SRSMOW

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Contents

1 Planets & The Sun

1.1 The Sun

$\odot$ symbol is often used in relation to the Sun, like $M_\odot, R_\odot, L_\odot$ – Solar mass, radius, luminosity.

1.2 Mercury

1.2.1 Position

- Mercury is the closest planet to the Sun and the smallest
- Spinning around the Sun takes only 87.97 Earth days – the shortest spinning time in the Solar System
- Mercury is an inferior (interior) planet to the Earth
- Planet can usually be seen in dusk or dawn, in twilight. It happens due to its proximity to the Sun

1.2.2 History

The planet was named after the Roman god Mercurius. He was the god of commerce and messenger of gods, mediator between gods and mortals. In Greek mythology he is kind of equal to Hermes

1.2.3 Surface

It is similar to the Moon: very cratered terrestrial planet. No geological activity for billions of years.

Atmosphere Mercury has no atmosphere, because its gravity is too weak to retain any gases. But there is an exosphere of hydrogen, helium, oxygen, sodium, calcium, potassium and others. Exosphere is chemically unstable. Helium and hydrogen come with Solar wind. Generally, the whole chemical composition is affected by Solar wind.

Chemical Compounds Messenger found high proportions of calcium, helium, hydroxide, magnesium, oxygen, potassium, silicon & sodium. These elements either are brought by Solar wind, or are sputtered from planet's ground due to Solar wind's powers. Water vapor is present due to comets that strike its surface.

Water vapor appears out of hydrogen from Solar wind and oxygen from rock, and sublimation from reservoirs of water ice in permanently shadowed polar craters. High amounts of water-related ions like O^+, OH^-, H_3O^+ were detected.

Weather

- Surface is incredibly heated: 100 K (-173°C; -280°F) at night & up to 700K (427°C; 800°F) during day across equatorial regions
- Polar regions are constantly below 180K (-93°C; -136°F)

Has no natural satellites

VLA and GSSR researches confirmed that there is ice on the polars of Mercury. It is possible because deep craters are never really exposed to sunlight. So, they become a cold trap, where ice accumulate. There is approximately 10^{15} kg of ice on polars.

1.2.4 Physical Properties

Basic Properties

- Diameter of 4880 km (like USA)

The planet has 3 main layers: core (85% of all size), mantle, crust. Like the Earth, but our planet's core takes only 55% of all it's size

No tectonic plates

Iron core is slowly cooling, causing the whole planet to shrink. Mercury has already shrinked for 4.4 miles

Magnetic Field Mercury has extremely powerful magnetic field. During Mariner 10 trip in 1973 the fact that earth's magnetic fielt is 1.1% of Mercury's one. Actually, it equals to 300nT (nanoTesla) on equator. Existence of such a magnetic field is explained by planet's liquid iron-rich core.

Orbit & Rotation Mercury's axis has the smallest tilt of all Solar System's planets (about $\frac{1}{30}^{\circ}$.)

Orbital Eccentritet Orbital eccentritet is largest of all known objects in Solar System. At perihelion, its distance to the Sun is 66% of one in aphelion. Distance from the Sun ranges from 4×10^6 to 70×10^6 km. Complex variations of surface temperature are possible due to such an orbit.

1.2.5 Spacecrafts

- 2 spacecrafts have visited Mercury
  - Mariner 10 (NASA) in 1974 and 1975
    - 1^{st} spacecraft to explore Mercury
    - 1^{st} spacecraft to use gravity of one planet to reach another
    - 1^{st} spacecraft to return data on a login-period comet
    - 1^{st} spacecraft to explore 2 planets in 1 mission
    - 1^{st} spacecraft to use gravity assistance to change its direction
    - 1^{st} spacecraft to return to its target after initial encounter
    - 1^{st} probe to use Solar wind as a major mean of spacecraft orientation during flight
  - Messenger (NASA), launched in 2004, orbited around Mercury for over 4000 times in 4 years before running out of energy and crashong into the planet's surface on 30 April, 2015.
    - Explored surface ingredients, revealed geological history, discobered details about its internal magnetic field, verified polar water-ice existance.
- Bepicolombo spacecraft is planned to arrive to Mercury in 2015

1.2.6 Other

crates	famous humanitarians
chains of crates	radioobservatories
scarps	explorators
furrows	architecture (buildings, etc)
valleys	abandoned old settlements (Angkor)

1.3 Venus

1.3.1 Position

- Venus is the 2^{nd} closest planet to the Sun and the 3^{rd} smallest
- Venus is an inferior (interior) planet to the Earth
- Has no moons, like Mercury.
- Usually can be seen in dusk or dawn, because of its inferiority: it is always close to the Sun.

1.3.2 History

The planet was named after the Roman goddess Venus.

1.3.3 Surface

70% is smooth, volcanic plains. Atmosphere is dense, contains Sulfur substances. Surface is therefore completely consealed for outer observer by clouds. Consists of 2 highland continents: southern (Aphrodite Terra) & northern (Ishtar Terra).

Is reported to have plate tectonics. The surface in such formed due to past volcanic activities, where average diameter of a volcano was 100 km.

Atmosphere is 96.5% CO_2.

1.3.4 Physical Properties

Basic Properties

- Diameter of 12103.6 km

Atmosphere of Venus is something worth being mentioned. It produces the most powerful greenhouse effect in the Solar System, and the surface temperature of the planet is higher than the one of Mercury. Minimal temperature on Mercury is 53K, maximal – 700K. Minimal temperature on Venus is 735K.

Magnetic Field Much weaker than one of the Earth.

Orbit & Rotation Rotates around itself in the 243 Earth days – slowest rotaion of all Solar System planets. Venusian day lasts longer than Venusian year.

Orbital Exxentritet Eccentricity is less than 0.01, smallest among all planets of Solar System.

1.3.5 Spacecrafts

A bunch of USSR Venera spacecrafts, japanese IKAROS

1.4 The Earth

1.4.1 Position

1.4.2 History

1.4.3 Surface

1.4.4 Physical Properties

Basic Properties

Magnetic Field

Orbit & Rotation

Orbital Exxentritet

1.4.5 Spacecrafts

1.4.6 Other

1.4.7 The Moon

1.5 Mars

1.5.1 Position

1.5.2 History

1.5.3 Surface

1.5.4 Physical Properties

Basic Properties

Magnetic Field

Orbit & Rotation

Orbital Exxentritet

1.5.5 Spacecrafts

1.5.6 Other

1.6 Jupiter

1.6.1 Position

1.6.2 History

1.6.3 Surface

1.6.4 Physical Properties

Basic Properties

Magnetic Field

Orbit & Rotation

Orbital Exxentritet

1.6.5 Spacecrafts

1.6.6 Other

1.7 Saturn

1.7.1 Position

1.7.2 History

1.7.3 Surface

1.7.4 Physical Properties

Basic Properties

Magnetic Field

Orbit & Rotation

Orbital Exxentritet

1.7.5 Spacecrafts

1.7.6 Other

1.8 Uran

1.8.1 Position

1.8.2 History

1.8.3 Surface

1.8.4 Physical Properties

Basic Properties

Magnetic Field

Orbit & Rotation

Orbital Exxentritet

1.8.5 Spacecrafts

1.8.6 Other

1.9 Neptune

1.9.1 Position

1.9.2 History

1.9.3 Surface

1.9.4 Physical Properties

Basic Properties

Magnetic Field

Orbit & Rotation

Orbital Exxentritet

1.9.5 Spacecrafts

1.9.6 Other

2 Constellations

. . . list sorted by area in square degrees

2.1 Northern Hemisphere

2.1.1 Ursa Major

northern

2.1.2 Hercules

northern

2.1.3 Pegasus

northern

2.1.4 Draco

northern

2.1.5 Leo

northern

2.1.6 Bootes

northern

2.1.7 Pisces

northern

2.1.8 Sagittarius

northern

2.1.9 Cygnus

northern

2.1.10 Taurus

northern

2.1.11 Camelopardalis

northern

2.1.12 Andromeda

northern

2.1.13 Auriga

northern

2.1.14 Perseus

northern

2.1.15 Cassiopeia

northern

2.1.16 Cepheus

northern

2.1.17 Lynx

northern

2.1.18 Libra

2.1.19 Gemini

northern

2.1.20 Cancer

northern

2.1.21 Canes Venatici

northern

2.1.22 Aries

northern

2.1.23 Coma Berenices

northern

2.1.24 Lyra

northern

2.1.25 Ursa Minor

northern

2.1.26 Leo Minor

northern

2.1.27 Lacerta

northern

2.1.28 Delphinus

northern

2.1.29 Corona Borealis

northern

2.1.30 Triangulum

northern

2.1.31 Sagitta

northern

2.1.32 Equulus

northern

2.2 Southern Hemisphere

2.2.1 Hydra

southern

2.2.2 Virgo

equatorial

2.2.3 Cetus

equatorial

2.2.4 Eridanus

southern

2.2.5 Centaurus

southern

2.2.6 Aquarius

southern

2.2.7 Ophiuchis

equatorial

2.2.8 Puppis

southern

2.2.9 Orion

equatorial

2.2.10 Vela

southern

2.2.11 Scorpius

southern

2.2.12 Carina

southern

2.2.13 Monoceros

equatorial

2.2.14 Sculptor

southern

2.2.15 Phoenix

southern

2.2.16 Capricornus

southern

2.2.17 Fornax

southern

2.2.18 Canis Major

southern

2.2.19 Pavo

southern

2.2.20 Grus

southern

2.2.21 Lupus

southern

2.2.22 Sextans

equatorial

2.2.23 Tucana

southern

2.2.24 Indus

southern

2.2.25 Octans

southern

2.2.26 Lepus

southern

2.2.27 Crater

southern

2.2.28 Columba

southern

2.2.29 Vulpecula

southern

2.2.30 Telescopium

southern

2.2.31 Horologium

southern

2.2.32 Pictor

southern

2.2.33 Piscis Austrinus

southern

2.2.34 Hydrus

southern

2.2.35 Antlia

southern

2.2.36 Ara

southern

2.2.37 Pyxis

southern

2.2.38 Microscopium

southern

2.2.39 Apus

southern

2.2.40 Corvus

southern

2.2.41 Canis Major

equatorial

2.2.42 Dorado

southern

2.2.43 Norma

southern

2.2.44 Mensa

southern

2.2.45 Volans

southern

2.2.46 Musca

southern

2.2.47 Chamaeleon

southern

2.2.48 Corona Australis

southern

2.2.49 Caelum

southern

2.2.50 Reticulum

southern

2.2.51 Triangulum Australe

southern

2.2.52 Scutum

southern

2.2.53 Circinus

southern

2.2.54 Crux

southern

3 Galaxies