

**SP\_CcDcAzimuth\_Point.doc**  
**Mars Global Digital Dune Database: MC-30**  
*By* R.K. Hayward, L.K. Fenton,  
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2012  
(<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\_CcDcAzimuth\_Point\_Geog  
Alternate Titles: South Pole CcDcAzimuth Point  
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  
Contact Information:  
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Delivery Point: 2255 N. Gemini Dr.  
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**Publication Information:**

Publication\_Place: Reston, Virginia  
Publisher: U.S. Geological Survey  
**Online\_Linkage: <http://pubs.usgs.gov/of/2012/1259>**

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 -179.809921

\* East Longitude 179.523680

\* North Latitude -65.061241

\* South Latitude -80.186291

\* 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

Contact Information:

Phone:

Voice: (928) 566-7022

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Address:

Delivery Point: 2255 N. Gemini Dr.

City: Flagstaff

Administrative

Area: Az Postal

Code: 86001

Country: United States

E-Mail Address: [rhayward@usgs.gov](mailto:rhayward@usgs.gov)

## 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\_CcDcAzimuth\_Points\_Geog  
Content Type: Downloadable Data

**ESRI Spatial Information**

Extent In The Item's Coordinate Reference

Bounding Rectangle:

\* West Longitude -179.809921  
\* East Longitude 179.523680  
\* North Latitude -65.061241  
\* South Latitude -80.186291  
\* 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],AUTHORITY ["ESRI",104905]]

### **ESRI Feature Class**

Feature Class Name: SP\_CcDcAzimuth\_Points\_Geog

- \* Feature Type: Simple
- \* Geometry Type: Point
- \* Has Topology: False
- \* Feature Count: 288
- \* Spatial Index: True
- \* Linear Referencing: False

### **ESRI Fields and Subtypes**

SP\_CcDcAzimuth\_Point\_Geog Feature Class

\* ROW COUNT 288

#### **DEFINITION**

(shape – point) Points that represent the azimuth found by extending a polyline from crater centroid to the centroid of a dune field within the crater on Mars between lat 65° and 90° S. (~300 records) It is represented as a point so that it can be plotted from the dune centroid for ease of comparison to the Average Slipface Azimuth. Note that the CdDcAzimuth file is also included as a polyline shapefile. In the ArcMap and ArcReader projects this layer will not render when zoomed out beyond 1:20,000,000. Also 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 OBJECTID**

- \* ALIAS OBJECTID
- \* 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 DuneBID

ALIAS Dune\_Lon\_Lat\_ID

\*DATA TYPE String

\*WIDTH 20

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. The Dune Field ID is listed with every associated image.

FIELD Dune\_Lon

ALIAS Dune\_Longitude\_East

\*DATA TYPE Double

\*WIDTH 8

FIELD DESCRIPTION

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 CcDcAzGeog

ALIAS CcDcAzimuth\_Geographic

\*DATA TYPE Double

\*WIDTH 8

FIELD DESCRIPTION

ArcMap tools were used to create polylines that extend from crater centroid to dune centroid. The azimuth is calculated in decimal degrees in the Geographic coordinate system (for compatibility with the EQ and NP parts of MGD<sup>3</sup>). 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\_Az\_Geog

ALIAS Slipface\_1\_Azimuth\_Geographic

\*DATA TYPE Double

\*WIDTH 8

FIELD DESCRIPTION

The azimuth, given in decimal degrees, is the average of individual slipface measurements. In selected areas, 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. The scope of this project did not allow for deciphering detailed slipface morphology or for measuring 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. Slipface azimuth was calculated in decimal degrees in the Geographic coordinate system (for compatibility with the Equatorial and North Polar parts of MGD<sup>3</sup>).

FIELD CcDcAzMerc

ALIAS CcDcAzimuth\_Mercator

\*DATA TYPE Double

\*WIDTH 8

FIELD DESCRIPTION

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. We recommend that numerical comparisons 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 SF\_Az\_Merc

ALIAS Slipface\_1\_Azimuth\_Mercator

\*DATA TYPE Double

\*WIDTH 8

FIELD DESCRIPTION

The azimuth, given in decimal degrees, is the average of individual slipface measurements. In selected areas, 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. The scope of this project did not allow for deciphering detailed slipface morphology or for measuring 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. Slipface azimuth was calculated in decimal degrees in the Mercator projection for comparison with the CcDcAzimuth in the Mercator projection. We recommend that numerical comparisons be made in the Mercator projection because the Mercator projection preserves direction.

FIELD CcDcAzSter

ALIAS CcDcAzimuth\_Stereographic

\*DATA TYPE Double

\*WIDTH 8

FIELD DESCRIPTION

The azimuth of the line connecting the crater centroid to dune centroid, calculated in decimal degrees in the South Polar Stereographic projection. This value is provided so that the user can correctly display the point version of the CcDcAzimuth in South Polar Sterographic projection. We recommend that numerical comparisons be made in the Mercator projection because the Mercator projection preserves direction.

FIELD CraterBID

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.

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 Crater\_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 Crater\_Lat

ALIAS Crater\_Latitude\_Aerocentric

\*DATA TYPE Double



\* WIDTH 8

FIELD DESCRIPTION

Position of the centroid of the crater in decimal degrees latitude (aerocentric).

**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:

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Postal Code: 86001

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E-Mail Address: [rhayward@usgs.gov](mailto:rhayward@usgs.gov)

\* Last Update: 2012-06-03

Maintenance:

Update Frequency: Not Planned

Scope Of The Updates: Dataset