Open-File Report 2012-1259

SP_Dune_Field.doc
Mars Global Digital Dune Database: MC-30

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(http:pubs.usgs.gov/of/2012/1259)

Summary
See Pamphlet.doc, Mars Global Digital Dune Database Purpose.

Description
See Pamphlet.doc, Mars Global Digital Dune Database Abstract.

Credits
There are no credits for this item.

Access and use limitations
There are no restrictions.

ArcGIS Metadata

Resource Identification

Citation Title: Sp_Dune_Field_Geog
Alternate Titles: South Pole Dune Field
Presentation Format: digital map
Collection Title: Mars Global Digital Dune Database
Responsible Party:
Individual's Name: Rosalyn K. Hayward
Organization's Name: USGS,
Astrogeology Contact's Position:
Geologist
Contact's Role: Originator
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Publication_Information:

Publication_Place: Reston, Virginia
Publisher: U.S. Geological Survey
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Themes Or Categories Of The Resource:
geoscientificInformation
Tags For Searching: Dune, Aeolian, Mars, Database, Gcm
Discipline Keywords: Planetary Science
Place Keywords: Mars
Theme Keywords: Dune
Theme Keywords: Aeolian
Theme Keywords: Database
Theme Keywords: GCM

Dataset Languages: English (United States)
Dataset Character Set Utf8 - 8 Bit Ucs Transfer Format
Status: Completed
Resource Maintenance:
Update Frequency: Not Planned
Scope Of The Updates: Dataset
Resource Constraints:
Constraints:
Limitations Of Use:
There are no restrictions.
Spatial Representation Type: Vector
* Processing Environment: Microsoft Windows Server 2008 R2 Version 6.1 (Build 7601) Service
Pack 1; Esri Arcgis 10.0.2.3200

Other Extent Information:
Geographic Extent:
Bounding Rectangle:
* Extent Type Extent Used For Searching
* West Longitude -180.000000
* East Longitude 180.000000
* North Latitude -64.910145
* South Latitude -81.467190
* Extent Contains The Resource: Yes

Point Of Contact:
Individual's Name: Rosalyn K. Hayward
Organization's Name: USGS, Astrogeology
Contact's Position: Geologist
Contact's Role: Originator
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Country: United States
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Reference System

Reference System Identifier
Value 104905
***** Codespace Esri
***** Version 10.0.0

Data Quality

Scope Of Quality Information
Resource Level: dataset
Lineage:
Process Step:
See Pamphlet.doc, Mars Global Digital Dune Database Process.
Data Quality Report - Completeness Omission:
See Pamphlet.doc, Mars Global Digital Dune Database – Completeness of Database.
Data Quality Report - Conceptual Consistency
Measure Description:
All attributes were verified by displaying the lines in both the database and the spatial coverage and they are believed to be logically consistent.
Data Quality Report - Topological Consistency
Measure Description:
These data are believed to be logically consistent. Line geometry is topologically clean.
Data Quality Report - Absolute External Positional Accuracy:
Measure Description:
The horizontal accuracy is derived from the accuracy of the Mars Orbiter Laser Altimeter (MOLA) dataset [Smith and others, 2001]. The globally adjusted MOLA dataset has an absolute horizontal accuracy on the order of 100 m, but individual features in images can probably only be tied to MOLA-derived shaded-relief digital image models with a precision on the order of 200 m. Other bases used included Thermal Emission Imaging System (THEMIS) digital images [Archinal and others, 2003, Christensen and others, 2004]. The digital features were drawn at 20K to 100K scale with a node spacing of approximately 0.3 km to 2 km.

ESRI Metadata and Item Properties

Metadata Properties:
Arcgis: Arcgis1.0
Metadata Style: FGDC CSDGM Metadata
Metadata Standard Or Profile: FGDC
Created In Arcgis: 2012-05-14t13:03:12
Last Modified In Arcgis: 2012-06-03t15:08:05
Automatic Updates:
Last Update: 2012-06-03t15:06:39
Have Been Performed: Yes

Item Properties
Name: SP_Dune_Field_Geog
Content Type: Downloadable Data

ESRI Spatial Information

Extent In The Item's Coordinate Reference
Bounding Rectangle:
* West Longitude -180.000000
* East Longitude 180.000000
* North Latitude -64.910145
* South Latitude -81.467190
* Extent Contains The Resource: Yes

Coordinate Reference
Type: Geographic
Geographic Coordinate Reference: GCS_Mars_2000
Coordinate Reference Details
Geographic Coordinate System
Well-Known Identifier: 104905
X Origin: -399.99999999999989
Y Origin: -399.99999999999989
XY Scale: 1000000000.0000001
Z Origin: -100000
Z Scale: 10000
M Origin: -100000
M Scale: 10000
XY Tolerance: 1.6870604858115214e-008
Z Tolerance: 0.001
M Tolerance: 0.001
High Precision: True
Left Longitude: -180
Well-Known Text
GEOGCS["GCS_Mars_2000",DATUM["D_Mars_2000",SPHEROID["Mars_2000_IAU_IAG",3396190.0,169.8944472236118]],PRIMEM

["Reference_Meridian",0.0],UNIT["Degree",0.0174532925199433],A
UTHORITY ["ESRI",104905]]

ESRI Feature Class

Feature Class Name: SP_Dune_Field_Geog

* Feature Type: Simple
* Geometry Type: Polyline
* Has Topology: False
* Feature Count: 1998
* Spatial Index: True
* Linear Referencing: False

ESRI Fields and Subtypes

SP_Dune_Field_Geog Feature Class

* ROW COUNT 746

DEFINITION

Dune fields on Mars between lat 65° and 90° S. (~750 records).

DEFINITION SOURCE

Mars Global Digital Dune Database

FIELD OBJECTID_1

* ALIAS OBJECTID_1
* DATA TYPE OID
* WIDTH 4
* FIELD DESCRIPTION
  Internal feature number.
* DESCRIPTION SOURCE
  ESRI
* DESCRIPTION OF VALUES Sequential unique whole numbers that are automatically generated.

FIELD Shape

* ALIAS Shape
* DATA TYPE Geometry
* FIELD DESCRIPTION
  Feature geometry.
* DESCRIPTION SOURCE
  ESRI
* DESCRIPTION OF VALUES Coordinates defining the features.

FIELD
Dune_
Lon
ALIAS Dune_Longitude_East

* DATA TYPE Double
* WIDTH 8

FIELD DESCRIPTION
This field records the position of the centroid of the dune field

in decimal degrees east longitude.

FIELD Dune_Lat

ALIAS Dune_Latitude_Aerocentric

* DATA TYPE Double

* WIDTH 8

FIELD DESCRIPTION

This field records the position of the centroid of the dune field in decimal degrees latitude (aerocentric) of the centroid.

FIELD Dune_ID

ALIAS Dune_Lon_Lat_ID

* DATA TYPE String

* WIDTH 10

FIELD DESCRIPTION

Each dune field has a unique ID number constructed after the method used by Barlow (2003) to assign ID numbers to craters. Longitude is listed first and both values are extended to one decimal place. The + or – sign of the latitude is given, indicating the break between the two values. Thus 122.5 east longitude, -34.5 south latitude, becomes 1225-345. The longitude is always four digits and the latitude is always three digits, filling in with leading zeroes where necessary.

FIELD In_original

* ALIAS In_original

* DATA TYPE String

* WIDTH 10

FIELD DESCRIPTION

The South Pole portion of MGD3 includes some dune fields that would not have been included based on the criteria applied to the Equatorial and North Pole portions. By selecting records with "yes" in this field, the user can choose to use only dune fields that would have been included in the other two portions of MGD^3. Dune fields that would not have been included, either because they are sand sheets with no dune forms present, or because they do not appear to be dune fields in THEMIS IR, have a "no" in this field.

LIST OF VALUES

VALUE yes

DESCRIPTION Dune field would have been included in Equatorial and North Pole portions of MGD^3.

LIST OF VALUES

VALUE no

DESCRIPTION Dune fields that would not have been included in Equatorial and North Pole portions of MGD^3, either because they are sand sheets with no dune forms present, or because they do not appear to be dune fields in THEMIS IR.

FIELD Dune_Type

* ALIAS Dune_Type

* DATA TYPE String

* WIDTH 20
FIELD DESCRIPTION
This field lists the dune form type or types found within the dune field. It is often based on partial image coverage of the dune field and so may not include all dune forms present. Unless otherwise noted, we use dune forms as defined by McKee, E.D., 1979, Introduction to a study of global sand seas, in E.D.McKee (Editor), A study of global sand seas: U.S. Geological Survey Professional Paper 1052.
LIST OF VALUES
VALUE B
DESCRIPTION barchan dune as defined by McKee, 1979
ENUMERATED DOMAIN VALUE DEFINITION SOURCE McKee,1979
LIST OF VALUES
VALUE Bd
DESCRIPTION barchanoid dune as defined by McKee, 1979
ENUMERATED DOMAIN VALUE DEFINITION SOURCE McKee,1979
LIST OF VALUES
VALUE D
DESCRIPTION dome dune as defined by McKee, 1979
ENUMERATED DOMAIN VALUE DEFINITION SOURCE McKee,1979
LIST OF VALUES
VALUE L
DESCRIPTION linear dune as defined by McKee, 1979
ENUMERATED DOMAIN VALUE DEFINITION SOURCE McKee,1979
LIST OF VALUES
VALUE S
DESCRIPTION star dune as defined by McKee, 1979
ENUMERATED DOMAIN VALUE DEFINITION SOURCE McKee,1979
LIST OF VALUES
VALUE SS
DESCRIPTION sand sheet - used for a body of sand without dune forms
LIST OF VALUES
VALUE T
DESCRIPTION transverse dune as defined by McKee, 1979
ENUMERATED DOMAIN VALUE DEFINITION SOURCE McKee,1979
LIST OF VALUES
VALUE U
DESCRIPTION Unclassified, used for dunes that could not be classified, usually due to a lack of suitably detailed images.
LIST OF VALUES
VALUE BullsEye

DESCRIPTION a term used informally by Fenton and Hayward, 2010, to indicate a dune field with successive concentric rings of sand
ENUMERATED DOMAIN VALUE DEFINITION SOURCE Fenton and Hayward, 2010

FIELD B_1
ALIAS B
* DATA TYPE String
* WIDTH 3
FIELD DESCRIPTION
Barchan dune as defined by McKee, 1979
DESCRIPTION SOURCE
McKee,1979
LIST OF VALUES
VALUE 1
DESCRIPTION barchan dune present
LIST OF VALUES
VALUE 0
DESCRIPTION barchan dune not present

FIELD Bd_1
ALIAS Bd
* DATA TYPE String
* WIDTH 3
FIELD DESCRIPTION
Barchanoid dune as defined by McKee, 1979
DESCRIPTION SOURCE
McKee,1979
LIST OF VALUES
VALUE 1
DESCRIPTION barchanoid dune present
LIST OF VALUES
VALUE 0
DESCRIPTION barchanoid dune not present

FIELD D_1
ALIAS D
* DATA TYPE String
* WIDTH 3
FIELD DESCRIPTION
dome dune as defined by McKee, 1979
DESCRIPTION SOURCE
McKee, 1979
LIST OF VALUES
VALUE 1
DESCRIPTION dome dune present
LIST OF VALUES
VALUE 0
DESCRIPTION dome dune not present

FIELD L_1
ALIAS L
* DATA TYPE String
* WIDTH 3
FIELD DESCRIPTION
Linear dune as defined by McKee, 1979
DESCRIPTION SOURCE
McKee, 1979
LIST OF VALUES
VALUE 1
DESCRIPTION linear dune present
LIST OF VALUES
VALUE 0
DESCRIPTION linear dune not present
FIELD S_1
ALIAS S
* DATA TYPE String
* WIDTH 3
FIELD DESCRIPTION
Star dune as defined by McKee, 1979
DESCRIPTION SOURCE
McKee, 1979
LIST OF VALUES
VALUE 1
DESCRIPTION star dune present
LIST OF VALUES
VALUE 0
DESCRIPTION star dune not present
FIELD SS_1
ALIAS SS
* DATA TYPE String
* WIDTH 3
FIELD DESCRIPTION
Sand sheet, used for a body of sand without dune forms
LIST OF VALUES
VALUE 1
DESCRIPTION sand sheet present
LIST OF VALUES
VALUE 0
DESCRIPTION sand sheet not present
FIELD T_1
ALIAS T
* DATA TYPE String
* WIDTH 3
FIELD DESCRIPTION

Transverse dune as defined by McKee, 1979

DESCRIPTION SOURCE
McKee, 1979
LIST OF VALUES
VALUE 1
DESCRIPTION transverse dune present
LIST OF VALUES
VALUE 0
DESCRIPTION transverse dune not present
FIELD U_1
ALIAS U
* DATA TYPE String
* WIDTH 3
FIELD DESCRIPTION
Unclassified, used for dunes that could not be classified, usually due to a lack of suitably detailed images.
LIST OF VALUES
VALUE 1
DESCRIPTION unclassified dune present, usually unclassified due to a lack of suitably detailed images
LIST OF VALUES
VALUE 0
DESCRIPTION unclassified dune not present
FIELD BullsEye
* ALIAS BullsEye
* DATA TYPE String
* WIDTH 3
FIELD DESCRIPTION
a term used informally by Fenton and Hayward, 2010, to indicate a dune field with successive concentric rings of sand
LIST OF VALUES
VALUE 1
DESCRIPTION bull's eye dune present
LIST OF VALUES
VALUE 0
DESCRIPTION bull's eye dune not present
FIELD Confidence
* ALIAS Confidence
* DATA TYPE String
* WIDTH 3
FIELD DESCRIPTION
This field was originally intended to indicate how certain we were that a feature was a dune field. With increased availability of higher resolution imagery, we are confident that all features included are dune fields. This field is retained for continuity with the Equatorial and

North Pole portions of MGD3. Note that we include as “dune fields” features that appear to be inactive, eroded dune fields, and dune fields that may be all sand sheet with no bedforms.

LIST OF VALUES
VALUE 1
DESCRIPTION confident that feature is a dune field

LIST OF VALUES
VALUE 2
DESCRIPTION fairly confident that feature is a dune field, need better images to verify

LIST OF VALUES
VALUE 3
DESCRIPTION less confident that feature is a dune field, need better images to verify

FIELD Type_Image
ALIAS Image_Types_used
* DATA TYPE String
* WIDTH 10
FIELD DESCRIPTION
Lists types of images used to locate/verify dune field. It is beyond the scope of this work to list all available images.

LIST OF VALUES
VALUE C
DESCRIPTION Mars Reconnaissance Orbiter (MRO) Context Camera (CTX)

LIST OF VALUES
VALUE H
DESCRIPTION Mars Express High Resolution Stereo Camera (HRSC)

LIST OF VALUES
VALUE Hi
DESCRIPTION MRO High Resolution Imaging Science Experiment (HiRISE)

LIST OF VALUES
VALUE I
DESCRIPTION Thermal Emission Imaging System (THEMIS) Infrared (IR)
LIST OF VALUES
VALUE M
DESCRIPTION Mars Orbiter Camera Narrow Angle (MOC NA)
LIST OF VALUES
VALUE V
DESCRIPTION THEMIS Visible (VIS)

FIELD Area_sinu_
ALIAS Dune_Area_km2_sinu
* DATA TYPE Double
* WIDTH 8

FIELD DESCRIPTION
– Area of dune field polygon (km^2) calculated in Sinusoidal projection to preserve area. Datum is Mars2000 sphere with 3396190 m diameter.

FIELD SF
ALIAS Slipface Status
* DATA TYPE String
* WIDTH 20
FIELD DESCRIPTION
This field indicates whether slipface measurements were made for the dune field.
LIST OF VALUES
VALUE yes
DESCRIPTION slipface measurements were made
LIST OF VALUES
VALUE no
DESCRIPTION imagery was not sufficient for slipface measurement

FIELD MDH1
ALIAS Mean_Dune_Height_1
* DATA TYPE Single
* WIDTH 4
FIELD DESCRIPTION
Mean dune height (m) used to calculate the volume for Method 1. MDH1 is based on a) using the average MOLA elevation minus the minimum MOLA elevation as an estimate of the average dune height in a dune field and b) placing dune fields into one of six groups depending on the assemblage of dune types within the dune field. MOLA elevation differences within a dune field, caused by underlying rugged terrain, will cause overestimation of dune height. To decrease the influence of rugged terrain, average dune height was calculated using only dune fields with a standard deviation (of elevation differences) equal to or less than that of the mean standard deviation of the interquartile range of the ~750 dune field polygons. The averages of the six groups derived from dune fields in more subdued terrain were applied to dune fields in more rugged terrain. This method still likely overestimates volume because of underlying topography.

FIELD Volume_1
* ALIAS Volume_1
* DATA TYPE Double
* WIDTH 8
FIELD DESCRIPTION
Volume 1 was calculated using the following formula: [MDH1]*.001* [Area_sinu_], where [MDH1] is the dune height (in meters, multiplied hereby .001 to convert to km) assigned to the dune polygon and [Area_sinu] is the area of the dune polygon calculated in the sinusoidal projection. This is a veryrough estimate of dune volume, chosen

because it is similar to one of the methods used to calculate volume for the Equatorial portion of MGD3. It assumes that dune height would be the maximum minus the minimum MOLA elevation in a dune field. Underlying topography exaggerates dune elevation differences and results in an overestimation of dune height and volume. Another source of overestimation is the assumption that if the dunes were leveled the resulting thickness would be equal to half the dune height (average minus minimum). Studies on Earth have shown that sediment thickness of leveled dunes is significantly less than half the dune height (Lancaster and Greeley, 1990). Note that to make the total volume estimate consistent with the Equatorial volume estimate, include only dune fields with a "yes" in the "In_original" field.

FIELD MDH2

ALIAS Mean_Dune_Height_2

* DATA TYPE Single
* WIDTH 4

FIELD DESCRIPTION

Mean dune height (m) used to calculate the volume for Method 2. MDH2 is based on measuring topographic profiles across representative dune crests using an ArcMap tool. In other areas, distance between barchan horns was measured. Terrestrial studies have found that dune height is roughly one tenth the distance between horns (for example, Finkel, 1959; Hesp and Hastings, 1998). Comparisons with Mars dune morphology suggest that the relationship may also be valid for Martian dunes (Bourke and others, 2006). As with MDH1, dune fields were categorized into six groups based on dune-type assemblage and a mean dune height was assigned to each category. Because profiles could not be measured on sand sheets, an arbitrary mean dune height of 1 m was assigned to the sand sheet category.

FIELD Volume_2

* ALIAS Volume_2
* DATA TYPE Double
* WIDTH 8

FIELD DESCRIPTION

Volume 2 was calculated using the following formula: [MDH2]*.001*[Area_sinu] *[cover]*.5, where [MDH2] is the dune height (in meters, multiplied here by .001 to convert to km) assigned to the dune polygon and [Area_sinu] is the area of the dune polygon calculated in the sinusoidal projection and [cover] (not provided in the attribute table) is an estimate of how much of the dune polygon is covered with dunes. Although this is a rough estimate of dune volume, it does mitigate the overestimation due to underlying topography and is likely more realistic than the Volume 1estimate. Volume 2 probably still overestimates volume because, as in Volume 1, it assumes that if a dune were leveled, the resulting thickness

would be half of the estimated dune height. Studies on Earth have shown that sediment thickness of leveled dunes is significantly less than half dune height (Lancaster and Greeley, 1990). This method was chosen because it is similar to a method used to estimate volume in the North Pole portion of MGD[3].

FIELD Avg_El
ALIAS Dune_Avg_Elev
* DATA TYPE Integer
* WIDTH 4
FIELD DESCRIPTION
The average elevation is given in meters. It was calculated for each dune field polygon using an ArcMap zonal statistics tool with MOLA (128 pixel/degree) gridded topography (in the South Polar Stereographic projection) as the value raster. The dune field polygons were in Sinusoidal projection. Note that the number of raster pixels used to calculate the average ranged from 3 for the smallest dune field to ~ 22,000 for the largest dune field. The average is more meaningful for the smaller dune fields.

FIELD CcDcAz_Geog
ALIAS CcDcAzimuth_Geographic
* DATA TYPE Double
* WIDTH 8
FIELD DESCRIPTION
This field is only populated for the dune fields that are located inside of craters and that meet the criteria for a meaningful CcDcAzimuth (~300). CcDcAzimuth is not calculated when a dune field is centrally located within a crater, when the crater floor is extremely rough, or when there are many scattered dune fields within a crater. ArcMap tools were used to create polylines that extend from crater centroid to dune centroid. The azimuth is given in decimal degrees calculated in Simple Cylindrical projection (for compatibility with the EQ and NP parts of MGD[3]). We recommend that numerical comparisons to other azimuths be made in the Mercator projection because the Mercator projection preserves direction. Note that the term "crater" was used for simplicity, even though a small number of the circular depressions containing dunes may not be impact craters.

FIELD CcDcAz_Merc
ALIAS CcDcAzimuth_Mercator
* DATA TYPE Double
* WIDTH 8
FIELD DESCRIPTION
This field is only populated for the dune fields that are located inside of craters and that meet the criteria for a meaningful CcDcAzimuth (~300). CcDcAzimuth is not calculated when a dune field is centrally located within a crater, when the crater floor is extremely rough, or when there are many scattered dune fields within a crater. ArcMap

tools were used to create polylines that extend from crater centroid to dune centroid. The azimuth is calculated in decimal degrees in the Mercator projection because that projection is best for preserving direction. We recommend using this field when comparing azimuths. Note that the term "crater" was used for simplicity, even though a small number of the circular depressions containing dunes may not be impact craters.

FIELD CcDcAz_Ster

ALIAS CcDcAzimuth_Stereographic

* DATA TYPE Double

* WIDTH 8

FIELD DESCRIPTION

This field is only populated for the dune fields that are located inside of craters and that meet the criteria for a meaningful CcDcAzimuth (~300). CcDcAzimuth is not calculated when a dune field is centrally located within a crater, when the crater floor is extremely rough, or when there are many scattered dune fields within a crater. ArcMap tools were used to create polylines that extend from crater centroid to dune centroid. The azimuth is calculated in decimal degrees in the South Polar Stereographic projection, to be used when plotting points on a South Polar Stereographic map. Note that the term "crater" was used for simplicity, even though a small number of the circular depressions containing dunes may not be impact craters.

FIELD SF_1_Az

ALIAS Slipface_1_Azimuth

* DATA TYPE Double

* WIDTH 8

FIELD DESCRIPTION

The azimuth, given in decimal degrees, is the average of individual slipface measurements. It was calculated in the Simple Cylindrical projection (for compatibility with the EQ and NP parts of MGD[3]). We recommend using azimuths calculated in the Mercator projection for comparison to other azimuths. Slipface method: Where THEMIS VIS, MOC NA, or CTX images of sufficient quality were available, polylines were drawn on slipfaces to measure the direction of wind movement at the time the gross dune morphology formed. It was beyond the scope of this report to look at the detail needed to discern subtle dune modification. It was also beyond the scope of this report to measure all slipfaces. We attempted to include enough slipface measurements to represent the general circulation (as implied by gross dune morphology) and to give a sense of the complex nature of aeolian activity on Mars. The absence of slipface measurements in a given direction should not be taken as evidence that winds in that direction did not occur. When more than one direction was recorded, slipface measurements were grouped and an average for each direction was calculated. Slipface1 is the direction with the greatest number of

slipfaces used in the averaging process. Images were projected to ArcMap in the South Polar Stereographic projection using the Mars_2000 datum.

FIELD SF_1_Count
ALIAS Slipface_1_Count
* DATA TYPE SmallInteger
* WIDTH 2
FIELD DESCRIPTION
The number of individual slipfaces used to calculate the average.

FIELD SF_2_Az
ALIAS Slipface_2_Azimuth
* DATA TYPE Double
* WIDTH 8
FIELD DESCRIPTION
The average of the direction with the second largest number of slipfaces used in the averaging process. It was calculated in the Simple Cylindrical projection (for compatibility with the EQ and NP parts of MGD^3). We recommend using azimuths calculated in the Mercator projection for comparison to other azimuths.

FIELD SF_2_Count
ALIAS Slipface_2_Count
* DATA TYPE SmallInteger
* WIDTH 2
FIELD DESCRIPTION
The number of individual slipfaces averaged to calculate the Slipface 2 azimuth.

FIELD SF_3_Az
ALIAS Slipface_3_Azimuth
* DATA TYPE Double
* WIDTH 8
FIELD DESCRIPTION
The average of the direction with the third largest number of slipfaces used in the averaging process. It was calculated in the Simple Cylindrical projection (for compatibility with the EQ and NP parts of MGD^3). We recommend using azimuths calculated in the Mercator projection for comparison to other azimuths.

FIELD SF_3_Count
ALIAS Slipface_3_Count
* DATA TYPE SmallInteger
* WIDTH 2
FIELD DESCRIPTION
The number of individual slipfaces averaged to calculate the Slipface 3 azimuth.

FIELD SF_4_Az
ALIAS Slipface_4_Azimuth
* DATA TYPE Double

* WIDTH 8
FIELD DESCRIPTION
The average of the direction with the fourth largest number of slipfaces used in the averaging process. It was calculated in the Simple Cylindrical projection (for compatibility with the EQ and NP parts of MGD[3]). We recommend using azimuths calculated in the Mercator projection for comparison to other azimuths.

FIELD SF_4_Count
ALIAS Slipface_4_Count
* DATA TYPE SmallInteger
* WIDTH 2
FIELD DESCRIPTION
The number of individual slipfaces averaged to calculate the Slipface 4 azimuth.

FIELD Environ
ALIAS Environment
* DATA TYPE String
* WIDTH 20
FIELD DESCRIPTION
A general description that divides dune fields into two main categories, those located within craters, C, and those located outside craters, N.
LIST OF VALUES
VALUE C
DESCRIPTION Dune field is located within a crater.
LIST OF VALUES
VALUE N
DESCRIPTION Dune field is not located within a crater.

FIELD Cr_Lon
ALIAS Crater_Longitude_East
* DATA TYPE Double
* WIDTH 8
FIELD DESCRIPTION
Position of the centroid of the crater in decimal degrees east longitude.

FIELD Cr_Lat
ALIAS Crater_Latitude_Aerocentric
* DATA TYPE Double
* WIDTH 8
FIELD DESCRIPTION
Position of the centroid of the crater in decimal degrees latitude (aerocentric).

FIELD Crater_BID
ALIAS Crater_“BarlowID”
* DATA TYPE String
* WIDTH 20
FIELD DESCRIPTION

A unique ID number constructed after the method used by Barlow (2003) to assign ID numbers to craters. Longitude is listed first and both values are extended to one decimal place. The + or – sign of the latitude is given, indicating the break between the two values. Thus 122.5 east longitude, -34.5 south latitude, becomes 1225-345. The longitude is always four digits and the latitude is always three digits, filling in with leading zeroes where necessary. A value of 0 means there is no associated crater. Note that the term "crater" was used for simplicity, even though a small number of the circular depressions containing dunes may not be impact craters.

FIELD Cr_Area_si

ALIAS Crater_Area_km2_sinu

* DATA TYPE Double

* WIDTH 8

FIELD DESCRIPTION

Crater area, in km^2, is given when a dune field is located within a crater. When a dune field is located within a crater that is within one or more other craters, the innermost crater is considered to exert the most influence, so its area is used. Areas were calculated in the Sinusoidal projection and are based on our digitized crater rims. Note that the term "crater" was used for simplicity, even though a small number of the circular depressions containing dunes may not be impact craters.

FIELD Cr_Diam

ALIAS Crater_Diameter_km

* DATA TYPE Double

* WIDTH 8

FIELD DESCRIPTION

Crater diameter, in km, is given when a dune field is located within a crater. Diameter is calculated by formula based on the area of the crater. Note that the term "crater" was used for simplicity, even though a small number of the
circular depressions containing dunes may not be impact craters.

FIELD MC

ALIAS Mars_5M_Chart

* DATA TYPE SmallInteger

* WIDTH 2

FIELD DESCRIPTION

Mars Chart (1:5 million) number for quadrangle in which dune field is located.

FIELD THEMIS_IR

ALIAS THEMIS_IR_images

* DATA TYPE String

* WIDTH 254

FIELD DESCRIPTION

This field contains a comma delimited list of image numbers of Mars Odyssey Thermal Emission Imaging System (THEMIS) Infrared (IR) images used to locate dunes. Images are not included

in the ArcMap or ArcReader versions of the database, but can be viewed or downloaded at http://themis-data.asu.edu/. The list is incomplete. The absence of image numbers does not imply a lack of THEMIS IR coverage.

FIELD THEMIS_VIS
ALIAS THEMIS_VIS_images
* DATA TYPE String
* WIDTH 254
FIELD DESCRIPTION
This field contains a comma delimited list of image numbers of THEMISVisible (VIS) images used to verify location of, classify, or measure slipfaces of dunes. Not all images listed are included in the ArcMap and ArcReader versions of the database, but all can be viewed or downloaded at http://themis-data.asu.edu/.

FIELD MOC_NA
ALIAS MOC_NA_images
* DATA TYPE String
* WIDTH 254
FIELD DESCRIPTION
This field contains image numbers, unless otherwise noted, of Mars Global surveyor (MGS) Mars Orbiter Camera Narrow Angle (MOC NA) images used to verify location of, classify, or measure slipfaces of dunes. Not all images listed are included in the ArcMap and ArcReader versions of the database, but all can be viewed or downloaded at http://www.msss.com/.

FIELD CTX
ALIAS CTX_images
* DATA TYPE String
* WIDTH 254
FIELD DESCRIPTION
This field contains a comma delimited list of image numbers of Mars Reconnaissance Orbiter (MRO) Context Camera (CTX) images used to verify location of, classify, or measure slipfaces of dunes. Images are not included in the ArcMap and ArcReader versions of the database, but can be viewed or downloaded at http://themis-data.asu.edu/.

FIELD HiRISE
ALIAS HiRISE_images
* DATA TYPE String
* WIDTH 254
FIELD DESCRIPTION
This field contains a comma delimited list of image numbers of MRO High Resolution Imaging Science Experiment (HiRISE) images used to verify location of or classify dunes. Images are not included in the

ArcMap and ArcReader versions of the database, but can be viewed or downloaded at http://themis- data.asu.edu/.

FIELD HRSC
ALIAS HRSC_images
* DATA TYPE String
* WIDTH 254
FIELD DESCRIPTION
This field contains a comma delimited list of image numbers of Mars Express High Resolution Stereo Camera (HRSC) images used to verify location of or classify dunes. Images are not included in the ArcMap and ArcReader versions of the database, but can be viewed or downloaded at http://themis-data.asu.edu/.

FIELD WEB_LINK_1
* ALIAS WEB_LINK_1
* DATA TYPE String
* WIDTH 254
FIELD DESCRIPTION
This field contains a link to an internet site displaying an image of the dune field. Activate the link in ArcMap using the Layer Properties/Display tab.

FIELD WEB_LINK_2
* ALIAS WEB_LINK_2
* DATA TYPE String
* WIDTH 254
FIELD DESCRIPTION
This field contains a link to an internet site displaying an image of some dune fields. Not all dune fields have a second link. Activate the link in ArcMap using the Layer Properties/Display tab. Note that only one field can be hyperlinked at a time.

FIELD Comments
* ALIAS Comments
* DATA TYPE String
* WIDTH 254
FIELD DESCRIPTION
This field contains comments.

FIELD Shape_Length
* ALIAS Shape_Length
* DATA TYPE Double
* WIDTH 8
* FIELD DESCRIPTION
Length of feature in internal units.

* DESCRIPTION SOURCE
ESRI

* DESCRIPTION OF VALUES Positive real numbers that are automatically generated.

FIELD Shape_Area
* ALIAS Shape_Area
* DATA TYPE Double
* WIDTH 8
* FIELD DESCRIPTION
  Area of feature in internal units squared.
* DESCRIPTION SOURCE
  ESRI
* DESCRIPTION OF VALUES Positive real numbers that are automatically generated.

FIELD SF1_Merc
ALIAS Slipface_1 _Mercator
* DATA TYPE Double
* WIDTH 8
FIELD DESCRIPTION
  The azimuth, given in decimal degrees, is the average of individual slipface measurements. It was calculated in the Mercator projection. We recommend this field for comparison to other azimuths.

FIELD SF2_Merc
ALIAS Slipface_2_Mercator
* DATA TYPE Double
* WIDTH 8
FIELD DESCRIPTION
  The average of the direction with the second largest number of slipfaces used in the averaging process. It was calculated in decimal degrees in the Mercator projection. We recommend this field for comparison to other azimuths.

FIELD SF3_Merc
ALIAS Slipface_3_Mercator
* DATA TYPE Double
* WIDTH 8
FIELD DESCRIPTION
  The average of the direction with the third largest number of slipfaces used in the averaging process. It was calculated in decimal degrees in the Mercator projection. We recommend this field for comparison to other azimuths.

FIELD SF4_Merc
ALIAS Slipface_4_Mercator
* DATA TYPE Double
* WIDTH 8
FIELD DESCRIPTION

The average of the direction with the fourth largest number of slipfaces used in the averaging process. It was calculated in decimal degrees in the Mercator projection. We recommend this field for comparison to other azimuths.

Metadata Details

Metadata Language: English
Metadata Character Set: Utf8 - 8 Bit Ucs Transfer Format
Scope Of The Data Described By The Metadata: Dataset
***** Scope Name: Dataset
Metadata Contact:
Individual's Name: Rosalyn K. Hayward
Organization's Name: USGS,Astrogeology
Contact's Position: Geologist
Contact's Role: Originator
Contact Information:
Phone:
Voice: (928) 566-7022
Fax: (928) 566-7014
Address:
Delivery Point: 2255 N. Gemini Dr.
City: Flagstaff
Administrative Area: Az
Postal Code: 86001
Country: United States
E-Mail Address: rhayward@usgs.gov
***** Last Update: 2012-06-03
Maintenance:
Update Frequency: Not Planned
Scope Of The Updates: Dataset