

DESCRIPTION OF AVN AND MRF BUFR MESSAGES

The National Weather Service is currently disseminating AVN and MRF-based (MAV and MEX) MOS guidance in BUFR (Binary Universal Form for the Representation of meteorological data) format (as of April 4, 2001). The BUFR message is a computer independent binary stream consisting of several different sections. The first section (Section 0) indicates the beginning of the BUFR message, and Section 1 describes the general contents and origin of the message. Section 2 is optional and is reserved for local use. In the MOS BUFR message, this section contains station call letters for the sites within the bulletin and a description message.

Section 3 explicitly describes the data stored in packed form in Section 4. Section 5 indicates the end of the BUFR message.

The NWS is using BUFR Edition 2 as described in WMO's Manual on Codes, Volume 1, FM 94-IX Ext. BUFR. The data in Section 4 are packed in compressed format.

This means that data in the BUFR message are packed by ELEMENT so that if 10 stations and 19 projections are included, then the element data for one station and all 19 projections are strung together followed by the next station and all projections, etc. When all the stations are exhausted, the data for the next element follows. This scheme allows for maximum compression of the data because for EACH element, a global min (for all stations and projections) is obtained and subtracted from each value.

A subset represents a data value for a particular station and projection. The number of subsets for a given element depends on the number of stations contained in the message and the number of valid projections needed to represent the forecast data. Specifically, the number of subsets is the number of stations multiplied by the number of projections. The number of data subsets for a given message is located in section 3.

Section 3 also contains a list of element descriptors which are fully described in BUFR Table B, and correspond on a one-to-one basis with the data in Section 4. Tables 1 and 2 contain the lists of descriptors (elements) that are available in the AVN and MRF-based MOS BUFR messages. Also, the tables contain each of the descriptor's corresponding Table B entries. Each list begins with the station's call letters, latitude, longitude, initial forecast time, the model on which the forecasts are based, the objective technique used to generate the forecasts, and the forecast projection. Afterwards, all the MOS forecasts available in the message are listed. Each forecast element is completely described by a single descriptor with a few exceptions. MRF categorical forecasts of precipitation amount, sky cover, and precipitation type require two descriptors to identify the forecast. The first descriptor indicates the forecast period, and the second is the forecast associated with that period. For example, if the second descriptor indicates a precipitation amount forecast, the preceding descriptor indicates whether it is a 12-h or 24-h forecast.

The AVN BUFR messages are transmitted under the following WMO headers:

JSMT20	KWNO	YYGGgg	- Pacific Region
JSMT21	KWNO	YYGGgg	- Northeast Region
JSMT22	KWNO	YYGGgg	- Southeast Region
JSMT23	KWNO	YYGGgg	- North Central Region
JSMT24	KWNO	YYGGgg	- South Central Region
JSMT25	KWNO	YYGGgg	- Rocky Mountains Region
JSMT26	KWNO	YYGGgg	- West Coast Region
JSMT27	KWNO	YYGGgg	- Southeast Alaska Region
JSMT28	KWNO	YYGGgg	- Southwestern Alaska Region
JSMT29	KWNO	YYGGgg	- Northern/Central Alaska Region

The MRF BUFR messages are transmitted out under two sets of headers. WMO headers

JSMT61-69 contain forecasts for projections between 18-84 hours. WMO headers
JSMT71-79 contain forecasts for projections between 90-198 hours.

JSMT60 KWNO YYGGgg - Pacific Region
JSMT61 KWNO YYGGgg - Northeast Region
JSMT62 KWNO YYGGgg - Southeast Region
JSMT63 KWNO YYGGgg - North Central Region
JSMT64 KWNO YYGGgg - South Central Region
JSMT65 KWNO YYGGgg - Rocky Mountains Region
JSMT66 KWNO YYGGgg - West Coast Region
JSMT67 KWNO YYGGgg - Southeast Alaska Region
JSMT68 KWNO YYGGgg - Southwestern Alaska Region
JSMT69 KWNO YYGGgg - Northern/Central Alaska Region

JSMT70 KWNO YYGGgg - Pacific Region
JSMT71 KWNO YYGGgg - Northeast Region
JSMT72 KWNO YYGGgg - Southeast Region
JSMT63 KWNO YYGGgg - North Central Region
JSMT74 KWNO YYGGgg - South Central Region
JSMT75 KWNO YYGGgg - Rocky Mountains Region
JSMT76 KWNO YYGGgg - West Coast Region
JSMT77 KWNO YYGGgg - Southeast Alaska Region
JSMT78 KWNO YYGGgg - Southwestern Alaska Region
JSMT79 KWNO YYGGgg - Northern/Central Alaska Region

Where YY is the day of the month, GGgg is the hour and minute the product is created.