Atmospheric escape and its role on Earth, Mars, and Extra-solar planets

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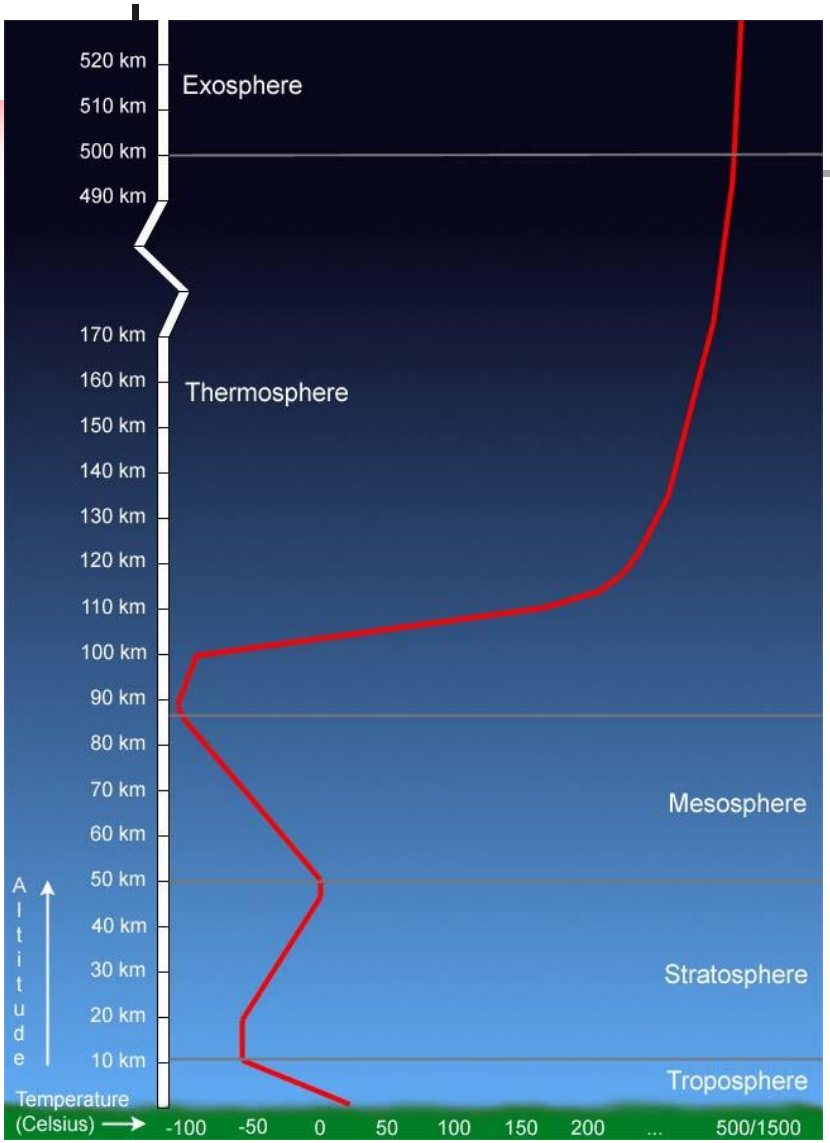
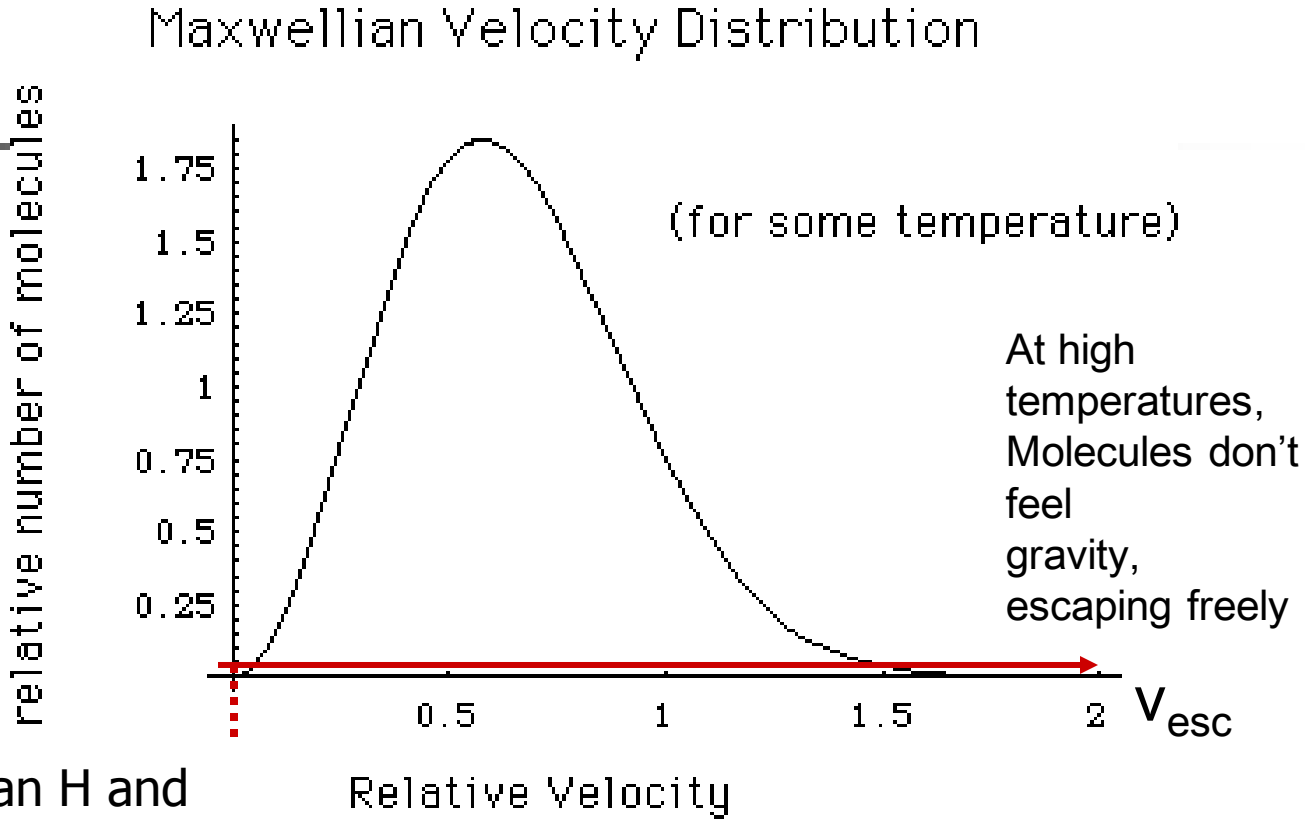


- The Exosphere is the collision-less region where molecules can escape if moving upward fast enough to achieve escape velocity.
- The Exobase marks the lower boundary of the Exosphere.
- Early in Earth's history, the upper atmosphere was likely dominated by hydrogen
- With the higher EUV (Extreme Ultra Violet fluxes), hydrodynamic escape was more common

Hydrodynamic escape

$\lambda_{esc} \alpha$ Potential Energy/ Temperature



- Heavier species than H and He can escape
- H is important to early Earth because methanogens may have used it. Also important for greenhouse gases
- Also important for early Mars and the atmospheric evolution of exoplanetary atmospheres