Geophysical Research Abstracts
Vol. 12, EGU2010-5308, 2010
EGU General Assembly 2010

Venus, Earth, Mars: Comparative Ion Escape Rates

Stas Barabash
Swedish Institute of Space Physics, Kiruna, Sweden (stas@irf.se, +46 980 79050)

For the solar system planets the non-thermal atmospheric escape exceeds by far the Jean escape for particles heavier than helium. In this talk we consider only ion escape and compare the total ion escape rates for Venus, Earth, and Mars caused by the interaction with the solar wind. The most recent data on the escape rates based on measurements from Mars Express, Venus Express, and Cluster show that despite large differences in the atmospheric masses (a factor of 100 – 200), different types of the interactions with the solar wind, the escape rates for Mars ,Venus, and the Earth are within the range $10^{24} - 10^{25} s^{-1}$. Surprisingly, the expected shielding of the Earth atmosphere by the intrinsic magnetic field is not as efficient as one may assume. The reason for this is the non-thermal escape caused by the solar wind interaction is an energy – limited process. The larger Earth's magnetosphere intercepts and tunnels down to the ionosphere more energy from the solar wind than more compact interaction regions of non-magnetized planets.