ВНЕЗЕМНАЯ КАРТОГРАФИЯ

THE SYSTEM OF GEOGRAPHIC NAMES ON THE PLANET VENUS: GENERAL REVIEW AND CARTOGRAPHIC ASPECTS

G. A. Burba, J. Blue***
** Vernadsky Institute of Geochemistry and Analytical Chemistry, RAS, Moscow, Russia;*
*** U.S. Geological Survey, Flagstaff, Arizona, USA*

СИСТЕМА ГЕОГРАФИЧЕСКИХ НАЗВАНИЙ НА ПЛАНЕТЕ ВЕНЕРА: ОБЩИЙ ОБЗОР И КАРТОГРАФИЧЕСКИЕ АСПЕКТЫ

Г.А. Бурба, Дж. Блю***
**Институт геохимии и аналитической химии им. В.И. Вернадского РАН, Москва, Россия;*
***Геологическая служба США, Флагстафф, Аризона, США*

Резюме. Первые названия деталей поверхности Венеры появились в 1960-х гг. после проведения радиолокационных наблюдений с Земли. В оптическом диапазоне поверхность Венеры не видна из-за сплошного слоя облаков в ее атмосфере. Съемки поверхности Венеры, проведенные радаром бокового обзора с борта искусственных спутников, позволили в 80-х и 90-х гг. впервые составить детальные карты этой планеты масштаба 1:5 000 000 и крупнее. Тогда же возникла и получила развитие система наименований деталей рельефа. Все детали рельефа на Венере имеют женские имена, поскольку эта планета – единственная из всех планет, носящая женское имя. Имена берутся из мифологий различных народов мира в соответствии с правилами, установленными Международным астрономическим союзом, в ведении которого находятся все названия за пределами Земли. В настоящее время количество названий на Венере больше, чем на каком-либо другом планетном теле кроме Земли. На Венере имеется более 1900 названия, что составляет 30% от всех наименований на планетах и спутниках. Эти названия взяты из мифологий и культур 192 этнических групп мира, что равно 73% от общего количества 263 этнических групп, из чьих культур взяты имена для деталей на планетах. Все названия деталей рельефа Венеры, а также и других планетных тел имеются в Указателе планетных названий, размещенном в сети Интернет по адресу: *http://planeterynames.wr.usgs.gov/*. Там же имеется радарная фотокарта Венеры на 62 листах, содержащая изображения и названия всех наименованных деталей.

The first designations of the features on the planet Venus have appeared in 1960s after the Earth-based radar observations. The designated features were radar-bright areas thousands of kilometers in size. Different groups of radar scientists used different designation systems – small Greek letters (α, β, γ, δ), capital Latin letters (A, B, C, D, etc. – for the main features; A1, A2, B1, B2, etc. – for smaller areas within the main features), Roman numerals (I, II, III, IV), or the names of radar-related scientists (Gauss, Hertz, Maxwell). As a result of it the main features obtained simultaneously three or four names: the bright area in the southern hemisphere of Venus was referred as α, or I (number), or F, and another prominent bright area, in the northern hemisphere was named as β, or II, or D2, or Gauss. The unified system has not been established, because very soon after the first Earth-based radar observations the images were obtained of much higher resolution due to spacecraft investigations. The observations by the spacecraft from the close distance provided data for the first detailed maps of Venus. Such maps portrayed the topographic data of the surface and resemble the terrestrial hypsometric maps. These maps provided the base for the development of the system of geographic names on Venus. Such system is usually referred as Venus nomenclature. The planetary nomenclature, like the terrestrial geographic nomenclature, is used to uniquely identify a feature on the surface of a planet or satellite so that the feature can be easily located, described, and discussed.

The naming of the features on Venus, as well, as on the other planets of the Solar system (but the Earth) is responsibility of the International Astronomical Union (IAU). There is Working Group on Planetary system Nomenclature (WGPSN) within the IAU, which is responsible for the current work on the planetary feature names. The WGPSN have six Task Groups (TG) – for the Moon, Mercury, Venus, Mars, the Outer Solar System (giant planets and their satellites, plus Pluto) and the Small Bodies (asteroids and comets). These TG conduct the preliminary work of choosing themes and proposing names for features. One of the authors (GAB) is chairman of Venus TG since 1994.

The names of the features on Venus, as well as on the other planetary bodies, consist of proper name and descriptor term. The descriptor term (in Latin) define the feature type. Currently there are 22 descriptor terms for the features on Venus (Table 1).

Table 1. Descriptor terms for the feature names on Venus

Term (singular, plural)	*Definition*
Astrum, Astra	Star-liked feature of radial trenches
Chasma, Chasmata	Deep, elongated, steep-sided depression
Collis, Colles	Small hill or knob; usually area with numerous such features
Corona, Coronae	Large circular feature, usually bounded with a ringed rim
Crater, Craters	Circular, bowl-shaped depression
Dorsum, Dorsa	Ridge, elongated positive topographic feature, usually sinuous
Farrum, Farra	Pancake-like structure, steep-sided dome with nearly flat top
Fluctus	Flow terrain (lava blanket area) with sinuous or lobate outlines, which is distinct in reflectivity or color from adjacent areas
Fossa, Fossae	Long, narrow, shallow depression, straight or curved, not sinuous
Labyrinthus	Complex of intersecting trenches
Linea, Lineae	Dark or bright elongated marking, straight or curved
Mons, Montes	Mountain, mountain belt
Patera, Paterae	Irregular crater, or a complex one with scalloped edges
Planitia	Low plain, lowland
Planum	Plateau, high plain
Regio	Large area marked by reflectivity or color distinctions from adjacent areas
Rupes	Scarp
Terra	Extensive land mass, highland
Tessera, Tesserae	Tile-like or parquet-patterned terrain, area with ridges, intersecting in two or more directions; usually an upland
Tholus, Tholi	Small domical mountain or hill
Unda, Undae	Dunes, wave-like formations
Vallis, Valles	Valley, narrow sinuous channel

The features of different types obtain proper names of different categories (Table 2), but within the main rule – all names on Venus are 'female names', as Venus is the only planet to possess female name.

Currently Venus is the planetary body with the greatest number of the named features. There are more then 1900 names on Venus, which is 30% from the total number of the feature names on the planets (but the Earth). The introduction of the new names takes place in accordance with the needs of the mapping. Areas of greater scientific interest, mapped in a greater detail, contain more named features, as a rule. The choice of names for the features on Venus is international. Venus has the greatest diversity of names, originated from the different cultures of the world. The approved names on Venus are derived from 192 different ethnic groups worldwide, which is 73% of the total number of 263 ethnic groups listed in the planetary gazetteer.

All of the named features on the planet Venus are listed in the online "Gazetteer of Planetary Nomenclature", which can be found on the Internet at the following URL: *http://planetarynames.wr.usgs.gov/*. The content of the gazetteer is determined by the rules of the International Astronomical Union, which is responsible for all extraterrestrial names. The gazetteer has a section for each of the 35 planetary bodies, which possess named features. The names are listed alphabetically by feature type, and there is also a general alphabetical list of all names on all planets (2 MB text file). The gazetteer contains about 7000 names.

Table 2. Categories of proper names for naming features on Venus

Feature type	*Name category*
Astrum	Goddesses, miscellaneous
Chasma	Moon, forest and hunt goddesses (similar to Greek *Artemis* and Roman *Diana*)
Colles	Sea goddesses
Corona	Fertility and earth goddesses
Crater	*Over 20 km in diameter* – Famous women; *under 20 km* – Common female first names
Dorsum	Sky goddesses
Farrum	Water goddesses
Fluctus	Goddesses, miscellaneous
Fossa	Goddesses of war, mythological female warriors
Labyrinthus	Goddesses, miscellaneous
Linea	Goddesses of war, mythological female warriors
Mons	Goddesses, miscellaneous (also one after the radar-related scientist, *Maxwell*)
Patera	Famous women
Planitia	Mythological heroines
Planum	Goddesses of love
Regio	Giantesses and Titanesses (also two after the Greek alphanumeric, *Alpha* and *Beta*)
Rupes	Goddesses of hearth and home
Tessera	Goddesses of fate and fortune
Terra	Goddesses of love
Tholus	Goddesses, miscellaneous
Undae	Desert goddesses
Vallis	*400 km and longer* – Word for planet Venus in various languages; *less than 400 km in length* – River goddesses

The "Images with Names" part of the Venus section in the gazetteer contains two clickable image maps for Venus; one map shows 1:5,000,000-scale radar B&W imagery from the "Magellan" orbiter (62 quadrangles 300 to 600 KB each), and the other shows 1:10,000,000-scale color altimetry maps (8 quadrangles ranging in size from 700 KB to 1.3 MB). The map files are in Adobe Portable Document Format (PDF). The 62 quads with radar imagery show every approved name on Venus, and the second series of maps, 8 quads with color altimetry, shows only names of larger, regional features. The maps are complementary; the 62 maps show all named features (down to Mamajan crater, which is just 2 km in diameter), but for tracing the outlines of the largest named features, which are up to 10,000 km (such as terrae, planitiae, regiones, and tesserae), the 8-quad map is preferable.