Extract 3 from *Red Mars*; reference word: nitrogen

After lunch they went back out in the Mercedes-Benz, and used it to haul a Boeing air miner to an area east of the habitats, where they were going to gather all the factories. The air miners were big metal cylinders, somewhat resembling 737 fuselages except that they had eight massive sets of landing gear, and rocket engines attached vertically to their sides, and two jet engines mounted above the fuselage fore and aft. Five of these miners had been dropped in the area some two years before. In the time since, their jet engines had been sucking in the thin air and ramming it through a sequence of separating mechanisms, to divide it into its component gases. The gases had been compressed and stored in big tanks, and were now available for use. So the Boeings each now held 5,000 liters of water ice, 3,000 liters of liquid oxygen, 3,000 liters of liquid nitrogen, 500 liters of argon, and 400 liters of carbon dioxide.

It was no easy task hauling these giants across the rubble to the big holding tanks near their habitats, but they needed to do it, because after they were drained into the holding tanks they could be turned on again. Just that afternoon another group had gotten one emptied out and turned back on, and the low hum of its jets could be heard everywhere, in a helmet or a habitat.

Martian atmosphere:

The atmosphere of Mars is 95 percent carbon dioxide, nearly 3 percent nitrogen, and nearly 2 percent argon with tiny amounts of oxygen, carbon monoxide, water vapor, ozone, and other trace gases. Earth's atmosphere is mostly nitrogen and oxygen, with only 0.03 percent carbon dioxide. The pressure of the Martian atmosphere varies with the seasons, ranging from 6 to 10 millibars, or about 1 percent of the air pressure at Earth's surface. The variation in pressure occurs because in the fall and winter at the poles of Mars, the temperature gets so low that carbon dioxide snows out of the atmosphere and forms meters-thick deposits of dry ice on the surface. In the springtime as the surface warms up, the dry ice evaporates back into the atmosphere. The pressure also varies with altitude just as it does on Earth and is about ten times lower on the top of Olympus Mons than on the floor of Hellas Planitia.

Even though the Martian atmosphere contains less than 1/100 as much water vapor as Earth's atmosphere, clouds and frosts form on Mars and have been studied in detail by telescopes and spacecraft. Wave clouds, spiral clouds, clouds formed near topographic obstacles such as volcanoes, wispy cirrus-like clouds, and a wide variety of hazes and fogs have all been observed. Along with the dust storms and related clouds described above, these features all reveal the Martian atmosphere to be quite dynamic.

Some surface features provide evidence for a very different climate early in the planet's history, which may indicate that the atmosphere of Mars was much thicker long ago than it is now. A thicker atmosphere would have been able to trap more solar heat through the greenhouse effect, possibly allowing the surface to warm up to the point where water could have remained liquid for long periods of time. Scientists do not know, however, what the composition of this thicker atmosphere was, and where it went. They theorize that it may have been driven off in a catastrophic impact event, or that the gases reacted with water and got trapped in rocks and minerals on the surface. Scientists also wonder where the liquid water that formerly existed at the surface went. Some astronomers believe that it seeped into the ground and is still there as ice in the subsurface today. Others think that it may have evaporated and slowly trickled off into space as sunlight broke apart the water vapor molecules over long periods of time. Determining the history of the Martian atmosphere and finding out whether sizable quantities of water still exist there are among the most important goals of Mars exploration today. [Encarta]