

The investigation of Venus by probes and balloons. The Russian mission Venera-D.

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ABSTRACT

The mission Venera-D is included in the Russian Federal Space Program to be launched in 2016. This mission includes the lander, balloons, and the orbiter. The long living balloons are planned to be deployed at different heights, in the clouds and under the clouds.

Scientific goals of the mission include:

- investigation of structure, chemical composition of the atmosphere, including noble gases abundance and isotopic ratio, structure and chemistry of the clouds;
- study of dynamics of the atmosphere, nature of the superrotation, radiative balance, nature of an enormous greenhouse effect;
- study of structure, mineralogy and geochemistry of the surface, search for seismic and volcanic activity, the lightening, interaction of the atmosphere and the surface;
- investigation of the upper atmosphere, ionosphere, magnetosphere, and the escape rate;
- study of the evolution of the atmosphere and the surface of Venus.

The complex of experiments on the orbiter includes, among the others, several spectrometers in the spectral range from UV to MW, the mapping spectrometers and the plasma package. On the lander there are instruments to work during the descent, and on the surface: gas-chromatograph, PTW (meteo), nephelometer and the particle sizes spectrometer, optical package, active gamma-spectrometer, TV-complex, which includes panoramic, high resolution and descending cameras.. On the balloon which has to work near the lower boundary of clouds, the devices will be installed to study the lower atmosphere and to get the surface images with high resolution.

Successful realization of the project Venera-D will allow to solve the important scientific problems of comparative planetology.