

CHAPTER 4

THE FIRST ATMOSPHERE AND WATER

Then God said, "Let there be an expanse in the midst of the waters, and let it separate the waters from the waters."

And God made the expanse, and separated the waters which were below the expanse from the waters which were above the expanse; and it was so.

Genesis 1:6-7

The Earth as we know it today is a very special planet. There may be others like it in the Universe, but the possibility does not seem as likely as it once did. Space exploration of the other planets in our Solar System has led us to a greater appreciation of some of the Earth's very special features. What is so different about the planet Earth?

For one thing, it is just the proper distance from the Sun so that it is neither too hot nor too cold. Like Goldilocks's response after tasting Little Bear's porridge in the children's story, the temperature of the Earth is "just right." Life as we know it is only possible within a very narrow temperature range, essentially between the freezing point and the boiling point of water. This range is only 1-2% of the total range between absolute zero and the temperature at the surface of the Sun.

The temperature of the Earth is kept in the critical range for life not only because the Earth is the correct distance from the Sun, but also because the Earth's size is "just right" and because it has the "right" rotational speed so that the Earth rotates about its axis every twenty-four hours, exposing one-half of the surface at the equator to the Sun for twelve hours at a time. If the Earth rotated much more slowly (perhaps ten days instead of twenty-four hours for a complete rotation), one half of the Earth would bake while the other half froze. Venus, the closest planet to Earth in size, rotates at the extremely slow rate of only once in 243 Earth days.

Temperature extremes are also evened out on Earth by its special