



SP_GCM.doc
Mars Global Digital Dune Database: MC-30
By R.K. Hayward, L.K. Fenton,
T.N. Titus, A. Colaprete, and P.R. Christensen
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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_GCM_Geog
Alternate Titles: South Pole GCM
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:
Phone:
Voice: (928) 566-7022
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Delivery Point: 2255 N. Gemini Dr.
City: Flagstaff
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Postal Code: 86001
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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 -174.743410

* East Longitude 180.000000

* North Latitude -58.104367

* South Latitude -85.000000

* 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

Fax: (928) 566-7014

Address:

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City: Flagstaff
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Postal Code: 86001
Country: United States
E-Mail Address: 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_GCM_Geog
Content Type: Downloadable Data

ESRI Spatial Information

Extent In The Item's Coordinate Reference

Bounding Rectangle:

- * West Longitude -174.743410
- * East Longitude 180.000000
- * North Latitude -58.104367
- * South Latitude -85.000000
- * 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_GCM_Geog

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

ESRI Fields and Subtypes

SP_GCM_Geog Feature Class

* ROW COUNT 1998

DEFINITION

(shape – polyline) Polylines represent output from the NASA/Ames General Circulation Model (GCM). The model output, created for the database by A. Colaprete, was created with a grid spacing of 6 degrees longitude by 5 degrees latitude for each degree of solar longitude (Ls) in one Martian year. Shear stress, wind velocity and wind azimuth were provided 8 times daily for each Ls, resulting in ~3000 vectors per grid location. Haberle and others (2003) have shown that setting a threshold stress of 0.0225N/m² with the Ames Mars GCM will lift dust (through bombardment from sand saltation) in spatial patterns that qualitatively agree with observed dust storm occurrences. Thus only output records with a wind stress value >0.0225 N/m² are included. We also excluded output if modeled surface temperature was <160 K because the surface would likely be covered with CO₂, thus sand would not be available for transport. Model output is provided for the area from 60° N to 90° N (5 degrees latitude beyond the southern extent of the study area). (1998 records)

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 OBJECTID

* ALIAS OBJECTID

* DATA TYPE Integer

* WIDTH 4

FIELD DESCRIPTION

none

DESCRIPTION SOURCE

none

FIELD LS

ALIAS Solar_Longitude

* DATA TYPE Double

* WIDTH 8

FIELD DESCRIPTION

This is the position of Mars relative to the Sun measured in degrees from the vernal equinox (start of northern Spring). It is used as a measure of Martian seasons: Northern Spring/Southern Autumn start at 0°. Northern Summer/Southern Winter start at 90°. Northern Autumn/Southern Spring start at 180°. Northern Winter/Southern Summer begin at 270°. Also known as heliocentric longitude and abbreviated Ls.

DESCRIPTION SOURCE

none

FIELD UDT

ALIAS Universal_Daylight_Time

* DATA TYPE Double

* WIDTH 8

FIELD DESCRIPTION

Local time at the Mars prime meridian.

DESCRIPTION SOURCE

none

FIELD LMT

ALIAS Local_Mean_Time

* DATA TYPE Double

* WIDTH 8

FIELD DESCRIPTION

This is the local time on Mars relative to a division of the Martian day into 24 equal parts. A Martian day is slightly longer than 24 hours and 37 minutes long. "DAY" is a local time of 08:00-20:00 (8am-8pm). "NIGHT" is a local time of 00:00-07:59 or 20:01-24:59 (0:00-7:59am or 8:01-11:59pm).

DESCRIPTION SOURCE

none

FIELD LON

ALIAS GCM_Longitude_East

*DATA TYPE SmallInteger

*WIDTH 2

FIELD DESCRIPTION

Position of the GCM grid point in decimal degrees east longitude.

DESCRIPTION SOURCE

none

FIELD LAT

ALIAS GCM_Latitude_Aerocentric

*DATA TYPE SmallInteger

*WIDTH 2

FIELD DESCRIPTION

Position of the GCM grid point in decimal degrees latitude (aerocentric).

DESCRIPTION SOURCE

none

FIELD STRESS

ALIAS Shear_Stress

*DATA TYPE Single

*WIDTH 4

FIELD DESCRIPTION

GCM model output. Wind stress in Newtons/meter².

DESCRIPTION SOURCE

none

FIELD WINDMAG

ALIAS Wind_Velocity

*DATA TYPE Double

*WIDTH 8

FIELD DESCRIPTION

GCM model output. Wind azimuth in decimal degrees. Note that because SP_GCM is a polyline shapefile, it will display correctly in ArcMap in any projection. However, if you convert the polylines to points, do not use the Wind_Azimuth (geog_bear) values to display direction, except in Geographic coordinate system or Simple Cylindrical projection. The display would be inaccurate in most other projections, including Polar Stereographic projection.

DESCRIPTION SOURCE

none

FIELD geog_bear

ALIAS Wind_Azimuth_Geog

*DATA TYPE Double

*WIDTH 8

FIELD DESCRIPTION

GCM model output. Wind azimuth in decimal degrees as calculated in Geographic coordinate system, is included for consistency with Equatorial and North Pole parts of MGD³. We recommend using Wind_Azimuth_Mercator (merc_bear) for numerical comparison to

other azimuths. Note that because SP_GCM is a polyline shapefile, it will display correctly in ArcMap in any projection. However, if you convert the polylines to points, do not use the Wind_Azimuth_Geog (geog_bear) values to display direction, except in Geographic coordinate system or Simple Cylindrical projection. The display would be inaccurate in most other projections, including Polar Stereographic projection.

DESCRIPTION SOURCE

none

FIELD PS_bear

ALIAS Wind_Azimuth_Ster

* DATA TYPE Double

* WIDTH 8

FIELD DESCRIPTION

GCM model output. Wind azimuth in decimal degrees, calculated in the Polar Stereographic projection. If the user converts the polylines to points, and wants to display them as arrows in the Polar Stereographic projection, use this column to rotate the arrows.

DESCRIPTION SOURCE

none

FIELD merc_bear

ALIAS Wind_Azimuth_Mercator

* DATA TYPE Double

* WIDTH 8

FIELD DESCRIPTION

GCM model output. Wind azimuth in decimal degrees, calculated in the Mercator projection. We recommend use of this field for numerical comparison to other azimuths. If you convert the polylines to points, do not use the Wind_Azimuth_Mercator (merc_bear) values to display direction, except in Mercator projection.

DESCRIPTION SOURCE

none

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.

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

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Phone:

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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