Title: In page 7, you can see the data for the atmosphere that the Hydrogen H2 0.50 parts per million.

As the reason for the very low concentration of H2, we sometimes find the following description: "Since H2 is lightest, it goes upward owing to buoyancy, and finally diffuses into the universe." Is this correct? If not, how do you explain the reason why the concentration of H2 is very low in the atmosphere?

Essay: Hydrogen is one of the most fundamental molecules in the Universe, yet it is very rare in the Earth's atmosphere. Why? There are two kinds of explanations in which one is relative to physics and the other belongs on chemistry.

As for the first statement, which insists that the Hydrogen is small and light, and so moves very fast at the given atmospheric temperature, most of the Hydrogen will escape from the atmosphere when its speed is greater than the escape velocity from the Earth.

On the contrary, those atmospheric chemists indicate that the main reason belongs on chemistry instead of physics, because the Hydrogen is so active that it will react with things among the atmosphere.

I guess that no one will deny the second statement, but what about the physical one? How to proof?

As we all known, the escape velocity of the earth is nearly 11.3km/s, which means that if we can calculate the speeds of the Hydrogen at this certain atmospheric environment, we can proof it. But actually, the calculation value, which is the mean velocity, cannot reach the escape velocity of the earth. So what supports this physical statement? The answer is the Maxwell-Boltzmann velocity distribution. There is a thing should be kept in mind that not all molecules have the same velocity, which means that we do not have to proof the mean velocity of the Hydrogen is greater than the escape velocity but other molecules' velocity, so the Hydrogen has more possibility to escape from the earth. According to the law of conservation of energy, which assumes that energy is evenly distributed, we can imply that a molecule with a lower mass will have a greater velocity and a molecule with a greater mass will have a lower velocity. Then back to the Maxwell-Boltzmann velocity distribution, it tells us that there is a small but finite probability of an individual molecule reaching escape velocity, and once that molecule is removed, it won't be coming back, the velocity distribution will be re-established because the atmosphere will remain at the same temperature. Now we can tell the lighter molecules like Hydrogen will have greater velocity and thus be more likely to attain escape velocity and leave.