

DESCRIPTION OF GFS-BASED LAMP BUFR MESSAGE

The National Weather Service is currently disseminating GFS-based LAMP guidance in BUFR (Binary Universal Form for the Representation of meteorological data) format, as of July 2006. 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 GFS LAMP BUFR message, section 2 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. Also see <http://www.wmo.ch/web/www/WDM/Guides/Guide-binary-1A.html> for more details about BUFR Edition 2. 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 25 projections are included, then the element data for one station and all 25 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. Both missing (values of 9999) and non missing values are included in this scheme.

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 descriptor ids which are fully described in BUFR Table B, and correspond on a one-to-one basis with the data in Section 4. Attachment one contains the list of the elements that are available in the GFS-based LAMP BUFR messages, as well as each element's descriptor id corresponding to the 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 LAMP forecasts available in the message are listed. Each forecast element is completely described by a single descriptor id.

The GFS-based LAMP BUFR messages are transmitted under the following WMO headers:

JSMF10 KWNO DDHHMM - Pacific Region
JSMF11 KWNO DDHHMM - Northeast Region
JSMF12 KWNO DDHHMM - Southeast Region
JSMF13 KWNO DDHHMM - North Central Region
JSMF14 KWNO DDHHMM - South Central Region
JSMF15 KWNO DDHHMM - Rocky Mountains Region
JSMF16 KWNO DDHHMM - West Coast Region
JSMF17 KWNO DDHHMM - Alaska Region

Where DD is the day of the month, HHMM is the hour and minute the product is created. More details about the WMO headers can be found in section B of <http://www.nws.noaa.gov/mdl/gfslamp/docs/lampheaders.pdf>