AL KITAB
The Renaissance Project

Part 2

Earth

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Introduction

They say there is a truth to all propositions, and though I myself tend to reject such a proposal, I must admit that there is, ironically, some truth to it. Take the world for example, long thought to be compromised of four basic elements - air, fire, water, and earth. Although such claims have been scientifically refuted in modern times, one cannot help but appreciate the little truth that etches such a statement. Our planet after all is a complex combination of these elementary elements. Earth is covered by land and sea, surrounded by air, fueled by the deep fires burning within its core and the fires burning in a distant star called the Sun. Despite discovering more than 120 elements in the past century, it seems the four ancient elements still hold sway in understanding the intricacies of our world.

In the following section, we will investigate our Earth and its major components: the Atmosphere (Air), the Hydrosphere (Water), and the Geosphere (Earth and Fire). We will then investigate whether descriptions of these sub systems in the Quran match the theories put forth by modern sciences.

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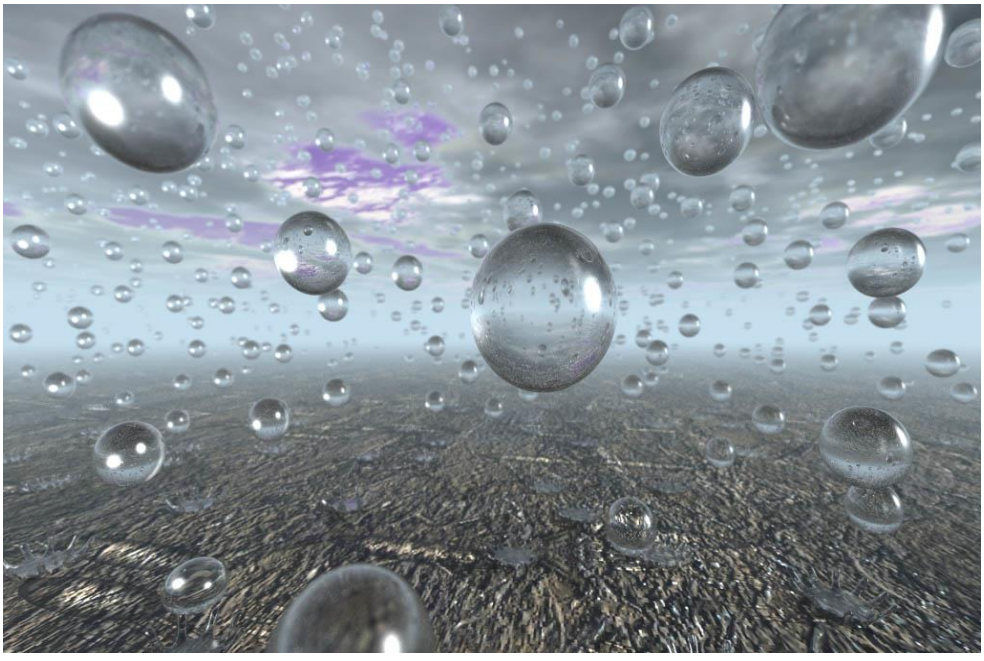
Chapter 8

Air



Mohamed Al Qadhi

Our atmosphere

His body had grown weak. His skin was pale. For a man known for his size and strength, Umar seemed broken; a shadow of himself. The yearlong deprivation of the most basic foods had weakened his body, yet it had not weakened his spirit. Behind his hawkish eyes laid determination; he believed that the most severe crisis his country has ever faced will be overcome, God willing.

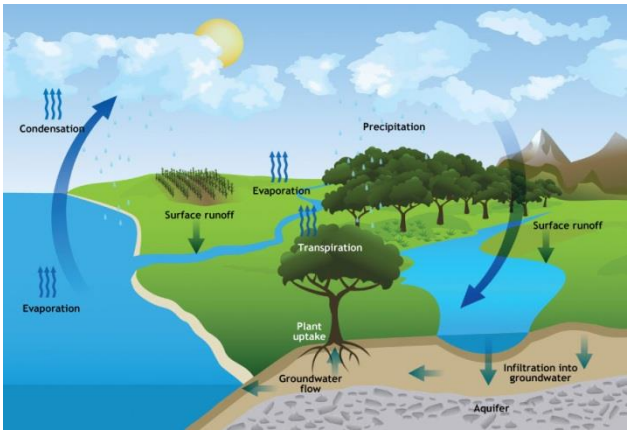
Raising their hands to the sky, Umar and a congregation of thousands of Muslims asked Allah for forgiveness and relief; to end the drought that had plagued Arabia – for it is within the sky that Allah had placed the deliverance they were seeking.

Our sky known as the atmosphere[1], is a critical element behind the creation and sustainability of life here on Earth. In Chapter 7, we saw the importance of the atmosphere in creating the conditions of night and day. This atmospheric function is just an example of the many important functions our atmosphere is responsible for:

1 *Water Cycle*

The rain Umar was so desperately seeking in his 4th year as reigning Calipha would come from our atmosphere. Every year, 380,000 km^3 worth of water evaporates from Earth's surface; 320,000 from water bodies and 60,000 from land terrains. The water vapor eventually forms clouds which are moved by our atmosphere's winds and eventually return the water back to the Earth in the form of rain, snow and hail. In this way, the Earth's water is constantly recycled, keeping it clean and pure.

Figure 8.1 The Water Cycle



2 *Temperature Control*

Another imperative function of our atmosphere is maintaining the right temperature on Earth. At any particular moment, the Sun emits a vast amount of energy that reaches the Earth. 53% of this energy is absorbed by the atmosphere while 47% reaches the Earth's surface. If the atmosphere did not absorb and reflect most of the Sun's energy outwards, the Earth would be too hot to sustain any type of life form.

The atmosphere also prevents the Earth from freezing once the sun sets. During nighttime, the Earth reemits the absorbed energy in the form of heat. The atmosphere reflects some of this heat back towards the surface keeping the Earth warm. Thus, through reflection, the atmosphere guarantees the Earth is not too hot nor too cold for life to prosper.

Did you know?

Our planet's warmth reaches an ideal average of 15 degrees Celsius during day time.

Greenhouse and Global Warming– The Science

During nighttime, the Earth reemits the energy it absorbed from the Sun in the form of infrared radiation. This decreases the temperature of the Earth significantly. If the atmosphere did not exist, the emitted energy would escape which would cause the Earth to freeze. Luckily, the "greenhouse" gases in our atmosphere such as carbon dioxide keep the Earth warm by absorbing the energy and returning it back to the surface. This is called the greenhouse effect. Unfortunately, human activity has increased greenhouse gases significantly which has contributed to global warming.

Note 1: The gaseous envelop surrounding the Earth. The dry atmosphere consists almost entirely of nitrogen (78.1%) and oxygen (20.9%), together with a number of trace gases, such as argon (0.93% volume mixing ratio), helium, and radioactively active greenhouse gases such as carbon dioxide (0.035%) and ozone.In addition, the atmosphere contains water vapor, whose amount is highly variable but typically 1% volume mixing ratio. The atmosphere also contains clouds and aerosols.

Our atmosphere

3 *Protection against Harmful Radiation*

The reflective and absorptive properties of our atmosphere are also critical in protecting the Earth and its inhabitants from harmful radiation. As you may know, some of the Sun's energy is emitted in the form of UV and Gamma energy which could burn organisms or induce deadly diseases such as cancer. The ozone layer (a layer of our atmosphere) absorbs this energy, protecting organisms on our planet. The atmosphere is thus a protective shield against our Sun that enables life to prosper and develop here on Earth.

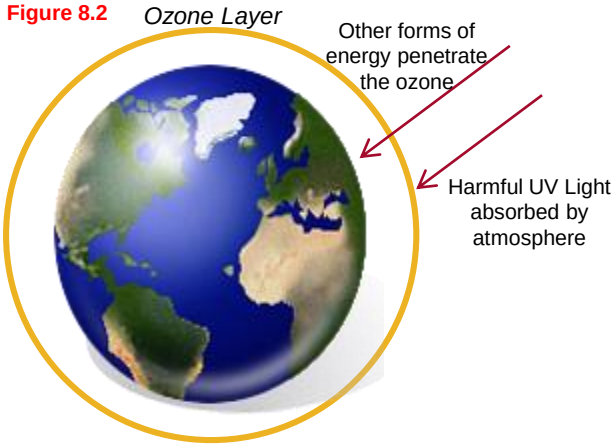
4 *Radio Communication*

Another essential layer of the Earth's atmosphere is called the ionosphere. Like the ozone layer, this layer shields the Earth from harmful radiation. More importantly, the ionosphere reflects various forms of microwave radiation coming from the Earth's surface. This makes radio transmissions over long distances possible (see Figure 8.3).

Examples of radio applications utilizing the ionosphere are AM radio, emergency frequencies, and commercial operator communications. Without the ionosphere, many of our current telecommunication capabilities would not exist.

In conclusion, the atmosphere has many functions that enable life to flourish here on Earth. These include returning water vapor, heat and radio signals back to our surface, providing us with rain, warmth and telecommunication respectively. Furthermore, the atmosphere shields the Earth from the Sun's heat and harmful radiation which would otherwise destroy all organisms living on our planet.

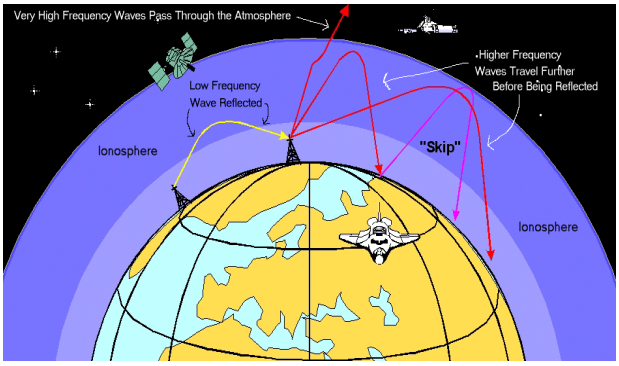
Figure 8.2 *Ozone Layer*



Ozone Layer – The Science

Contains a high composition of O_3 particles that are responsible for absorbing harmful UVC and most of the UVB radiation coming from the Sun.

Figure 8.3 Ionosphere and Radio



Ionosphere – The Science

The Ionosphere is a region of the atmosphere that has been ionized by the Sun's energy. It consists of charged particles and free electrons which reflect radio signals of certain frequencies back to the Earth.

Short, medium and long waves are reflected while ultra short waves (very high frequency radio) are not, enabling communication with the outside world For example, pulsar transmissions from neutron stars (see Chapter 5) penetrate our atmosphere due to their high frequency. Another example is TV transmission which is not reflected by the ionosphere.

Earthly Skies

The reflective and protective nature of our atmosphere is described in the Quran. In Chapter 21 “The Prophets”, the very same chapter that describes scientific facts such as the Big Bang and the Big Crunch, Allah points towards the protective nature of our atmosphere that makes life possible here on Earth:

”وَجَعَلْنَا ٱلسَّمَآءَ سَقْفًا مَّحْفُوظًا ۖ وَهُمْ عَنْ ءَايَـٰتِهَا مُعْرِضُونَ “ (21,32)
“And we made the sky a protective roof; yet they turn away from this sign”

Here, Allah describes our sky as a protective ceiling against the outside world. This is accurate because as we have seen, the ozone and ionized layers protect us from harmful radiation that would otherwise destroy life. Furthermore, our atmosphere is responsible for diffusing and burning thousands of rocks and objects that could cause serious damage to our way of life.

It is important to note that this verse, like the Big Bang verse that precedes it (see Chapter 2), also addresses the unbelievers. It is as if the Quran is saying “how do you explain that this book written 1400 years ago is describing a very accurate characteristic of the atmosphere that has only been discovered in recent times? How can you refute its divinity? – and they, after seeing this clear sign turn away and refuse to believe”.

More impressive perhaps is the Quran’s description of the atmosphere’s reflective nature. This is described in the following verse:

”وَالسَّمَاءِ ذَاتِ الرَّجْعِ“ (86,11)

“By the sky that returns / reflects”

Traditionally, people have attributed this oath to the Earth’s water cycle only; the sky returns water back to our Planet through rain and so forth. Recent discoveries however have shown that our atmosphere also returns heat and radio waves that prevent the freezing of the planet and enables modern day communication respectively. It is perhaps this fact that had prompted Allah to swear by the sky’s reflective and returning nature.

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Photo and Figure Sources

- Figure 8.1 Photo Credit: Green infrastructure Project – The Botanic Garden of South Australia
- Figure 8.3 Photo Credit: National Oceanic and Atmospheric Association

Editors

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