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Abstract

The Venusian magnetotail is formed by solar wind magnetic flux tubes draping around the planet and stretched antisunward. The magnetotail topology represents two magnetic lobes separated by a thin current sheet. Such a configuration is a free energy reservoir. The accumulated energy is generally released by antisunward acceleration of the planetary ions. But in the case of a magnetic reconnection, hypothetically appeared somewhere in the equatorial current sheet, some part of the planetary ions filling the tail, should be accelerated toward the planet. To check this hypothesis we have performed statistical and case studies based on the data from the IMA mass-spectrometer and the magnetometer onboard ESA Venus Express mission. We found that the distribution function of the planetary ions in the equatorial plane of the wake, near the midnight, and at the distances less than 1.7Rv from the center of the planet contains the significant part moving toward the planet. At the same time the magnetic field statistics and the numerical simulation show the magnetic field minimum similar to an X-line in the current sheet at the distance about 1.7 Rv from the planet center. This could be an evidence for a quasi-permanent reconnection in the Venusian wake.