HELIUM AND ATOMIC HYDROGEN DURING A QUIET SUN PERIOD *

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Abstract: The vertical distribution of helium and atomic hydrogen has been determined for physical conditions corresponding to a quiet sun period, i.e. for day-time and night-time thermopause temperatures reaching 850° K and 650° K, respectively.

Thermal diffusion has been considered in the thermosphere since it strongly affects the absolute concentrations of He and H. Values of thermopause temperature below 1000° K lead to a large variation of the vertical distribution of atomic hydrogen. Its concentration at 200 km varies by about a factor of 10 for thermopause temperatures between 1000° K and 700° K while it varies only by a factor of 2 between 2000° K and 1000° K. The behavior of atomic hydrogen has been determined for variations of the turbopause level.

Physical conditions above 500 km are particularly affected when atomic oxygen plays a minor role compared with helium and atomic hydrogen. The escape of atomic hydrogen is related to temperature when the thermopause temperature is less than 850° K. The escape of He^4 and He^3 depends on ionization conditions. In addition, the escape of He^3 is temperature dependent.

Ionization equilibrium conditions are different for temperatures greater or less than 1000° K, due to the large variation at low temperature of $n(H)/n(O)$, which affects the O^+ concentration as low as 500 km. The electron scale height at 500 km increases more rapidly than the scale height associated with O^+ for $T < 1000°$ K. In any case, the atmospheric scale height, which is about 130 km at 2000° K and 1000° K for an altitude as low as 750 km, is subject to an increase particularly important for temperatures less than 1000° K.

Of this abstract
no Russian translation has been received

* To be published in Annales de Géophysique, Paris, 1963.