

TITAN: NOMENCLATURE SYSTEM AND THE VERY FIRST NAMES FOR ONE MORE WORLD.

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Introduction: A rich harvest of new results has been obtained in 2005 by the Cassini-Huygens mission to the Saturnian system, a cooperative project of NASA, the European Space Agency and the Italian Space Agency. One of the main achievements is a unique possibility to obtain the first look onto the surface of Saturn's largest Moon, Titan. The success of the Huygens probe into Titan's thick nitrogen-methane atmosphere has revealed a new world, strangely Earth-like, with methane playing the role of water, low temperature ice substituting for rock, and organic aerosols precipitated from the atmosphere taking the place of soil. Streams of liquid methane course over the icy bedrock of a world nearly frozen in time shortly after its formation.

Titan surface structure: Prior to the Cassini-Huygens mission there was almost no data on the surface of Titan, despite the fact that it is one of the largest moons in the solar system, with a diameter of 5150 km. Titan's atmospheric haze hid the surface from Voyager and Earth-based observations in visible light. The Cassini spacecraft during its flybys close to Titan revealed the surface features with its visual and IR imaging instrument, and with the first strips from an imaging radar survey. The resolution of these images is still coarse to moderate, and Cassini has still seen only a fraction of the surface. As a result the description of the feature types on Titan that we can make today is just as first approach.

The current synoptic map covers about 80% of Titan – segments of the area south of 35°N. Images for this map were obtained in a near-IR band (938 nm) at which light can penetrate Titan's atmosphere. The map shows only brightness variations on Titan's surface (the illumination is such that there are no shadows and no shading from topographic variations). The dark terrains are presumably lowlands. The Huygens probe landed in such a region. The bright regions of Titan are thought to consist of upland terrain that is relatively uncontaminated by the dark material that fills the lowland regions. In the south polar region there is a dark feature with sharp boundaries identified as the best candidate so far for a past or present hydrocarbon lake on Titan. In a bright terrain area just north of the Huygens landing site, there are numerous channels with a dendritic pattern. They have been formed by a running fluid and could carry liquid methane in past and present times.

Creation of the Titan nomenclature: The International Astronomical Union's (IAU) Working Group on Planetary System Nomenclature (WGPSN) established 10 feature types and Latin terms for naming on Titan, as well as 7 categories of proper names. The initial work has been done by the authors of this abstract – the members of the Outer Solar System Task Group, which is a subdivision of the WGPSN, and Jennifer Blue, who is a geographer at the USGS/Flagstaff Astrogeology Research Program. Further development was made by the WGPSN, which approved the names in 2005.

Feature type definitions:

ALBEDO FEATURE: Geographic area distinguished by amount of reflected light.

ARCUS: Arc-shaped feature.

CRATER: A circular depression.

FACULA (*pl.* FACULAE): Bright spot(s).

FLUMEN (*pl.* FLUMINA): Channel(s) on Titan that might carry liquid.

LACUS: Small plain; on Titan – a "lake" or small, dark plain with discrete, sharp boundaries.

MACULA: Dark spot.

REGIO: A large area marked by reflectivity or color distinctions from adjacent areas, or a broad geographic region.

RINGED FEATURE: Cryptic ringed feature.

VIRGA (*pl.* VIRGAE): A streak or stripe of color.

Proper name categories:

Albedo features: Sacred or enchanted places, paradise, celestial realms from legends, myths, stories, and poems of cultures from around the world.

Craters and ringed features: Deities of wisdom.

Facula/Faculae: *Facula:* Islands on the Earth that are not politically independent.

Clusters of Faculae: Archipelagos on the Earth.

Flumen/Flumina: Mythical or imaginary rivers.

Lacus: Lakes on Earth, preferably with a shape similar to the lacus on Titan.

Other features (Arcus, Macula, Regio): Deities of happiness, peace, and harmony from world cultures.

Virga/Virgae: Deities of rain.

Feature names on Titan: The 45 names listed below can be used in papers with a note "provisional name" until their final official approval by the forthcoming IAU General Assembly (August 2006).

Coordinates are rounded to 1°. Longitudes are W.

ALBEDO FEATURES (13)

Aaru	10 N	340	Egyptian abode of the blessed dead.
Adiri	10 S	210	Melanesian afterworld where life is easier than on Earth.
Aztlan	10 S	20	Mythical land from which the Aztecs believed they migrated.
Belet	5 S	255	Malay afterworld reached by a flower-lined bridge.
Ching-tu	30 S	205	Chinese Buddhist paradise where those who attain salvation will live in unalloyed happiness.
Dilmun	15 N	175	Sumerian garden of paradise, primeval land of bliss.
Fensal	5 N	30	Magnificent mansion of the Norse goddess Frigga, to which she invited all married couples who had led virtuous lives on Earth to enjoy each other's company forever.
Mezzoramia	70 S	0	Oasis of happiness in the African desert, from an Italian legend.
Quivira	0 N/S	15	Legendary city of a fabulous treasure sought by Coronado and other explorers (SW USA).
Senkyo	5 S	320	Japanese ideal realm of aloofness and serenity, freedom from worldly cares and death.
Shangri-la	10 S	165	Tibetan mythical land of eternal youth.
Tsegihi	40 S	10	Navajo sacred place.
Xanadu	15 S	100	An imaginary country, in the poem "Kubla Khan" by English author Samuel Coleridge (1772 – 1834).
<u>ARCUS (1)</u>			
Hotei Arcus	28 S	79	Japanese god of happiness, contentment and good fortune.
<u>CRATER (2)</u>			
Menrva	20 N	87	Etruscan goddess of wisdom.
Sinlap	11 N	16	Kachin (North Burma) wise spirit who dwells in the sky.
<u>FACULA / FACULAE (15)</u>			
Antilia Faculae	11 S	187	Archipelago corresponding to the mythical island of Antilia, once thought to lie midway between Europe and the Americas.
Bazaruto Facula	12 N	16	Mozambique isl.
Coats Facula	11 S	29	Canadian island.
Crete Facula	9 N	150	Greek island.
Elba Facula	11 S	1	Italian island.
Kerguelen Facula	5 S	151	French island.
Mindanao Facula	7 S	174	Philippine isl.
Nicobar Faculae	2 N	159	Indian archipel.
Oahu Facula	5 N	167	Hawaiian island.
Santorini Facula	2 N	146	Greek island.

Shikoku Facula	10 S	164	Japanese island.
Sotra Facula	12 S	40	Norwegian isl.
Texel Facula	11 S	183	Dutch island.
Tortola Facula	9 N	143	One of the British Virgin Islands.
Vis Facula	7 N	138	Croatian island.

FLUMEN / FLUMINA (0)

No feature named so far with this term.

LACUS (1)

Ontario Lacus	72 S	183	Lake between Canada and USA.
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MACULA (4)

Eir Macula	24 S	115	Norse goddess of healing and peace.
Elpis Macula	31 N	27	Greek goddess of happiness and hope.
Ganesa Macula	50 N	87	Hindu elephant-headed god of good fortune and wisdom.
Omacatl Macula	18 N	37	Aztec god of good cheer and lord of banquets.

REGIO (1)

Tui Regio	20 S	130	Chinese goddess of happiness, joy and water.
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RINGED FEATURES (3)

Guabonito	11 S	151	Taino Indian (Antilles) sea goddess who taught the use of amulets.
Nath	30 S	8	Irish goddess of wisdom.
Veles	2 N	137	Slavic god of housekeeping wisdom.

VIRGA / VIRGAE (5)

Bacab Virgae	19 S	151	Mayan rain god.
Hobal Virga	35 S	166	Arabian rain god
Kalseru Virga	36 S	137	NW Australian rainbow serpent, bringer of rain.
Perkunas Virgae	27 S	162	Lithuanian god of rain, thunder and lightning.
Shiwanni Virgae	25 S	32	Zuni (SW USA) rain god.

Diameter of craters and ringed features (km):

Menrva	392	Guabonito	55
Sinlap	80	Nath	95
		Veles	45

Web resources: The lists of the names on Titan are at the Gazetteer of Planetary Nomenclature on the Internet: [Titan Nomenclature Table of Contents](#), or at the URL <http://planetarynames.wr.usgs.gov/>, then go to "Saturnian system," and after that to "Titan Nomenclature Table of Contents."

There is also a map of Titan (600 kB PDF) with all named features on the web: [Titan](#), or at the URL http://planetarynames.wr.usgs.gov/images/Titan_comp.pdf

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