |
| 103-105 | MIN = Minimum Temperature in Fahrenheit (Time Period Varies) |
| 107-111 | PCP01 = 1-Hour Liquid Precip Report in inches and hundredths -- |
THAT IS, THE PRECIP FOR THE PRECEDING 1 HOUR PERIOD
113-117 PCP06 = 6-HOUR LIQUID PRECIP REPORT IN INCHES AND HUNDREDTHS --
THAT IS, THE PRECIP FOR THE PRECEDING 6 HOUR PERIOD
119-123 PCP24 = 24-HOUR LIQUID PRECIP REPORT IN INCHES AND HUNDREDTHS
THAT IS, THE PRECIP FOR THE PRECEDING 24 HOUR PERIOD
125-129 PCPXX = LIQUID PRECIP REPORT IN INCHES AND HUNDREDTHS, FOR
A PERIOD OTHER THAN 1, 6, OR 24 HOURS (USUALLY FOR 12 HOUR PERIOD
FOR STATIONS OUTSIDE THE U.S., AND FOR 3 HOUR PERIOD FOR THE U.S.)
T = TRACE FOR ANY PRECIP FIELD
131-132 SD = SNOW DEPTH IN INCHES

NOTES:
- *'s IN FIELD INDICATES ELEMENT NOT REPORTED.
- SOME VALUES WERE CONVERTED FROM METRIC TO ENGLISH UNITS. THIS WILL
  OCCASIONALLY RESULT IN MINOR DIFFERENCES VS ORIGINAL DATA DUE TO ROUNDING.
- COLUMN POSITION REFERS TO ASCII TEXT DATA.
- THIS FORMAT CAN BE EASILY IMPORTED INTO A SPREADSHEET OR A DATABASE
  MANAGEMENT SYSTEM SINCE FIELDS ARE SPACE-DELIMITED.
- THIS FORMAT DOES NOT INCLUDE QUALITY CONTROL FLAGS, WHICH ARE AVAILABLE
  IN THE ADVANCED FORMAT THROUGH THE CLIMATE DATA ONLINE SYSTEM.

PRESENT WEATHER CODE TABLE

The code that denotes a specific type of weather observed.

00-49 No precipitation at the station at the time of observation
00-19 No precipitation, fog, ice fog (except for 11 and 12),
  duststorm, sandstorm, drifting or blowing snow at the station at the
  time of observation or, except for 09 and 17, during the preceding
  hour
00: Cloud development not observed or not observable
01: Clouds generally dissolving or becoming less developed
02: State of sky on the whole unchanged
03: Clouds generally forming or developing
04: Visibility reduced by smoke, e.g. veldt or forest fires, industrial smoke or volcanic ashes
05: Haze
06: Widespread dust in suspension in the air, not raised by wind at or near the station at the time of observation
07: Dust or sand raised by wind at or near the station at the time of observation, but no well-developed dust whirl(s) or sand whirl(s), and no duststorm or sandstorm seen or, in the case of ships, blowing spray at the station
08: Well developed dust whirl(s) or sand whirl(s) seen at or near the station during the preceding hour or at the time of observation, but no duststorm or sandstorm
09: Duststorm or sandstorm within sight at the time of observation, or at the station during the preceding hour
10: Mist
11: Patches of shallow fog or ice fog at the station, whether on land or sea, not deeper than about 2 meters on land or 10 meters at sea
12: More or less continuous shallow fog or ice fog at the station, whether on land or sea, not deeper than about 2 meters on land or 10 meters at sea
13: Lightning visible, no thunder heard
14: Precipitation within sight, not reaching the ground or the surface of the sea
15: Precipitation within sight, reaching the ground or the surface of the sea, but distant, i.e., estimated to be more than 5 km from the station
16: Precipitation within sight, reaching the ground or the surface of the sea, near to, but not at the station
17: Thunderstorm, but no precipitation at the time of observation
18: Squalls at or within sight of the station during the preceding hour or at the time of observation
19: Funnel cloud(s) (Tornado cloud or waterspout) at or within sight of the station during the preceding hour or at the time of observation
20-29 Precipitation, fog, ice fog or thunderstorm at the station during the preceding hour, but not at the time of observation
20: Drizzle (not freezing) or snow grains not falling as shower(s)
21: Rain (not freezing) not falling as shower(s)
22: Snow not falling as shower(s)
23: Rain and snow or ice pellets not falling as shower(s)
24: Freezing drizzle or freezing rain not falling as shower(s)
25: Shower(s) of rain
26: Shower(s) of snow or of rain and snow
27: Shower(s) of hail (Hail, small hail, snow pellets), or rain and hail
28: Fog or ice fog
29: Thunderstorm (with or without precipitation)

30-39 Duststorm, sandstorm, or blowing snow

30: Slight or moderate duststorm or sandstorm has decreased during the preceding hour
31: Slight or moderate duststorm or sandstorm no appreciable change during the preceding hour
32: Slight or moderate duststorm or sandstorm has begun or has increased during the preceding hour
33: Severe duststorm or sandstorm has decreased during the preceding hour
34: Severe duststorm or sandstorm no appreciable change during the preceding hour
35: Severe duststorm or sandstorm has begun or has increased during the preceding hour
36: Slight or moderate drifting snow generally low (below eye level)
37: Heavy drifting snow generally low (below eye level)
38: Slight or moderate blowing snow generally high (above eye level)
39: Heavy blowing snow generally high (above eye level)

40-49 Fog or ice fog at the time of observation

40: Fog or ice fog at a distance at the time of observation, but not at the station during the preceding hour, the fog or ice fog extending to a level above that of the observer
41: Fog or ice fog in patches
42: Fog or ice fog, sky visible, has become thinner during the preceding hour
43: Fog or ice fog, sky invisible, has become thinner during the preceding hour
44: Fog or ice fog, sky visible, no appreciable change during the preceding hour
45: Fog or ice fog, sky invisible, no appreciable change during the preceding hour
46: Fog or ice fog, sky invisible, has begun or has become thicker during the preceding hour
47: Fog or ice fog, sky invisible, has begun or has become thicker during the preceding hour
48: Fog, depositing rime, sky visible
49: Fog, depositing rime, sky invisible

50-99 Precipitation at the station at the time of observation

50-59 Drizzle

50: Drizzle, not freezing, intermittent, slight at time of observation
51: Drizzle, not freezing, continuous, slight at time of observation
52: Drizzle, not freezing, intermittent, moderate at time of observation
53: Drizzle, not freezing, continuous, moderate at time of observation
54: Drizzle, not freezing, intermittent, heavy (dense) at time of observation
55: Drizzle, not freezing, continuous, heavy (dense) at time of observation
56: Drizzle, freezing, slight
57: Drizzle, freezing, moderate or heavy (dense)
58: Drizzle and rain, slight
59: Drizzle and rain, moderate or heavy

60-69 Rain

60: Rain, not freezing, intermittent, slight at time of observation
61: Rain, not freezing, continuous, slight at time of observation
62: Rain, not freezing, intermittent, moderate at time of observation
63: Rain, not freezing, continuous, moderate at time of observation
64: Rain, not freezing, intermittent, heavy at time of observation
65: Rain, not freezing, continuous, heavy at time of observation
66: Rain, freezing, slight
67: Rain, freezing, moderate or heavy
68: Rain or drizzle and snow, slight
69: Rain or drizzle and snow, moderate or heavy
70-79  Solid precipitation not in showers

70: Intermittent fall of snowflakes, slight at time of observation
71: Continuous fall of snowflakes, slight at time of observation
72: Intermittent fall of snowflakes, moderate at time of observation
73: Continuous fall of snowflakes, moderate at time of observation
74: Intermittent fall of snowflakes, heavy at time of observation
75: Continuous fall of snowflakes, heavy at time of observation
76: Diamond dust (with or without fog)
77: Snow grains (with or without fog)
78: Isolated star-like snow crystals (with or without fog)
79: Ice pellets

80-99  Showery precipitation, or precipitation with current or recent thunderstorm

80: Rain shower(s), slight
81: Rain shower(s), moderate or heavy
82: Rain shower(s), violent
83: Shower(s) of rain and snow mixed, slight
84: Shower(s) of rain and snow mixed, moderate or heavy
85: Show shower(s), slight
86: Snow shower(s), moderate or heavy
87: Shower(s) of snow pellets or small hail, with or without rain or rain and snow mixed, slight
88: Shower(s) of snow pellets or small hail, with or without rain or rain and snow mixed, moderate or heavy
89: Shower(s) of hail (hail, small hail, snow pellets), with or without rain or rain and snow mixed, not associated with thunder, slight
90: Shower(s) of hail (hail, small hail, snow pellets), with or without rain or rain and snow mixed, not associated with thunder, moderate or heavy
91: Slight rain at time of observation, thunderstorm during the preceding hour but not at time of observation
92: Moderate or heavy rain at time of observation, thunderstorm during the preceding hour but not at time of observation
93: Slight snow, or rain and snow mixed or hail (Hail, small hail, snow pellets), at time of observation, thunderstorm during the preceding hour but not at time of observation
94: Moderate or heavy snow, or rain and snow mixed or hail (Hail, small hail, snow pellets) at time of observation, thunderstorm during the preceding hour but not at time of observation
95: Thunderstorm, slight or moderate, without hail (Hail, small hail, snow pellets), but with rain and/or snow at time of observation, thunderstorm at time of observation
96: Thunderstorm, slight or moderate, with hail (hail, small hail, snow pellets) at time of observation, thunderstorm at time of observation
97: Thunderstorm, heavy, without hail (Hail, small hail, snow pellets), but with rain and/or snow at time of observation, thunderstorm at time of observation
98: Thunderstorm combined with duststorm or sandstorm at time of observation, thunderstorm at time of observation
99: Thunderstorm, heavy, with hail (Hail, small hail, snow pellets) at time of observation, thunderstorm at time of observation

PAST WEATHER CODE TABLE

The code that denotes a specific type of past weather observed.
0: Cloud covering 1/2 or less of the sky throughout the appropriate period
1: Cloud covering more than 1/2 of the sky during part of the appropriate period and covering 1/2 or less during part of the period
2: Cloud covering more than 1/2 of the sky throughout the appropriate period
3: Sandstorm, duststorm or blowing snow
4: Fog or ice fog or thick haze
5: Drizzle
6: Rain
7: Snow, or rain and snow mixed
8: Shower(s)
9: Thunderstorm(s) with or without precipitation

LOW CLOUD TYPE

0: No low clouds
1: Cumulus humulis or Cumulus fractus other than of bad weather or both
2: Cumulus mediocris or congestus, with or without Cumulus of
species fractus or humulis or Stratocumulus all having bases at the same level
3: Cumulonimbus calvus, with or without Cumulus, Stratocumulus or Stratus
4: Stratocumulus cumulogenitus
5: Stratocumulus other than Stratocumulus cumulogenitus
6: Stratus nebulosus or Stratus fractus other than of bad weather, or both
7: Stratus fractus or Cumulus fractus of bad weather, or both
   (pannus) usually below Altostratus or Nimbostratus
8: Cumulus and Stratocumulus other than Stratocumulus cumulogenitus, with bases at different levels
9: Cumulonimbus capillatus (often with an anvil), with or without Cumulonimbus calvus, Cumulus, Stratocumulus, Stratus or pannus

MIDDLE CLOUD TYPE

0: No middle clouds
1: Altostratus translucidus
2: Altostratus opacus or Nimbostratus
3: Altocumulus translucidus at a single level
4: Patches (often lenticular) of Altocumulus translucidus, continually changing and occurring at one or more levels
5: Altocumulus translucidus in bands, or one or more layers of Altocumulus translucidus or opacus, progressively invading the sky; these Altocumulus clouds generally thicken as a whole
6: Altocumulus cumulogenitus (or cumulonimbogenitus)
7: Altocumulus translucidus or opacus in two or more layers, or Altocumulus opacus in a single layer, not progressively invading the sky, or Altocumulus with Altostratus or Nimbostratus
8: Altocumulus castellanus or floccus
9: Altocumulus of a chaotic sky; generally at several levels

HIGH CLOUD TYPE

0: No High Clouds
1: Cirrus fibratus, sometimes uncinus, not progressively invading the sky
2: Cirrus spissatus, in patches or entangled sheaves, which usually do not increase and sometimes seem to be the remains of the upper part of a Cumulonimbus; or Cirrus castellanus or floccus
3: Cirrus spissatus cumulonimbogenitus
4: Cirrus unicinus or fibratus, or both, progressively invading the sky; they generally thicken as a whole
5: Cirrus (often in bands) and Cirrostratus, or Cirrostratus alone, progressively invading the sky; they generally thicken as a whole, but the continuous veil does not reach 45 degrees above the horizon
6: Cirrus (often in bands) and Cirrostratus, or Cirrostratus alone, progressively invading the sky; they generally thicken as a whole; the continuous veil extends more than 45 degrees above the horizon, without the sky being totally covered
7: Cirrostratus covering the whole sky
8: Cirrostratus not progressively invading the sky and not entirely covering it
9: Cirrocumulus alone, or Cirrocumulus predominant among the High clouds