DEM Data Record Format

Record type A, element 1 has been changed to require certain information in specified byte locations. A new element, element 2, record type A, has been defined to record the NMD organization from which the DEM was authorized. The element counts of old record type A, elements 2-15, have been incremented by one to elements 3-16 An attempt has been made to keep the old and new DEM formats compatible; therefore, although the element counts have changed, the byte positions and information content of these fields (old elements 2-15, new elements 3-16) remain the same. This change should be transparent to old DEM applications programs. The new element 2, the mapping center of DEM origin is named in record A, bytes 141-144. Valid codes are MAC (Mapping Application Center, GPM2 (specific to MAC Gestalt Photo Mapper II auto correlator), MCMC (Mid Continent Mapping Center), RMMC (Rocky Mountain Mapping Center), WMC (Western Mapping Center) and FS (U.S. Forest Service). Codes indicating other sources of DEM's are defined when required. Also, new data elements 17-29 have been appended to the end of the type A record. These elements are contained in the end of the previously blank filled portion of the 1,024 byte record.

The type A record contains information defining the general characteristics of the DEM, including descriptive header information relating to the DEM's name, boundaries, units of measurement, minimum and maximum data values, number of type B records, and projection parameters. There is only one type A record for each DEM file, and it appears as the first record in the data file. The type B record contains elevation data and associated header information. All type B records of the DEM files are made up of data from one-dimensional bands called profiles. Therefore, the number of complete profiles covering the DEM area is the same as the number of type B records in the DEM. In a UTM structured DEM, an occasional profile exists within the bounds of the DEM quadrilateral but is void of elevation grid points and is not represented in the DEM. (This is called the "missing profile condition" and occurs occasionally as the first or last hypothetical profile of the DEM at the respective DEM corner.) The type C record contains statistics on the accuracy of the data in the file.

The following special conventions shall be observed for the population of data fields in the A, B, and C record elements:

- All character fields must be in upper case. Character fields of no data value must be blank, ASCII space (binary 0010 0000).
- All integer or character flagged fields of no data value but which default to zero must be ASCII zero (binary 0011 0000).
- All real (non-integer) numeric fields shall be populated. Default zero fill shall follow the following convention:

```
 12345678901234567890123456 (byte position, left justified)
"   .000000000000000D+00"| Standard format specified is
"  0.0"                  | D24.15. Zero values listed are
"  0.000000000000000D+00"| common machine dependent numeric
"   .000000000000000"    | defaults for zero values.
```

Type A Record

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Sample DEM Type A Logical Records-Reno, Nevada-California, Quadrangle (West Half) (1 degree)

NJ11-01W
           3    1   0    0   0.0          0.0       0.0      0.0
0.0
```

-0424800000000000D+06 0.1404000000000D+06 0.999000000000D+03
0.264100000000000D+04 0.0 00.300000E+010.300000E+010.100000E+01 1
1201

Data Element	Content	Explanation
1	NJ11-01W	Quadrangle name field (144 characters); NJ11-01W is the designation for the DEM covering the west half of the Reno, Nevada-California, sheet.
2	3	DEM level code; 3 reflects processing by DMA which includes registration to planimetric features appearing on the source 1-degree.
3	1	Pattern code; 1 indicates a regular elevation pattern.
4	0	Planimetric reference system code; 0 indicates geographic coordinate system.
5	0	Zone code; there are no zones in the geographic system. Therefore, the zone code is set to zero.
6	0.0 (15 sets of 0.0)	Map projection parameters; all 15 fields are set to zero for the geographic system and should be ignored. Presence of non-zero parameters are not related to the geographic coordinate system and should also be ignored.
7	3	Units code; 3 represents arc-seconds as the unit of measure for ground planimetric coordinates throughout the file.
8	2	Units code; 2 represents meters as the unit of measure for elevation coordinates throughout the file.
9	4	Number (n) of sides in the polygon which defines the coverage of the DEM file (usually equal to 4).
10	-0.4284...D+06, 0.1404...D+06 .... -0.4248...D+06 0.1404...D+06	A 4,2 array containing the ground coordinates of the four corners of the DEM. In this case translation from arc-seconds to degrees, minutes and seconds yields: -119 00 0, 39 00 00; -119 00 00, 40 00 00; -118 00 00, 40 00 00; -118 00 00. 39 00 00.
11	0.9990...D+06 0.2641...D+04	Minimum and maximum elevations for the DEM.
12	0.0	Counterclockwise angle from the primary axis of ground planimetric referenced to the primary axis of the DEM local reference system.
13	0	Accuracy code; 0 indicates that a record of

	0.300000E+01 0.100000E+01	resolution (x,y, z); set to 3, 3, 1; or 3, 6, 1; or 3, 9, 1 depending on the latitude of the product.
15	1 1201	A two-element array containing the number of rows and columns of profiles in the DEM. The row value m is usually set to 1 as an indication that the arrays are actually one-dimensional profiles. The column value n set to 1,201 indicates that the DEM file consists of a total of 1,201 profiles.

Type B Record

DEM Type B Logical Record-Reno, Nevada California, Quadrangle (West Half) (1 degree)

```
     1      1   1201    1  -0.42480000000000D+06   0.1404000000000D+06  0.0
0.121000000000D+04  0.177200000000D+04  1538  1539  1539  1534  1529  1520
1513   1508  1501  1493  1488  1479  1475  1474  1473  1472  1469  1467
1466
1464
```

Data Element	Content	Explanation
1	1 1	Row and column identification number of the profile contained in this record; 1, 1 represents row 1, column 1, in the DEM data set.
2	1201 1	Number of rows (elevations) and columns in this profile; 1201, 1 indicates there are 1,201 elevations and 1 column in this profile.
3	-0.4284...D+06 0.1404...D+06	Translated to the decimal, -428400.0 and 140400.0 are the ground planimetric coordinates (arc-seconds) of the first elevation in the profile, thus computed equal to -119 and 39 degrees.
4	0.0	Elevation of local datum for the profile. Always zero for 1-degree DEM, the reference is mean sea level.
5	0.1212...D+04 0.1772...D+04	Minimum and maximum elevations for the profile.
6	1538 1539...	An array of m x n elevations (m=1201, n=1) for the profile expressed in units of measure of meters (record A, element 8, indicates meters as units of measure) above or below the local datum (record a, element 4).

Type C Record

Data Element		(FORTRAN Notation)	ASCII Format	Starting byte	Ending byte	Comment
1	Code indicating availability of statistics in data element 2	INTEGER*2	16	1	6	Code 1 = available 0 = unavailable
2	RMSE of file's datum relative to absolute datum (x, y, z)	INTEGER*2	3I6	7	24	In some units as indicated by elements 8 and 9 of logical record type A.
3	Sample size on which statistics in data element 2 are based	INTEGER*3	I6	25	30	If 0, then accuracy will be assumed to be estimated rather than computed.
4	Code indicating availability of statistics in data element 5	INTEGER*2	I6	31	36	Code 1 = available 0 = unavailable
5	RMSE of DEM data relative to file's datum (x, y, z)	INTEGER*2	3I6	37	54	In same units as indicated by elements 8 and 9 of logical record type A.
6	Sample size on which statistics in element 5 are based	INTEGER*2	I6	55	60	If 0, then accuracy will be assumed to be estimated rather than computed.