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Operations and Services

Surface Observation Program (Land), NWSPD 10-13

SUPPLEMENTARY OBSERVATIONS AND COMPLEMENTARY DATA SOURCES AND NETWORKS

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SUMMARY OF REVISIONS: This directive supersedes NWSI 10-1311, “Supplementary Observations,” dated August 25, 2005 and it rescinds NWSI 10-1312, “Complementary Data Sources and Networks,” dated January 28, 2005. Changes are: (1) incorporated both instructions into a single entity; (2) divided the Instruction into only two appendices; Appendix A “Supplementary Observations”, and Appendix B “Complementary Data Sources and Networks”; (3) in Appendix B Section 1 and Section 1.2.b added delegation of authority to the corporate board; (4) in Appendix B Section 1.2 added reference to NWSI 1-1201; (5) added Section 1.2.c to Appendix B.

Signed
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6/1/09
Date

Supplementary Observations and Complementary Data Sources and Networks

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1. Introduction. This instruction establishes National Weather Service (NWS) operating methods for the Supplementary Observing Program and the Complementary Data Programs. It describes each program, the NWS role, and their differences.

2. Supplementary Observing Program. The supplementary observing program is part of the total observation concept. This instruction defines and describes the National Weather Service (NWS) Supplementary Observations program and prescribes uniform instructions for reporting and coding supplementary weather data. It is intended to provide a framework within which meteorological phenomena and climatological data are identified and reported.

The advantages of automated observing systems are many, although these systems are not able to identify all the elements that can be reported by human observers. Some elements not required to be reported by automated systems are still useful for NWS operations and climatology. Complementary technologies (e.g., radars and satellites) are used to derive some of these elements. However, some elements will continue to be manually observed, coded as separate messages from the automated observation, and transmitted as supplementary data.

3. Complementary Data Sources. Complementary Data Sources are acquired, used and transmitted by the NWS from outside networks. In order to accomplish its mission, the NWS must be able to identify and predict mesoscale weather phenomena. Observations from complementary sources enhance this identification and prediction. These observations are produced by a wide range of automated sources and not from manual spotters or other observers.

This instruction describes the National Weather Service (NWS) process for the acquisition, use and transmission of complementary data sets. This instruction emphasizes the NWS role in

weather data acquisition and dissemination. This process should be capable of bringing together diverse data sets, advancing the ability to understand weather and climate variability and change.

NWS offices are encouraged to identify, collect, and use complementary surface based data in their forecast and warning programs. Some complementary observation sources may not meet NWS observational standards as stated in NWSI 10-1302. It is the responsibility of NWS staff to exercise their best judgment in the use of the data, but the data can and should be used. These data sets can add valuable information to supplement traditional data networks.

Current Observations are often driven by different mission needs and tend to focus on the measurement of discrete variables at specific locations. Most non-NWS observing systems are not designed to meet existing NWS requirements. However, post-processing schemes for QC will allow the NWS to utilize these observations more readily to support agency programs. To increase the value of these disparate observing systems the NWS needs to (1) link qualifying observing systems into a network of integrated systems, (2) formulate agreements across a set of federal, state and private sector partners to create structure for such an integrated observing system, and (3) provide a framework that encourages the integration of new observations into a broader strategy involving research and operations.

4. Appendix A. Appendix A explains in detail the Supplementary Observing Program. It defines its scope, NWS roles, equipment, and training requirements. It also prescribes detailed uniform instructions for reporting, coding and transmitting the data.

5. Appendix B. Appendix B offers a similar explanation for the acquisition, use and transmission of Complementary data sets.

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1. Supplementary Data Reports. Supplementary data reports are divided into two categories: Event-driven reports and climatological reports.
 - a. Supplementary Data Observations (SDO). These reports provide event-driven observations primarily intended to support weather forecasting and verification.
 - b. Supplementary Climatological Data (SCD). These reports provide routinely scheduled observations useful for climatological applications as well as hydrometeorological operations. They are required at all WFOs, WSOs, and DCOs.

2. Weather Forecast Offices (WFO), Weather Service Offices (WSO), and Data Collection Offices (DCO). WFOs, WSOs, and DCOs may report event-driven supplementary observations and will report climatologically oriented supplementary data at 6-hourly main synoptic times, calendar day maximum/minimum temperatures and precipitation at midnight Local Standard Time (LST). Sunshine data will be reported at 0800 Coordinated Universal Time (UTC) if a sunshine sensor is available.

3. Snow-Paid Stations. These stations should report 6-hourly snow depth (as required, see Section 13.3.3.8) and snowfall at synoptic times and 24-hour snowfall at midnight local standard time. Water equivalency may be reported at 1800 UTC if designated by the supervising WFO and the proper measuring equipment has been installed. Other climatological data may be reported, but is not mandatory. See section 13.
 - 3.1 Minimum Equipment Required at Snow-Paid Stations. The NWS will provide each snow-paid station with a snow board and measuring stick. A standard 8" rain gauge will be provided to snow-paid stations designated to provide water equivalency measurements.
 - 3.2 Training of Snow-Paid Observers. Each new snow-paid station will be provided the "Measuring Snow" video or DVD. The WFO responsible for the Snow-Paid station will also provide individual on-site training of the observer and will provide additional training if warranted. The WFO will keep a record of all training provided to snow-paid to ensure training is satisfactorily completed.

- 3.3 Data Collection from Snow-Paid Stations. The NWS supervising office will make arrangements to collect the SCD observations from the Snow-Paid observers. Collection of data may be by phone, Fax, the Internet, or any other means acceptable to the Snow-Paid observer, along with general hydrometeorological needs. The SDO is only reported if designated by the Regional Headquarters or if considered operationally significant by the observing staff.
4. Continuation of Reported Event-Driven Data. Once an event-driven observation has been generated, the observer must maintain an awareness of the validity of the report in order to initiate updates. Event-driven elements will be reported on an “as-observed” basis and do not imply a continuous or basic weather watch. Once reported, weather and/or obstructions to vision should continue to be reported in any subsequent SDO reports while they are occurring. Once an SDO is initiated for an event, maintain cognizance of current conditions.
5. Recency of Observed Data. Data entered into a supplementary observation will have been observed within 15 minutes of the time of the report (except for duration of sunshine, 98mmm).
6. Designated Stations. The phrase “designated stations” refers to stations that have been instructed by their regional headquarters to perform a specified task that is not required to be performed at all stations.
7. Observation Filing Time. Event-driven observations should be completed and transmitted as soon as possible. The SCD is a scheduled observation. The report should be transmitted no earlier than 10 minutes before the scheduled hour, nor later than 10 minutes after the scheduled hour.
8. Forms. There are no required official forms for use at WFOs, WSOs, or DCOs for recording supplementary data or climatological data observations. These stations may use the Supplementary Observations Worksheet found in Section 14 for recording supplementary observations. Snow-Paid observers will use the Supplementary Observations Worksheet found in Section 14 for recording required climate data. These worksheets may be copied by the supervising office and made available to Snow-Paid observers.
9. NWS Stations Augmenting ASOS. If a climate element is included with ASOS as augmentation, that element will also be reported in the SCD observation. For example, if snow depth is reported in the remarks of the ASOS METAR report to satisfy service level requirements, it will also be reported in the SCD.
10. Supplementary Data Observation (SDO). These reports provide event-driven observations based on local user requirements, useful for weather forecasting and general hydrometeorological needs, including verification. Event-driven reports are issued when certain phenomena are first observed. A follow-up “termination” report is required only for the cessation of weather and obscurations (see 10.3.5 and 10.3.6.1).

Several stations have been designated as terrain-problematic sites and are instructed to generate SDOs for specific events. Each station will coordinate with its regional headquarters to determine which events it is to report. Observers should use their best judgement on checking for the need to issue event-driven SDOs.

10.1 SDO Report. The SDO may consist of four elements and a remarks section. Together they make up the complete SDO report, and they are coded in the following order:

- a. Station Identifier (CCCC)
- b. Type of Observation (SDO)
- c. Corrected Observation (COR)
- d. Time of Observation (UTC)
- e. Weather and/or Obscurations (WX)
 - (1) WFOs and DCOs Collocated with ASOS
Ice Pellets (PL)
 - (2) WFOs Not Collocated with ASOS
Ice Pellets (PL)
Volcanic Ash (VA)
 - (3) When considered significant by observing staff, report:
Ice Crystals (IC)
Freezing Fog (FZFG)
Smoke (FU)
Blowing phenomena (blowing dust [BLDU], sand [BLSA], snow [BLSN],
and spray [BLPY])
- f. Remarks (RMK)
 - (1) Decodable Remarks:
Termination (END) of weather and/or obstructions to vision
SNINCR x/x - Snow increasing rapidly
GR x - Size of largest hailstones observed
 - (2) Other remarks when considered significant by the observing staff:

Local variations in visibility
Virga

Precipitation not at the station
Cloud layers above 12,000 feet and significant cloud types

Distant clouds obscuring mountains
Phenomena considered significant by the on-site observer

10.2 Format and Content of the SDO Report. The underline character () indicates a required space, and the solidus (/) indicates a required solidus.

CCCC_SDO_(COR)_TIME_WX/_Decodable RMK_/_Other RMK (in the order described in 2.1)

10.3 Coding the SDO.

10.3.1 Station Identifier (CCCC). A four-letter location identifier is included in all reports indicating the station to which the coded report applies. The station identifier is separated from elements following it by a space.

10.3.2 Type of Observation (SDO). The designator is included in all reports to indicate the type of observation. Add “SDO” to designate a Supplementary Data Observation. The type of observation is separated from elements following it by a space.

10.3.3 Corrected Observation (COR). If the report is a correction to a previously disseminated SDO, add “COR” after the space following the type of observation. A space is also required between the entry and the time of the observation.

10.3.4 Time of Observation (UTC). The time of observation is included in all reports in hours and minutes (UTC is used in all disseminated reports) and is the time of the observation. If the report is a correction to a previously disseminated erroneous report, the time entered on the corrected report is the same time used in the observation being corrected. The time of observation is separated from the element following it by a space.

10.3.5 Weather and/or Obscurations (WX). Ice Pellets (PL) is the only required weather to be reported in an SDO. Volcanic ash is the only required obscuration to be reported in an SDO. Visibility is not a factor in reporting “VA” as present weather (WX) in an SDO, therefore, any observed “VA” will be reported. Ice Crystals (IC), Freezing Fog (FZFG), Smoke (FU), and blowing phenomena (blowing dust [BLDU], sand [BLSA], snow [BLSN], and spray [BLPY]) should be reported when considered significant by the observing staff. Initiation and termination reports will be issued for weather and/or obscurations (see Section 10.3.6.1). Once weather and/or obscurations have been observed and reported, they should continue to be reported in any subsequent SDO reports while they are occurring.

When more than one form of precipitation is occurring at a time or precipitation is occurring with an obscuration, the intensities determined will be no greater than that which would be determined if any of the forms were occurring alone. Report the intensity of Ice Pellets using the symbols from Table A-1. No intensity is assigned to Ice Crystals. When more than one type of weather and/or obscuration is reported at the same time, they will be reported as follows: 1) precipitation in the order of decreasing dominance (most dominant first), and 2) obscurations in order of decreasing dominance.

	Precipitation Intensity Symbols
Light	-
Moderate	No Symbol
Heavy	+

Table A-1. Precipitation Intensity Symbols

The intensity of Ice Pellets is identified as light, moderate, or heavy in accordance with one of the following tables (A-2 or A-3):

Intensity	Criteria
Light	Up to 0.10 inch per hour; maximum 0.01 inch in 6 minutes.
Moderate	0.11 inch to 0.30 inch per hour; more than 0.01 inch to 0.03 inch in 6 minutes.
Heavy	More than 0.30 inch per hour; more than 0.03 inch in 6 minutes.

Table A-2. Intensity of Ice Pellets Based on Rate-of-Fall

Intensity	Criteria
Light	Scattered pellets that do not completely cover an exposed surface regardless of duration. Visibility is not affected.
Moderate	Slow accumulation on the ground. Visibility reduced by ice pellets to less than 7 miles.
Heavy	Rapid accumulation on the ground. Visibility reduced by ice pellets to less than 3 miles.

Table A-3. Estimating the Intensity of Ice Pellets

10.3.6 Remarks (RMK). Appropriate remarks may be included in all SDOs. Remarks are separated from the weather (WX) element by a solidus and a space. If there is no weather (WX), the remarks are preceded by a space after the time. Remarks are made according to the following:

- a. Where plain language is called for, authorized contractions and abbreviations are used to conserve time and space. However, in no case should an essential remark be omitted for the lack of readily available contractions. In such cases, the only requirement is that the remark be clear.
- b. Location of weather phenomena, with the exception of precipitation, will be reported as “in the vicinity of the station” or “VC” if between 5 and 10 miles from the point of observation, and “distant from the station” or “DSNT” when beyond 10 miles from the point of observation. Precipitation will be reported as “showers in the vicinity” or “VCSH” when not occurring at the point of observation but within 10 miles of the point of observation, and “distant” or “DSNT” when occurring beyond 10 miles of the point of observation.
- c. Movement of clouds or weather is reported with respect to the direction toward which the phenomenon is moving, using eight points of the compass.
- d. Descriptions of locations of a phenomenon done by reference to a set of directions will use eight points of the compass, entered in a clockwise order.

10.3.6.1 Termination (END) of Weather and/or Obscurations. A termination SDO report is required whenever one of the designated weather and/or obscurations (PL, IC, FZFG, FU, BLDU, BLSA BLSN, BLPY, and VOLCANIC ASH) for which an SDO was originally issued is determined to have ended. These termination reports will contain the key word “END” followed by a space and a description of the weather event which ended; e.g., END PL, END FZFG, END FU, END BLSN, END VOLCANIC ASH, etc.

10.3.6.2 Snow Increasing Rapidly, SNINCR x/x. Report snow increasing rapidly (SNINCR) on an hourly basis, on the hour, whenever the snow depth increase equals or exceeds 0.5 inches in the past hour. The format is to report “SNINCR” followed by the depth increase in the past hour and the total depth of snow on the ground at the time of the SDO, separated from each other by a solidus (/). For example, SNINCR 2/12 would indicate a snow depth increase of 2 inches in the last hour and a total depth on the ground of 12 inches.

10.3.6.3 Size of Largest Hailstones Observed, GR x. Whenever hail is observed, report the size of the largest hailstones with the contraction “GR” followed by the size of the hailstones. The diameter of the largest hailstones should be estimated or measured and reported in 1/4 inch increments. If the diameter is less than 1/4 inch, no report is required. For example, GR 3/4 would indicate that the largest hailstones were 3/4 inch in diameter. Additional reports should be disseminated whenever the current hailstone size exceeds the last “GR x” report.

10.3.6.4 Decodable and Other Remarks (Non-Decodable) Separator, _/_. The purpose of the remarks separator (_/_) is to assist computer decoders in differentiating between decodable remarks and remarks not readily amenable to decoding. The remarks separator (_/_) will be coded only if, the SDO contains both decodable and non-decodable remarks. The solidus is separated from decodable and non-decodable remarks by a space (the underline character

represents a required space). The blank spaces on either side of the solidus are critical. The decoders will key on the three-character “_/_” sequence.

10.3.6.5 Local Variation in Visibility (Designated Stations). Significant “local variations in visibility” will be reported by designated stations when observed. Report any weather elements or phenomena that affect local variations in visibility, followed by the direction and distance from the station; e.g., VIS N2, VCFG –E2. Once reported, significant changes to “local variations in visibility” should be reported in updated SDO reports. “Local variations in visibility” should continue to be reported in any subsequent SDO reports while they are occurring.

A termination report is not required for “local variations in visibility,” unless designated by the regional headquarters. If designated to report the termination of “local variations in visibility,” the report will contain the key word “END” followed by a space and a description of the event; e.g., END VIS N2, END VCFG N-E2, etc. Termination reports for “local variations in visibility” can have several meanings: 1) the event ended, 2) the event is no longer considered significant, but it may still exist, or 3) due to darkness, it is not possible to determine if the event still exists.

10.3.6.6 Virga (Designated Stations). Significant “virga” will be reported by designated stations when observed. Report “VIRGA” followed by the location (if known) and the direction from the station; e.g., VIRGA VC W, VIRGA OVR MTNS W. Once reported, significant changes to “virga” should be reported in updated SDO reports; e.g., VIRGA VC NW MOV E. Virga should continue to be reported in any subsequent SDO reports while it is occurring.

A termination report is not required for “virga” unless designated by the regional headquarters. If designated to report the termination of “virga,” the report will contain the key word “END” followed by a space and a description of the event; e.g., END VIRGA VC N. Termination reports for “virga” can have several meanings: 1) the event ended, 2) the event is no longer considered significant, but it may still exist, or 3) due to darkness, it is not possible to determine if the event still exists.

10.3.6.7 Precipitation Not at the Station (Designated Stations). Significant “precipitation not at the station” will be reported by designated stations when observed. Report “VCSH,” followed by the location (if known), and the direction from the station; e.g., VCSH SW, VCSH OVR MTNS N. Once reported, significant changes to “precipitation not at the station” should be reported in updated SDO reports; e.g., VCSH SW MOV NW. “Precipitation not at the station” should continue to be reported in any subsequent SDO reports while it is occurring.

A termination report is not required for “precipitation not at the station,” unless designated by the regional headquarters. If designated to report the termination of “precipitation not at the station,” the report will contain the key word “END” followed by a space and a description of the event; e.g., END VCSH NW, END VCSH OVR MTNS N, etc. Termination reports for “precipitation not at the station” can have several meanings: 1) the event ended, 2) the event is no longer considered significant, but it may still exist, or 3) due to darkness, it is not possible to determine if the event still exists.

10.3.6.8 Cloud Layers above 12,000 Feet and Significant Cloud Types (Designated Stations). Significant “cloud layers above 12,000 feet” and “significant cloud types” (CB, TCU, ACC, SCSL, ACSL, CCSL, or rotor clouds) will be reported by designated stations when observed. Report “CLD LYR” followed by amounts (SCT, BKN, or OVC) and cloud base height. Only significant cloud layers above 12,000 feet are reported, with maximum of layers above 12,000 feet limited to three layers; e.g., CLD LYR BKN140 OVC200. Report significant cloud types associated with orographic features and their location and/or direction from the station; e.g., ACSL VC SW-W, ROTOR CLDS OVR MTNS VC W-NW. Once reported, significant changes to “cloud layers above 12,000 feet” and “significant cloud types” should be reported in updated SDO reports; e.g., CB W MOV N. “Cloud layers above 12,000 feet” and “significant cloud types” should continue to be reported in any subsequent SDO reports while they are occurring.

A termination report is not required for “cloud layers above 12,000 feet” and “significant cloud types,” unless designated by the regional headquarters. If designated to report the termination of “cloud layers above 12,000 feet” and “significant cloud types,” the report will contain the key word “END” followed by a space and a description of the event; e.g., END CLD LYR OVC140, END ACSL SW-W, etc. Termination reports for “cloud layers above 12,000 feet” and “significant cloud types” can have several meanings: 1) the event ended, 2) the event is no longer considered significant, but it may still exist, or 3) due to darkness, it is not possible to determine if the event still exists.

10.3.6.9 Distant Clouds Obscuring Mountains (Designated Stations). Significant “distant clouds obscuring mountains” will be reported by designated stations when observed. Describe the event and the location (if known) and direction from the station; e.g., CLD BASES OBSCG MTNS W. Once reported, significant changes to “distant clouds obscuring mountains” should be reported in updated SDO reports. “Distant clouds obscuring mountains” should continue to be reported in any subsequent SDO reports while they are occurring.

A termination report is not required for “distant clouds obscuring mountains,” unless designated by the regional headquarters. If designated to report the termination of “distant clouds obscuring mountains,” the report will contain the key word “END” followed by a space and a description of the event; e.g., END CLD BASES OBSCG MTNS W, etc. Termination reports for “distant clouds obscuring mountains” can have several meanings: 1) the event ended, 2) the event is no longer considered significant, but it may still exist, or 3) due to darkness, it is not possible to determine if the event still exists.

10.3.6.10 Phenomena Considered Significant by the On-site Observer. There is no limitation on remarks if you consider them significant, such as Blowing Volcanic Ash. Any significant weather information not covered above may be reported.

A termination report is not required for “phenomena considered significant by the on-site observer.” If a termination report is issued for “phenomena considered significant by the on-site observer,” the report will contain the key word “END” followed by a space and a description of the event; e.g., END BLOWING VA. Termination reports for “phenomena considered

significant by the on-site observer” can have several meanings: 1) the event ended, 2) the event is no longer considered significant, but it may still exist, or 3) due to darkness, it is not possible to determine if the event still exists.

CONTENT OF THE SUPPLEMENTARY DATA OBSERVATION (SDO)		
Element	Reference	Brief Description
Station Identifier (CCCC)	10.3.1	Four-letter code group used to identify the observing location.
Type of Observation (SDO)	10.3.2	Indicates the content of the observation, i.e., SDO.
Corrected Observation (COR)	10.3.3	Correction to a previously disseminated SDO.
Time of Observation (UTC)	10.3.4	Actual time of observation; usually the time the last element is observed.
Weather and/or Obscurations (WX)	10.3.5	Generate an SDO for PL and VA. If significant report IC, FZFG, FU, BLDU, BLSA, BLSN, and BLPY. Continue to report in subsequent SDOs until ended.
Remarks (RMK); and their order of entry follow:	10.3.6	Remarks may be included in all supplementary data observations, if appropriate.
Termination (END) of Weather and/or Obscurations	10.3.6.1	When weather and/or obscurations end, a termination report is required; e.g., END PL, END FZFG, END FU, END BLDU, etc.
Snow Increasing Rapidly, SNINCR x/x	10.3.6.2	Snow depth increase ≥ 0.5 inches in the past hour, report hourly when occurring, Report “SNINCR” followed by the depth increase in the past hour and the total depth on the ground; e.g., SNINCR 2/12. No termination report.
Size of Largest Hailstones, GR x	10.3.6.3	When hail is observed, report the size of the largest hailstones. Report “GR” followed by the size in 1/4 inch increments; e.g., GR 3/4. No report for hail less than 1/4 inch. No termination report.
Remarks Separator, _/_	10.3.6.4	The remarks separator “_/_” is used only if the SDO contains both decodable and non-decodable remarks (the underline character indicates a required space).
Local Variation in Visibility (Designated Stations)	10.3.6.5	Report conditions that affect local visibility. Report “VIS” and/or condition affecting visibility, direction, and distance from station; e.g., VIS N2, VCFG –E2. Continue to report in subsequent SDOs until ended. Termination (END) reports (Designated Stations); e.g., END VIS N2, END VCFG –E2.
Virga (Designated Stations)	10.3.6.6	Report the location (if known), and the direction of VIRGA from the station, e.g., VIRGA OVR MTNS W, VIRGA VC W. Continue to report in subsequent SDOs until ended. Termination (END) reports (Designated Stations); e.g., END VIRGA OVR MTNS W, END VIRGA VC W.
Precipitation Not at the Station (Designated Stations)	10.3.6.7	Report “VCSH,” location (if known), and direction from the station; e.g., VCSH SW, VCSH OVR MTNS N. Continue to report in subsequent SDOs until ended. Termination (END) reports (Designated Stations); e.g., END VCSH SW.
Cloud Layers Above 12,000' and Significant Cloud Types (Designated Stations)	10.3.6.8	Report significant cloud layers above 12,000' and significant cloud types. Report “CLD LZR,” amount (FEW SCT, BKN, OVC) and height; e.g., CLD LZR OVC140. Report cloud types followed by direction and/or location; e.g., ACSL VC SW-W, ROTOR CLDS OVR MTNS W-NW. Continue to report in subsequent SDOs until ended. Termination (END) reports (Designated Stations); e.g., END CLD LZR OVC140, END ACSL VC SW-W.
Distant Clouds Obscuring Mountains (Designated Stations)	10.3.6.9	Describe the event, location (if known), and direction from station; e.g., CLD BASES OBSCG MTNS W. Continue to report in subsequent SDOs until ended. Termination (END) reports (Designated Stations); END CLD BASES OBSCG MTNS W.
Phenomena Considered Significant by the On-site Observer	10.3.6.10	Any significant weather information not covered above may be entered here if not included in an ASOS observation; e.g., Blowing VA. Use appropriate contractions or plain language. Termination reports not required, but if reported, precede remark with “END.”

Table A-4. Content of the Supplementary Data Observation (SDO)

11. SCD Observation. These reports provide routinely scheduled observations useful for climatological applications as well as hydrometeorological operations. A follow-up “termination” report is not required for SCD observations.

11.1 SCD Report. The SCD may consist of four elements and coded additive data remarks. Together they make up the complete SCD report and are coded in the following order:

- a. Station Identifier (CCCC)
- b. Type of Observation (SCD)
- c. Corrected Observation (COR)
- d. Time of Observation (UTC)
- e. Weather and/or Obscurations (WX)
 - (1) WFOs, WSOs, and DCOs Collocated with ASOS
Precipitation types and intensity (in order of decreasing dominance)
 - (2) WFOs Not Collocated with ASOS
Precipitation types and intensity (in order of decreasing dominance)
Volcanic Ash
- f. Coded Remarks (RMK)
 - 8NN_nC_LhC_MC_H - Total cloud cover and synoptic cloud types
 - 931sss - Depth of new snow (snowfall)
 - 933RRR - Water equivalent of snow on the ground
 - 4/sss - Depth of snow on the ground
 - 6RRRR - 6-hour precipitation amount
 - 98mmm - Duration of sunshine
 - 24/931sss - Calendar day total snowfall
 - 7R₂₄R₂₄R₂₄R₂₄ - Calendar day total precipitation
 - 4s_nT_xT_xT_xs_nT_nT_nT_n - Calendar day maximum and minimum temperatures

11.2 Format and Content of the SCD Report. The underline character () indicates a required space, and the solidus (/) indicates a required solidus.

CCCC_SCD_(COR)_TIME_WX/_RMK (in the order described in 3.1)

11.3 Coding the SCD Observation:

11.3.1 Station Identifier (CCCC). A four-letter location identifier is included in all reports indicating the station to which the coded report applies. The station identifier is separated from elements following it by a space.

11.3.2 Type of Observation (SCD). The designator “SCD” is included in all reports to indicate the type of observation. The type of observation is separated from elements following it by a space.

11.3.3 Corrected Observation (COR). If the report is a correction to a previously disseminated SCD, add “COR” after the space following the type of observation. A space is also required between the entry and the time of the observation.

11.3.4 Time of Observation (UTC). The UTC time of the observation in hours and minutes is included in all reports. If the report is a correction to a previously disseminated erroneous report, the time entered on the corrected report is the same time used in the observation being corrected. The time of observation is separated from the element following it by a space.

11.3.5 Weather and/or Obscurations (WX). Report any precipitation types (Table A-5), plus intensities (Table A-6) observed at 0000, 0600, 1200, or 1800 UTC. Report volcanic ash if occurring at the synoptic hours. When more than one form of precipitation is occurring at a time or precipitation is occurring with an obscuration, the intensities determined will be no greater than that which would be determined if any of the forms were occurring alone. Report intensities using the symbols from Table A-6. Report the intensity of ice pellets according to Table A-7 or A-8. Report the intensity of rain, freezing rain, snow, or drizzle according to Table A-9, A-10, or A-11. No intensity is assigned to hail, ice crystals, or volcanic ash. The intensity refers to the first precipitation type, so any precipitation that follows will be of equal or lesser intensity. When more than one type of precipitation and/or “volcanic ash” are reported at the same time, they will be reported as follows: 1) precipitation is reported in the order of decreasing dominance (most dominant reported first), and 2) volcanic ash.

Precipitation Types/Volcanic Ash Report if observed at 0000, 0600, 1200, or 1800 UTC			
Weather	Contraction	Weather	Contraction
Rain	RA	Snow	SN
Rain Showers	SHRA	Snow Showers	SHSN
Drizzle	DZ	Snow Pellets	GS
Freezing Rain	FZRA	Snow Grains	SG
Freezing Drizzle	FZDZ	Ice Crystals	IC
Ice Pellets	PL	Hail	GR
Ice Pellet Showers	SHPL	Volcanic Ash	VA

Table A-5. Precipitation Types/Volcanic Ash and their Contractions

Intensity	Precipitation Intensity Symbols
Light	-
Moderate	No Symbol
Heavy	+

Table A-6. Precipitation Intensity Symbols

The intensity of Ice Pellets is identified as light, moderate, or heavy in accordance with one of the following tables (A-7 or A-8):

Intensity	Criteria
Light	Up to 0.10 inch per hour; maximum 0.01 inch in 6 minutes.
Moderate	0.11 inch to 0.30 inch per hour; more than 0.01 inch to 0.03 inch in 6 minutes.
Heavy	More than 0.30 inch per hour; more than 0.03 inch in 6 minutes.

Table A-7. Intensity of Ice Pellets Based on Rate-of-Fall

Intensity	Criteria
Light	Scattered pellets that do not completely cover an exposed surface regardless of duration. Visibility is not affected.
Moderate	Slow accumulation on the ground. Visibility reduced by ice pellets to less than 7 miles.
Heavy	Rapid accumulation on the ground. Visibility reduced by ice pellets to less than 3 miles.

Table A-8. Estimating the Intensity of Ice Pellets

Intensity	Criteria
Light	Up to 0.10 inch per hour; maximum 0.01 inch in 6 minutes.
Moderate	0.11 inch to 0.30 inch per hour; more than 0.01 inch to 0.03 inch in 6 minutes.
Heavy	More than 0.30 inch per hour; more than 0.03 inch in 6 minutes.

Table A-9. Intensity of Rain or Freezing Rain Based on Rate-of-Fall

Intensity	Criteria
Light	From scattered drops that, regardless of duration, do not completely wet an exposed surface up to a condition where individual drops are easily seen.
Moderate	Individual drops are not clearly identifiable; spray is observable just above pavements and other hard surfaces.
Heavy	Rain seemingly falls in sheets; individual drops are not identifiable; heavy spray to height of several inches is observed over hard surfaces.

Table A-10. Estimating the Intensity of Rain or Freezing Rain

Intensity	Criteria
Light	Visibility > 1/2 mile.
Moderate	Visibility > 1/4 mile but ≤ 1/2 mile.
Heavy	Visibility ≤ 1/4 mile.

Table A-11. Intensity of Snow or Drizzle Based on Visibility

11.3.6 Coded Remarks (RMK). Coded remarks are separated from the weather (WX) element by a solidus and a space. If there is no weather (WX), the coded remarks are preceded by a space after the time. Coded remarks are made in the following order:

- 8NN_hC_LhC_MC_H - Total cloud cover and synoptic cloud types
- 931sss - Depth of new snow (snowfall)
- 933RRR - Water equivalent of snow on the ground
- 4/sss - Depth of snow on the ground
- 6RRRR - 6-hour precipitation amount
- 98mmm - Duration of sunshine
- 24/931sss - Calendar day total snowfall
- 7R₂₄R₂₄R₂₄R₂₄ - Calendar day total precipitation
- 4s_nT_xT_xT_xs_nT_nT_nT_n - Calendar day maximum and minimum temperatures

11.3.6.1 Total Cloud Cover and Synoptic Cloud Types, 8NN_hC_LhC_MC_H. Report the total cloud cover and synoptic cloud types every six hours at 0000, 0600, 1200, and 1800 UTC, unless the sky is clear. The first character “8” is the code group indicator for total cloud cover and synoptic cloud types. The code letter “N” represents the total cloud cover in oktas (eights) from Table A-12. The code letters “N_h” represent the total amount of low clouds. If there are no low clouds, “N_h” represents the total amount of all middle clouds. Use Table A-12 for coding “N_h” for low or middle clouds. The code letters “C_L” represent the highest priority code figure for low clouds from Table A-14. The code letter “h” represents the height of the base of the lowest (low or mid) cloud seen from Table A-13. The code letters “C_M” represent the highest priority code figure for middle clouds from Table A-15. The code letters “C_H” represent the highest priority code figure for high clouds from Table A-16.

Basic rules for coding: Enter “0” for clouds absent. Middle or high clouds determinable through thin spots or breaks in lower layers are entered for “C_M” or “C_H,” as appropriate. Above an overcast layer, enter the type, if determinable, or a solidus (/) for “C_M,” “C_H,” or both. Do not enter “0” for clouds above an overcast layer. If “N” is coded as either “9” or “/,” code all cloud types and “h” (cloud height) with a solidus (/). Synoptic cloud types should be reported as missing (/) when, because of darkness or other reasons, cloud type determinations cannot be made. Code “0 ” for “h” when only high clouds are present. Several examples follow:

<u>Observed Sky Condition</u>	<u>Report</u>
a. 2/8 TCU 1,500 ft, 3/8 AC, 3/8 CI	8822474
b. Sky obscured by 8/8 fog	89/////
c. Not able to take observation	8/////
d. Clear skies	No report required
e. 8/8 STFRA 600 ft	88872//

- f. 4/8 ST 800 ft, 2/8 AC, 2/8 UNKN (UNKN = Unable to determine) 864637/
- g. <1/8 CU 1,500 ft 8111400
- h. 8/8 AC 10,000 ft, breaks in overcast 877097/
- i. 2/8 CI 25,000 ft 8200001

N and N_h = CLOUD COVER	
Cloud Amount in Oktas (eighths)	Code Figure
0	0
1 okta or less, but not zero	1
2 oktas	2
3 oktas	3
4 oktas	4
5 oktas	5
6 oktas	6
7 oktas or more, but not 8 oktas	7
8 oktas	8
Sky obscured by fog and/or other meteorological phenomena.	9
Cloud cover is indiscernible for reasons other than fog or other meteorological phenomena, or observation is not made.	/
<small>NOTE: If there are breaks in the sky at all, such as an overcast with a mackerel sky (altocumulus perlucidus or stratocumulus perlucidus), N would be coded 7. If there is only a wisp of cloud in the sky, N cannot be coded as 0 but coded as 1. Surface-based obscurations do not affect coding of N. A total obscuration is coded as 9.</small>	

Table A-12. Total Cloud Cover

h = HEIGHT OF THE LOWEST (LOW OR MID) CLOUD SEEN	
Reportable Heights (ft)	Code Figure
0 or 100	0
200 or 300	1
400 to 600*	2
700 to 900*	3
1000 to 1900*	4
2000 to 3200*	5
3300 to 4900*	6
5000 to 6500**	7
7000 to 8000**	8
8500 or higher	9
Unknown or not able to take observation	/

* reported in 100 foot increments; ** reported in 500 foot increments.
 Heights between the end of a range and beginning of the next are rounded up if midway or greater.

Table A-13. Height of the Lowest Cloud Seen

PRIORITY	C _L CLOUDS PRESENT	CODE FIGURE
1st	<p align="center"><u>CB WITH OR WITHOUT OTHER C_L CLOUDS</u></p> <p>At least one CB top is clearly striated or fibrous (cirriform); or, by convention, if lightning, thunder, or hail indicates the presence of CB, but the top isn't visible due to lower clouds.</p>	9
2nd	None of the CB tops are clearly fibrous, striated, or in the form of an anvil.	3
3rd	<p align="center"><u>NO CB PRESENT</u></p> <p>SC formed by the spreading out and flattening of CU; other CU may be present.</p>	4
4th	CU and SC, not formed by the spreading out of CU, with bases at different levels.	8
5th	CU and/or TCU of moderate or strong vertical extent; other CU or SC may be present, but all bases are at the same level.	2
6th	<p><u>NO CB AND CODE FIGURES 4, 8, AND 2 DON'T APPLY. USE THE CODE FIGURE OF THE DOMINANT TYPE CLOUD.</u></p> <p>CU with little vertical extent and seemingly flattened and/or ragged CU not of bad weather; or</p>	1
	SC not resulting from the spreading or flattening of CU; or	5
	ST in a relatively continuous layer and/or ragged shreds; or	6
	STFRA of bad weather and/or CUFRA of bad weather usually below AS or NS.	7

Table A-14. Coding of C_L Clouds

PRIORITY	C_M CLOUDS PRESENT	CODE FIGURE
1st	<p style="text-align: center;"><u>AC PRESENT WITH OR WITHOUT NS OR AS</u></p> <p>Sky is chaotic; AC generally at several levels.</p>	9
2nd	AC with sproutings in the form of turrets or battlements or having the appearance of small cumuliform tufts.	8
3rd	AC with AS or NS present.	7
4th	<p style="text-align: center;"><u>AC PRESENT BUT NO AS OR NS</u></p> <p>AC formed by spreading out and flattening of CU or CB and is the only C_M cloud present.</p>	6
5th	Semi-transparent AC in bands, or AC in one or more fairly continuous layers (semi-transparent or opaque), progressively invading the sky.	5
6th	Patches (often almond-shaped or lenticular) of generally semi-transparent AC occurring at one or more levels and continuously changing in appearance.	4
7th	AC in two or more layers, usually partly opaque; or one opaque layer of AC. AC is not progressively invading the sky.	7
8th	AC at one level; not invading the sky; greater part of AC is semi-transparent.	3
9th	<p style="text-align: center;"><u>NO AC PRESENT</u></p> <p>NS or AS; the greater part of which is sufficiently opaque to hide the sun or moon.</p>	2
10th	AS, predominately semi-transparent; the sun or moon may be weakly visible through semi-transparent portions.	1

Table A-15. Coding of C_M Clouds

PRIORITY	C _H CLOUDS PRESENT	CODE FIGURE
1st	CC present alone or is the predominant high cloud present.	9
	<u>CS PRESENT WITH OR WITHOUT CI OR CC</u>	
2nd	CS covers the whole sky.	7
3rd	CS not invading or covering the whole sky.	8
4th	CI and/or CS progressively invading the sky. The continuous veil extends more than 45 degrees above the horizon, but does not cover the whole sky.	6
5th	CI and/or CS invading the sky and growing denser; the continuous veil does not extend more than 45 degrees above the horizon.	5
	<u>C_H9 NOT APPLICABLE AND NO CS PRESENT</u>	
6th	CI in hooks or filaments progressively invading the sky and growing denser.	4
7th	Dense CI often in the form of an anvil being the remains of CB.	3
	<u>CODE FIGURES 3 THROUGH 9 NOT APPLICABLE. USE CODE FIGURE OF DOMINANT TYPE CLOUD.</u>	
	High cloud present is a combination of dense CI, CI with sproutings (like turrets or battlements), and of CI in tufts; or	2
8th	High cloud is CI in the form of filaments, strands, or hooks.	1

Table A-16. Coding of C_H Clouds

11.3.6.2 Depth of New Snow, 931sss (Snowfall). Report the depth of new snow (snowfall) every six hours at 0000, 0600, 1200, and 1800 UTC, when any amount of snow has fallen in the past six hours. The “931” is the code group indicator for depth of new snow. The code letters “sss” represent the greatest accumulation of new snow (i.e., snow, snow pellets, snow grains, ice pellets, ice crystals) in the past six hours reported in tens, units, and tenths of inches, using three digits. The amount reported for “sss” is the greatest accumulation of new snow observed, even if some (or all) of it melted. Snow often melts as it lands.

If snow continually melts as it lands, and the accumulation never reaches 0.1 inches on the measuring surface (preferably a snowboard), the snowfall shall be coded as a trace. Trace amounts are coded 931000. Do not code the group if it consists entirely of hail. If snowfall occurred several times during the observation period, and each snowfall melted either completely or in part before the next snowfall, report the total of the greatest snow depths of each event. It is essential to measure snowfall in locations where the effects of blowing and drifting are minimized. Under such circumstances, several measurements may be necessary to obtain an average snowfall. Although frequent observations may be required to obtain the

greatest accumulation of new snow during the reporting period, “never” sum hourly snowfall measurements to obtain a 6-hourly depth of new snowfall.

Several examples follow:

- a. During the 6-hour period it snows continuously producing 5.3 inches of new snow. The group “931sss” would be coded 931053.
- b. During the 6-hour period it snows only one time, but it is of long duration and adds 6.3 inches of new snow. Between melting and drifting, there are only 4.7 inches left by the time of the observation. The group “931sss” would be coded 931063.
- c. During the 6-hour period it snows two times. After the first snow there are 2.3 inches of new snow. Before the second snow, 0.5 inches of the new snow melts. The second snow adds another 1.4 inches of new snow. The group “931sss” would be coded 931037.
- d. During the 6-hour period it snows three times. The first snow deposits 1.0 inches, the second 2.0 inches, and the third 0.5 inches. All of the snow from each event melts before the next accumulation and no snow is left on the ground at the scheduled 6-hourly observation time. The group “931sss” would be coded 931035.

11.3.6.3 Water Equivalent of Snow on the Ground, 933RRR. Report the water equivalent of snow on the ground at 1800 UTC if the average snow depth (to the nearest inch) is 2 inches or more. The “933” is the code group indicator for water equivalent of snow on the ground. The code letters “RRR” represent the water equivalent of snow (i.e., snow, snow pellets, snow grains, ice pellets, ice crystals, hail) on the ground reported in tens, units, and tenths of inches, using three digits. An observation of 3.6 inches (water equivalent) would be coded 933036, an observation of 12.5 inches would be coded 933125, etc. Do not code the group if it consists entirely of hail. This value is never estimated, ratios (e.g., 10 to 1) or temperature/snow water equivalent tables are not to be used to determine water equivalency of snow for this group. If the water equivalent of snow on the ground is not observed or determined, no report is required.

11.3.6.4 Depth of Snow on the Ground, 4/sss. Report the depth of snow and ice on the ground at 0000, 0600, 1200, and 1800 UTC whenever there is more than a trace of snow on the ground. The “4/” is the code group indicator for depth of snow on the ground. The code letters “sss” represent the depth of snow on the ground reported in whole inches using three digits. For example, a snow depth of 21 inches would be coded 4/021. Do not code the group if it consists entirely of hail.

11.3.6.5 6-Hour Precipitation Amount, 6RRRR. The 6-hour precipitation group will be coded in the format, “6RRRR,” where “6” is the group indicator and “RRRR” is the amount of precipitation. The amount of precipitation (water equivalent) accumulated in the past 6 hours

will be reported in the 6-hour SCD report. The amount of precipitation will be coded in inches, using the tens, units, tenths, and hundredths digits of the amount. For example, 2.17 inches of precipitation would be coded “60217.” A trace will be coded “60000.” When an indeterminable amount of precipitation has occurred during the period, “RRRR” will be coded “6////.”

11.3.6.6 Duration of Sunshine, 98mmm. At sunshine duration reporting sites, the “98mmm” group is reported at 0800 UTC. The “98” is the code group indicator for the duration of sunshine. The code letters “mmm” represent the total minutes of sunshine. The minutes of sunshine that occurred the previous calendar day are coded by using the hundreds, tens, and units digits. For example, 96 minutes of sunshine would be coded 98096. If no sunshine occurred the data would be coded 98000. If the sunshine sensor was out of service, the report would be coded 98///.

11.3.6.7 Calendar Day Total Snowfall, 24/931sss. The “24/931sss” group is reported at midnight Local Standard Time (LST) when any amount of snow has fallen in the preceding 24 hours. The “24/” is the code group indicator for 24-hour snowfall. The “931” is the code group indicator for depth of new snow. The code letters “sss” represent the depth of all snowfall (i.e., snow, snow pellets, snow grains, ice pellets, ice crystals, hail) in the past 24 hours reported in tens, units, and tenths of inches, using three digits. The amount reported for “sss” is the actual amount that has fallen, even if some (or all) of it melted. Trace amounts are coded 24/931000. Do not code the group if it consists entirely of hail. The value is determined by adding snowfall amounts observed between midnight and the first 6-hourly observation, all subsequent 6-hourly observations for the calendar day, and the amount observed between the last 6-hourly observation and midnight. If midnight corresponds to a 6-hourly observation, the value is determined by simply adding the four 6-hourly snowfall observations for the calendar day.

11.3.6.8 Calendar Day Total Precipitation, 7R₂₄R₂₄R₂₄R₂₄. The “7R₂₄R₂₄R₂₄R₂₄” group is reported at midnight Local Standard Time (LST) whenever more than a trace of precipitation (water equivalent) has fallen in the preceding 24 hours. The “7” is the code group indicator for the calendar day total precipitation. The amount of precipitation “R₂₄R₂₄R₂₄R₂₄” is encoded using the tens, units, tenths, and hundredths of inches for the 24 hour period. For example, 1.36 inches of precipitation in the past 24 hours would be coded 70136. The value is determined by adding precipitation amounts observed between midnight and the first 6-hourly observation, all subsequent 6-hourly observations for the calendar day, and the amount observed between the last 6-hourly observation and midnight. If midnight corresponds to a 6-hourly observation, the value is determined by simply adding the four 6-hourly precipitation observations for the calendar day.

Note: In the SCD, the 7R₂₄R₂₄R₂₄R₂₄ group refers to a 24-hour precipitation total ending at midnight LST, whereas the 7R₂₄R₂₄R₂₄R₂₄ group in the remarks of an ASOS or manual METAR report refers to a 24-hour precipitation total ending at 1200 UTC.

11.3.6.9 Calendar Day Maximum and Minimum Temperatures, 4s_nT_xT_xT_xs_nT_nT_nT_n. The 24-hour maximum and minimum temperatures are reported at midnight Local Standard Time (LST). The “4” is the code group indicator for the calendar day maximum and minimum temperatures. The code letters “s_n” represent the sign of the temperature. Code a “1” if the temperature is below 0°C and “0” if the temperature is 0°C or higher. The code letters “T_xT_xT_x”

represent the 24-hour maximum temperature coded in tenths of degrees Celsius using three digits. The code letters “T_nT_nT_n” represent the 24-hour minimum temperature coded in tenths of degrees Celsius using three digits. For example, a 24-hour maximum temperature of 10.0°C and a 24-hour minimum temperature of -1.5°C would be coded 401001015. If either or both maximum or minimum temperature(s) is missing, code the “s_n” and temperature with a solidus (/).

CONTENT OF SUPPLEMENTARY CLIMATOLOGICAL DATA (SCD) OBSERVATIONS						
Element	Reference	Brief Description				
Station Identifier (CCCC)	11.3.1	Four-letter code group used to identify the observing location.				
Type of Observation (SCD)	11.3.2	Indicates the content of the observation, i.e., SCD.				
Corrected Observation (COR)	11.3.3	Correction to a previously disseminated SCD.				
Time of Observation (TIME in UTC)	11.3.4	Actual time of the observation; usually the time the last parameter is observed.				
Weather and/or Obscurations (WX)	11.3.5 Table A-5	Report any precipitation type/intensity and/or Volcanic Ash if observed at time of 6-hourly observation. PL should also be reported in an SDO.				
Coded Remarks (RMK); and their order of entry follow:	11.3.6	All SCD reports will contain a remark.	Time of Transmission (UTC)			
			0000	0600	1200	1800
Total Cloud Cover and Synoptic Cloud Types, 8NN _i C _L hC _M C _H	11.3.6.1	Report total cloud cover for “N” in oktas (eights). Report total low or mid clouds for “N _h .” Report height of lowest cloud for “h.” Report the highest priority cloud type for “C _L , C _M ,” and “C _H .”	X	X	X	X
Depth of New Snow, 931sss (Snowfall)	11.3.6.2	Report if any snow fell in the past 6-hours. “sss” is the depth of new snow reported in tenths of inches. Report 931000 for a trace.	X	X	X	X
Water Equivalent of Snow on the Ground, 933RRR	11.3.6.3	Report if the average snow depth is 2 inches or more. “RRR” is the water equivalent of snow on the ground reported in tenths of inches using three digits.				X
Depth of Snow on the Ground, 4/sss	11.3.6.4	Report in the 00, 06, 12, and 18 UTC observation if > “T” of snow is on the ground.	X	X	X	X
6-Hour Precipitation Amount, 6RRRR	11.3.6.5	Report if any precipitation fell during the time period. RRRR is the amount of precipitation (water equivalent) reported in tens, units, tenths and hundredths.	X	X	X	X
Duration of Sunshine, 98mmm	11.3.6.6	Report daily total sunshine until an ASOS sunshine sensor is fielded. “mmm” is the total minutes of sunshine.	0800 UTC			
Calendar Day Total Snowfall, 24/931sss	11.3.6.7	Report if any snow fell in the past 24-hours. “sss” is the total snowfall in the past 24-hours. Report 24/931000 for a trace.	Midnight <u>LST</u>			
Calendar Day Total Precipitation, 7R ₂₄ R ₂₄ R ₂₄ R ₂₄	11.3.6.8	Report the 24-hour precipitation (water equivalent). Encoded in tens, units, tenths, and hundredths.	Midnight <u>LST</u>			
Calendar Day Maximum and Minimum Temperatures, 4s _n T _x T _x T _x s _n T _n T _n T _n	11.3.6.9	Report the 24-hour max and min temperatures in °C. s _n is the sign of the temperature (“1” for <0°C, “0” for ≥0°C). “T _x T _x T _x ” is the max temperature (tenths of °C). “T _n T _n T _n ” is the min temperature (tenths of °C).	Midnight <u>LST</u>			

Table A-17 Content of SCD Observations

12. Examples of SDO and SCD Reports.

KXXX SDO 1001 PL
 KXXX SDO 1020 END PL
 KXXX SDO 1059 SNINCR 1/3
 KXXX SCD 1158 -SN/ 88873// 931016 4/006 60012
 KXXX SCD 1759 -DZ/ 89///// 933007 4/005 60001
 KXXX SCD 2358 8415471 4/004 60000
 KXXX SDO 0135 VIS N2
 KXXX SDO 0149 VIS N3
 KXXX SDO 0210 END VIS N3
 KXXX SDO 0215 VCSH W-N
 KXXX SDO 0325 END VCSH W-N
 KXXX SCD 0559 877087/ 4/003
 KXXX SCD 0859 24/931016 70006 400610028
 KZZZ SCD 1158 8220870 4/008
 KZZZ SCD COR 1158 8220870 4/007
 KZZZ SCD 1759 933009 4/007
 KZZZ SCD 2359 8635401 4/006
 KZZZ SCD 0559 8321501 4/005 400670022
 KZZZ SCD 0800 98267

13. Snow Paid Stations. This section describes the observing and reporting procedures of Supplementary Climatological Data (SCD) observations at Snow-Paid stations.

13.1 Elements to Report. These stations should report 6-hourly snow depth and snowfall at synoptic times and 24-hour snowfall at midnight Local Standard Time. Water equivalency may be reported at 1800 UTC if designated by the supervising WFO and the proper measuring equipment has been installed. Other climatological data may be reported, but is not mandatory.

13.2 Equipment. Snow-Paid stations will be provided a snow board and measuring stick. A standard 8" rain gauge will be provided to stations designated to provide water equivalency measurements.

13.3 SCD Observation. These reports provide routinely scheduled observations useful for climatological applications as well as hydrometeorological operations.

13.3.1 SCD Report. The SCD report from Snow-Paid observers consists of three elements and coded additive data remarks. Together they make up the SCD report and are coded in the following order:

- a. Station Identifier (CCCC)
- b. Type of Observation (SCD)

- c. Time of Observation (UTC)
- d. Coded Remarks (RMK)

931sss - Depth of new snow (Snowfall)
 933RRR - Water equivalent of snow on the ground (Designated Stations)
 4/sss - Depth of snow on the ground
 24/931sss - Calendar day total snowfall

13.3.2 Format and Content of the SCD Report from Snow-Paid Stations. The underline character () indicates a required space, and the solidus (/) indicates a required solidus.

CCCC_SCD_(COR)_TIME_RMK (in the order described in 2.1)

13.3.3 Coding the SCD Observation.

13.3.3.1 Station Identifier (CCCC). A four-letter location identifier is included in all reports indicating the station to which the coded report applies. The station identifier is separated from elements following it by a space.

13.3.3.2 Type of Observation (SCD). The designator is included in all reports to indicate the type of observation. Add “SCD” to designate an SCD observation. The type of observation is separated from elements following it by a space.

13.3.3.3 Corrected Observation (COR). If the report is a correction to a previously disseminated SCD, add “COR” after the space following the type of observation. A space is also required between the entry and the time of the observation.

13.3.3.4 Time of Observation (Time in UTC). The time of observation is included in all reports in hours and minutes (UTC is used in all disseminated reports) and is the time of the observation. If the report is a correction to a previously disseminated erroneous report, the time entered on the corrected report is the same time used in the observation being corrected. The time of observation is separated from the element following it by a space.

13.3.3.5 Coded Remarks (RMK). Coded remarks are separated from the time of observation by a space. Coded remarks are made in the following order:

931sss - Depth of new snow (snowfall)
 933RRR - Water equivalent of snow on the ground (Designated Stations)
 4/sss - Depth of snow on the ground
 24/931sss - Calendar day total snowfall

13.3.3.6 Depth of New Snow, 931sss (Snowfall). Report the depth of new snow (snowfall) every six hours at 0000, 0600, 1200, and 1800 UTC, when any amount of snow has fallen in the past six hours. The “931” is the code group indicator for depth of new snow. The code letters “sss” represent the greatest accumulation of new snow (i.e., snow, snow pellets,

snow grains, ice pellets, ice crystals) in the past six hours reported in tens, units, and tenths of inches, using three digits. The amount reported for “sss” is the greatest accumulation of new snow observed, even if some (or all) of it melted. Snow often melts as it lands.

If snow continually melts as it lands, and the accumulation never reaches 0.1 inches on the measuring surface (preferably a snowboard), the snowfall shall be coded as a trace. Trace amounts are coded 931000. Do not code the group if it consists entirely of hail. If snowfall occurred several times during the observation period, and each snowfall melted either completely or in part before the next snowfall, report the total of the greatest snow depths of each event. It is essential to measure snowfall in locations where the effects of blowing and drifting are minimized. Under such circumstances, several measurements may be necessary to obtain an average snowfall. Although frequent observations may be required to obtain the greatest accumulation of new snow during the reporting period, “never” sum hourly snowfall measurements to obtain a 6-hourly depth of new snowfall.

Several examples follow:

- a. During the 6-hour period it snows continuously producing 5.3 inches of new snow. The group “933sss” would be coded 931053.
- b. During the 6-hour period it snows only one time, but it is of long duration and adds 6.3 inches of new snow. Between melting and drifting, there are only 4.7 inches left by the time of the observation. The group “931sss” would be coded 931063.
- c. During the 6-hour period it snows two times. After the first snow there are 2.3 inches of new snow. Before the second snow, 0.5 inches of the new snow melts. The second snow adds another 1.4 inches of new snow. The group “931sss” would be coded 931037.
- d. During the 6-hour period it snows three times. The first snow deposits 1.0 inches, the second 2.0 inches, and the third 0.5 inches. All of the snow from each event melts before the next accumulation and no snow is left on the ground at the scheduled 6-hourly observation time. The group “933sss” would be coded 931035.

13.3.3.7 Water Equivalent of Snow on the Ground, 933RRR (Designated Stations).

Report the water equivalent of snow on the ground at 1800 UTC if the average snow depth (to the nearest inch) is 2 inches or more. The “933” is the code group indicator for water equivalent of snow on the ground. The code letters “RRR” represent the water equivalent of snow (i.e., snow, snow pellets, snow grains, ice pellets, ice crystals, hail) on the ground reported in tens, units, and tenths of inches, using three digits. An observation of 3.6 inches (water equivalent) would be coded 933036, an observation of 12.5 inches would be coded 933125, etc. Do not code the group if it consists entirely of hail. This value is never estimated, ratios (e.g., 10 to 1) or temperature/snow water equivalent tables are not to be used to determine water equivalency of

snow for this group. If the water equivalent of snow on the ground is not observed or determined, no report is required.

13.3.3.8 Depth of Snow on the Ground, 4/sss. Report the depth of snow and ice on the ground at 0000, 0600, 1200, and 1800 UTC whenever there is more than a trace of snow on the ground. The “4/” is the code group indicator for depth of snow on the ground. The code letters “sss” represent the depth of snow on the ground reported in whole inches using three digits. For example, a snow depth of 21 inches would be coded 4/021. Do not code the group if it consists entirely of hail.

13.3.3.9 Calendar Day Total Snowfall, 24/931sss. The “24/931sss” group is reported at midnight Local Standard Time (LST) when any amount of snow has fallen in the preceding 24 hours. The “24/” is the code group indicator for 24-hour snowfall. The “931” is the code group indicator for depth of new snow. The code letters “sss” represent the depth of all snowfall (i.e., snow, snow pellets, snow grains, ice pellets, ice crystals, hail) in the past 24 hours reported in tens, units, and tenths of inches, using three digits. The amount reported for “sss” is the actual amount that has fallen, even if some (or all) of it melted. Trace amounts are coded 24/931000. Do not code the group if it consists entirely of hail. This value is calculated by using the appropriate entries in Column 34, of the Supplementary Observations Worksheet (see Appendix C). The value in row labeled “1” in Column 27 is not used in the total, unless the Midnight observation corresponds with a 6-hourly observation.

CONTENT OF SUPPLEMENTARY CLIMATOLOGICAL DATA (SCD) OBSERVATIONS AT SNOW-PAID STATIONS						
Element	Reference	Brief Description				
Station Identifier (CCCC)	13.3.3.1	Four-letter code group used to identify the observing location.				
Type of Observation (SCD)	13.3.3.2	Indicates the content of the observation, i.e., SCD.				
Corrected Observation (COR)	13.3.3.3	Correction to a previously disseminated SCD.				
Time of Observation (UTC)	13.3.3.4	Actual time of the observation; usually the time the last parameter is observed.				
Coded Remarks (RMK); and their order of entry follow:	13.3.3.5	All SCD reports will contain a remark.	Time of Transmission (UTC)			
			0000	0600	1200	1800
Depth of New Snow, 931sss (Snowfall)	13.3.3.6	Report if any snow fell in the past 6-hours. “sss” is the depth of new snow reported in tenths of inches. Report 931000 for a trace.	X	X	X	X
Water Equivalent of Snow on the Ground, 933RRR	13.3.3.7	Designated Stations. Report if the average snow depth is 2 inches or more. “RRR” is the water equivalent of snow on the ground reported in tenths of inches using three digits.				X
Depth of Snow on the Ground, 4/sss	13.3.3.8	Report in the 00, 06, 12, and 18 UTC observation if > “T” of snow is on the ground.	X	X	X	X
Calendar Day Total Snowfall, 24/931sss	13.3.3.9	Report if any snow fell in the past 24-hours. “sss” is the total snowfall in the past 24-hours. Report 24/931000 for a trace.	Midnight <u>LST</u>			

Table A-18. Content of SCD Observations at Snow Paid

13.4 Examples of SCD Reports from Snow-Paid Stations.

KABC SCD 1150 931003
KABC SCD 1754 931044 4/005 933004
KABC SCD 2353 931023 4/006
KABC SCD 0557 931031 4/008 24/931101

See Section 14. Example of Completed Supplementary Observations Worksheet. The above examples illustrate the entries on the worksheet.

13.5. Snow-Paid SCD Worksheet. This section describes the entries for supplementary observations by Snow-Paid observers on the Supplementary Observations Worksheets. The worksheets are to be kept on station until they are no longer required by the local supervising office.

13.5.1 Entries on the SCD Worksheet. Snow-Paid observers do not have to be certified. They will record data only in the columns necessary to meet contractual requirements.

13.5.2 Writing Instrument. The same type of writing instrument will be used throughout the form. To ensure legible copies and ample contrast for reproduction, use a black-inked fine ballpoint pen.

13.5.3 Missing Data. Explain briefly the reasons for any missing data in Block 65, Remarks, Notes, and Miscellaneous Phenomena.

13.5.4. Corrections. Draw a single black line through the erroneous entry. Do not erase or otherwise obliterate entries. Record corrected data in the appropriate blocks on the same or next line appropriately identified. If space is not available, record the data in Block 65.

13.5.5 Heading. The heading portion of the worksheet consists of three blocks in the upper-right corner. The procedures in completing these blocks are as follows:

- a. In the block labeled “STATION”, enter the station name and state abbreviation, followed by the stations four letter station identifier.
- b. In the block labeled “DATE”, enter the numeric values for the Month, Day, and Year, e.g., 1/19/04.
- c. In the block labeled “To convert LST to UTC”, enter the number of whole hours to convert the station’s local standard time to UTC. For example, stations in the Eastern Time Zone will enter “5”, station’s in the “Central Time Zone”, will enter “6”, etc.

13.5.6 Entries on the “Supplementary Observations Worksheet” by Column Number.

13.5.6.1 Type of Observation (Column 1). SCD will be recorded to designate a Supplementary Climatological Data observation.

13.5.6.2 Time of Observation (Column 2). Record the actual time of observation in Local Standard Time (LST). During Daylight Saving time, the time of observation will continue to be in LST. The time used in the transmitted observation will be the equivalent Universal Coordinated Time (UTC).

13.5.6.3 Present Weather (Column 9). No entry is required.

13.5.6.4 Remarks and Supplemental Coded Data (Column 14). Record all remarks in Column 14 according to the procedures for coding and dissemination. The procedures for coding remarks are the same procedures for entering the data into Column 14.

13.5.6.5 Observer’s Initials (Column 15). The observer responsible for the observation will initial this column.

13.5.6.6 Time (LST) (Column 26). Record the beginning time of the first 6-hourly observation scheduled after 0000 LST on the line captioned “**MID TO**” and the following line captioned “**1**” from Column 27. On the following three lines record in chronological order the beginning times of the subsequent 6-hourly observations. Record entries in hours and minutes (4 digits) to the nearest minute. At stations in the time zone where midnight LST corresponds to the time of a 6-hourly observation, the lines captioned “**MID TO**” and “**MID**” are not used. Stations not open for the full 24 hour calendar day will follow these same instructions.

13.5.6.7 Number (No.) (Column 27). Identifies the Midnight To, first, second, third, fourth, and Midnight observations of the day. No entry is required.

13.5.6.8 Maximum Temperature (Column 31). No entry is required.

13.5.6.9 Minimum Temperature (Column 32). No entry is required.

13.5.6.10 Precipitation (Column 33). No entry is required.

13.5.6.11 Snowfall (Column 34). At 6-hourly observation times, record the amount of solid precipitation that fell in the six hours prior to the observation on the lines numbered (in Column 27) “**1**”, “**2**”, “**3**”, and “**4**”. At stations taking midnight observations, record the snowfall between midnight and the first 6-hourly observation on the line captioned “**MID TO**”. On the line captioned “**MID**” record the amount of snowfall that occurred between the last 6-hourly observation and midnight. “Snow” as used in this and the following snow depth paragraphs include all types of solid precipitation; e.g., snow, snow grains, ice crystals, ice pellets, and hail. Make entries as follows:

- a. If there is no solid precipitation, no entry is required.

- b. A trace, but less than 0.05 inch, record a “T”.
- c. Snow often melts as it lands. If snow continually melts as it lands, and the accumulation never reaches 0.1 inches on the measuring surface, snowfall will be recorded as a trace (T) and a remark should be included in Column 65 that “Snow melted as it landed.”
- d. A measurable amount occurred, record the maximum depth of solid precipitation to the nearest 0.1 inch. If solid precipitation occurred several times during the period, and each fall melted either completely or in part before the next fall, record the total of the maximum depths of each fall.
- e. If an amount consists entirely of hail, no entry is required.

13.5.6.12 Snow Depth (Column 35). Record the depth of solid precipitation and ice on the ground at the time of each 6-hourly observation on the lines identified as “1”, “2”, “3”, and “4” respectively.

- a. No snow or ice on the ground in exposed areas, or less than 0.5 inch, no entry is required.
- b. If there is a measurable amount on the ground, record the depth to the nearest whole inch.
- c. When solid precipitation has occurred in the past six hours and because of melting or sublimation, the current depth is less than at some time during the six hours (reportable value), record the current depth in Column 35.
- d. If the depth consists entirely of hail, no entry is required.
- e. Snow depth is entered in Column 35 at main synoptic times (00, 06, 12, and 18 UTC).

13.5.6.13 Water Equivalent (Column 62). Designated stations only. Whenever the average snow depth is 2 inches or more (to the nearest inch), record the water equivalent to the nearest 0.1 inch as measured at approximately 1800 UTC daily. Record the amount in the appropriate block in the row equivalent to 1800 UTC.

13.5.6.14 Remarks, Notes, and Miscellaneous Phenomena (Column 65). No entry is required for Sunrise, Sunset, or Total Sunshine. Use this section to describe information such as:

- a. Conditions affecting the representativeness or accuracy of the recorded data.
- b. Outages, changes in instruments, reasons for change, times of change or outage.

APPENDIX B - Complementary Data Sources and Networks

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1. Complementary Data Sources. NWS policy is to make data or information in its possession available to public and private sector users without restriction to the extent practical and within resource constraints. An exception to this policy is when the NWS agrees to restrictions on dissemination or use as a condition of receiving the data or information. When negotiating terms for the acquisition of complementary data, NWS officials should seek to avoid

agreeing to restrictions and, failing that, seek to negotiate the least restrictive terms possible. The Assistant Administrator for Weather Services has delegated the authority as designee to all members of the corporate board, acting within their acquisition authority, to sign on behalf of the AA data agreements used to obtain surface observations from external parties when those agreements include restrictions on redistribution. This authority cannot be redelegated. The NWS will follow the instructions in this paragraph for the acquisition, use and transmission of complementary data.

1.1 Assessment. Assess the value of the data for use.

- a. Perform this assessment using best judgment based on metadata provided by the data platform owner.
- b. All assessments should be made at the appropriate level of the NWS depending upon the scope of sensor deployment.
- c. Data may be used by NWS when required metadata is available.

1.2 Documentation. The acquisition, use and transmission of data not in the public domain will be documented. **For more comprehensive instructions refer to NWSI 1-1201, Obtaining Environmental Data from External Parties.** Each WFO and RFC will document all agreements for the routine ingest of non-Federal automated data, and send the documentation to the appropriate Division of their respective Regional Headquarters for review. The Regional headquarters will then forward the documentation to the Office of Science and Technology (OS&T) Programs and Plans Division (W/OST1) which will coordinate with the Office of Climate, Water and Weather Services (OCWWS) Observing Services Division (W/OS7). The Programs and Plans Division must receive existing documentation within one year of the effective date of this policy.

Any agreements made after the effective date of this instruction will be completed as described below.

- a. Appendix B Section 6 is an agency approved standard form to formalize agreements where the data provider imposes no restrictions on the data. The signatory may be a Corporate Board Member who may delegate this authority. Documentation of the agreement will be sent to the appropriate Division of their respective Regional Headquarters, NCEP or National Headquarters for review. The documentation will then be forwarded to the Office of Science and Technology (OS&T) Programs and Plans division (W/OST1) and the Office of Climate, Water and Weather Services (OCWWS) Observing Services Division (W/OS7).
- b. The Assistant Administrator for Weather Services has delegated the authority as designee to all members of the Corporate Board, acting within their acquisition authority, to sign on behalf of the AA data agreements used to obtain surface observations from external parties when those agreements include restrictions on

redistribution. Documentation of the agreements will be sent to OST1 and OS7.

- c. If signing an agreement is not within the acquisition authority of Corporate Board members, the Assistant Administrator for Weather Services must sign all agreements that have restrictions on redistribution. Documentation of the proposed agreements will be sent to OST1 for coordination with OS7 and the submitting member.

1.3 “Click-through,” “Shrink-wrap,” or Similar Agreements. Some methods of data acquisition, especially via internet, impose conditions of use by a “click-through” agreement. The user “clicks” a button and by doing so agrees to the terms of use of the data. This directive applies to such “click-through” agreements or any similar agreement.

- a. If the “click-through” agreement imposes no restriction on use of the data by NWS, a copy of the agreement should be attached to the form provided in Appendix B and the documentation procedures of 1.2.a followed.
- b. If the “click-through” agreement imposes restrictions on the use of the data by NWS, the documentation procedures of 1.2.b apply.

* Note: Shrink-wrap. Relating to a legal agreement, such as a software license, to which one indicates acceptance by opening the shrink-wrap that encloses a product subject to the agreement.

1.4 Metadata. Ensure metadata is available to the NWS.

- a. Sections 3 and 4 lists the required and recommended metadata elements.
- b. Metadata will also be available to outside users if the NWS transmits the data. This requirement is considered to be met if the metadata is available in the public domain.
- c. The data provider/owner is responsible for timely updating of their metadata.

1.5 Quality Control. The NWS cannot require the data owner to perform data quality control, but should encourage them to do so.

1.6 Use of Discretion. Offices should exercise discretion in the use and transmission of all complementary data, whether quality controlled or not.

1.7 Transmission of Data. Complementary data may be transmitted without disclaimer if: the data source meets NWS standards for siting and accuracy, the data has been quality controlled, and there are no restrictions placed on the data by the data provider or other government agencies. If the data is deemed by the NWS to be unreliable, the agency reserves the right to cease any transmission of the data.

1.8 Disclaimers for Data. Complementary data not meeting the requirements of paragraph 1.7 may be transmitted if accompanied by a disclaimer, or set apart by other means. An example of a disclaimer is, “This data is from non-NWS sources and has not been quality controlled.” When possible, transmit quality control “flags” with the data.

1.9 Data Formats. Provide data owners/providers information on data formats, encoding software, as well as, sensor standards for performance and siting as described in NWSI 10-1302.

1.10 Data Standards. Adhere to Advanced Weather Interactive Processing System code standards when converting complementary data. Other formats may be used for local purposes.

2. Transmission of Complementary Data over NWS Communication Circuits:

2.1 Evaluation. First evaluate data for accuracy and level of compliance to NWS standards as found in NWSI 10-1302. If data meets NWS standards, it may be transmitted without disclaimer.

2.2 Scope. If the scope of complementary data is inter-regional or national, the NWS Office of Climate, Water and Weather Services, Observing Services Division (W/OS7), must complete the “AGREEMENT FOR THE NWS ACQUIRING COMPLEMENTARY DATA” (Appendix B) with the data provider/owner. Agreements formulated by OS7 will be signed by the Office Director or their designee. In other situations the regional office soliciting the data source must complete the form. Agreements formulated by the regions will be signed by the Regional Director or their designee. The Regional Director may delegate this responsibility to the Meteorologist in Charge if the network resides solely within a field office’s county forecast and warning area. Copies of the completed agreement must be sent to W/OS7 for documentation and inclusion into the national database.

2.3 Procedure. Permission to transmit data over NWS communication circuits, acquisition of site identifiers and/or bulletin headers will be achieved through normal Data Review Group procedures.

3. Required Metadata. The NWS will not accept complementary data if the following metadata elements are unavailable.

- a. Mesonet owner.
- b. Station names and identifiers.
- c. Station location in degrees, minutes and seconds or latitude and longitude in degrees decimal.
- d. Station elevation in meters or feet.
- e. Environmental parameters measured by mesonet sensors, including units.

- f. Reporting frequency.
 - g. Description of the observation time stamps for each station in the mesonet, e.g GMT or local time. For the latter, time zone information and whether the station clock represents daylight savings or standard time.
4. Recommended Metadata. The NWS should acquire the following metadata elements if available from complementary data sources.
- a. Description of the site's location and exposure. This could include digital panoramic photos, drawings, or text.
 - b. Type of sensors and manufacturer.
 - c. Sensor accuracy and performance characteristics.
 - d. Algorithm(s) used to calculate data.
 - e. Level of quality control performed by the mesonet data provider.
 - f. Frequency of maintenance.
5. Complementary Data Definitions:
- 5.1 Acquisition. The automated retrieval or receipt of electronic files at NWS offices.
- 5.2 Complementary Data. Data not from NWS nationally supported surface observing platforms assessed to be of sufficient quality to support NWS climate and/or warning forecast and service.
- 5.3 Complementary Data Networks. One or more surface observing stations incorporated into a collection of stations. These stations may include complementary data sources managed by government agencies, universities and/or other public and private entities.
- 5.4 Metadata. Metadata are "data about data" describing the content, quality, condition, and other characteristics of observational data, including any known errors or discontinuities. Metadata contain information relevant to instruments, calibration coefficients and location histories, instrument sampling time, calibration dates, validation of sensor performance, exposure, and QA flags.
- 5.5 Quality Control. An automated or manual assessment of data quality of the observing elements. This will also include the ability to terminate or stop transmission of obviously erroneous or incorrect data.
- 5.6 Use. The evaluation or assimilation of data to support the NWS mission

- 5.7 Transmission. The active relaying of data over NWS communication services to the public.
- 5.8 Public Domain. Products with no protection of copyright or specific instructions for use.
- 5.9 Restriction. Any terms or conditions which limit the NWS use and/or transmission of data for either internal or external purposes.

6. Agreement for NWS Acquiring Complementary Data.

AGREEMENT FOR NWS ACQUIRING COMPLEMENTARY DATA	
1. Data Provider Point Of Contact	NWS Point Of Contact
Name:	Name:
Location:	NWS Office:
Phone:	Phone:
2. NWS will acquire the data through:	Internet Address:
3. Location of metadata (URL):	
3b. Details on type of metadata available (LAT?/LON?/Elevation?, name, etc.)	
4. Maintenance done on data collection platform by provider? (list any information available)	
5. Quality Control done on observations by provider? (list any information available)	
GENERAL TERMS AND CONDITIONS DURATION OF AGREEMENT, AMENDMENTS, AND MODIFICATIONS This agreement is subject to the availability of funds. This agreement will become effective when signed by both parties. This agreement will terminate 5 years from the date it becomes effective, but it may be terminated, revised, amended, renewed, or extended for another 5 year period at any time by mutual consent of the parties. Either party may terminate this agreement by providing 30 days written notice to the other party. The Government reserves the right to terminate the agreement immediately at the convenience of the Government.	
RESOLUTION OF DISAGREEMENTS Should disagreement arise on the interpretation of the provisions of this agreement, or amendments and/or revisions thereto, that cannot be resolved at the operating level, the area(s) of disagreement shall be stated in writing by each party and presented to the other party for consideration. If agreement on interpretation is not reached within 30 days, then the parties shall forward the written presentation of the disagreement to respective higher officials for appropriate resolution.	
All information in this agreement shall comply with Weather Service Instruction 10-1312. This agreement allows NWS to use the data without restriction and for any purpose. Any expenses associated with this agreement incurred by either signatory will remain exclusive to the signatory.	
For the National Weather Service	For the Data Provider
Signature	Signature
Date	Date
Name Title - printed	Name Title - printed