



Effects of impacts on the atmospheric evolution

Lê Binh San Pham and Özgür Karatekin

Royal Observatory of Belgium, Brussels, Belgium (lebinhsan.pham@oma.be)

Previous studies have shown that impacts by asteroids and comets could affect the atmospheric evolution of a planet, by removing part of its atmosphere, by delivering into it material and volatiles, or by heating its atmosphere and surface. Here, we investigate the atmospheric loss and the delivery of volatiles during a period of intense bombardment of meteorites, with the help of a simplified semi-analytic model that takes into account the impact simulation results. Effects of impacts on the temperature of the planet is also considered. We concentrate mainly on Mars.

We show that impacts on Mars alone can hardly remove a significant amount of atmospheric mass in the last 4 Gyr. However, it is possible that these impacts have contributed to the warming of the planet atmosphere and surface in the past, allowing the formation of the discovered water-related features.