Essay on the main constituents of the earths atmosphere

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The earth’s atmosphere can be defined as a series of progressively arranged “ shells” or “ spheres” held to its position by the force of gravity. Just to mention, the earth’s atmosphere exerts pressure to the earth’s surface which is referred to as the atmospheric pressure. In addition, the earth’s atmosphere covers a region of about 480 kilo meters around the earth’s surface after which exists the exosphere. Also, the earth’s atmosphere is further divided into heterosphere and homospere. Homospere is the layer 80 kilo meters just above the earth’s surface that has a uniform chemical composition in terms of proportion of its gases while on the contrary, the heterosphere exhibits non-uniformity in arrangement of these spherical shells. Moreover, the atmosphere can be subdivided into four major regions depending on the temperatures and zones of temperature changes. These temperature zones include: The thermosphere, the mesosphere, the stratosphere and the troposphere (Christopherson, 2005, Pp. 70-71).

To begin with, the earth’s atmosphere comprises of: Nitrogen gas which is approximately 78 %, oxygen gas which is approximately 20. 9 %, Argon gas which is approximately 0. gas 934 %, carbon dioxide gas which is approximately 0. 037 %, Neon gas which is roughly 0. 001 % and other trace gases. In addition, the earth’s atmosphere comprises of an ozone layer. These can be considered as the components of the earth’s atmosphere. Additionally, dust particles and water vapor are also found in the atmosphere. The following are discussions on the structural compositions and importance of these gases (McKnight, 1984, p. 41).

The first very important constituent of the atmosphere is nitrogen gas. It comprises about 78 % of the total composition of the atmosphere. It is an inert gas that does not support any life process for example respiration or combustion. Moreover, nitrogen mainly originates from volcanic sources that occur as a result of eruptions while other sources include decomposition of organic matter and breakdown of certain rocks. Nitrogen in life is very vital and fundamental since it is the main component of our bodies and also plants. Just to mention, we acquire nitrogen through the food we eat and not through direct inhalation. As a matter of fact, nitrogen as an element constitutes the largest part of the organic molecules that exist on earth. For example, in proteins we actually have plenty of nitrogen which is very essential in the synthesis of amino acids. In addition, plants always acquire the nitrogen through the soil whereby nitrogen fixing bacteria play a significant role in ensuring that nitrogen in form of nitrates is taken by plants. The nitrogen taken by plants plays a very significant role in photosynthesis. Photosynthesis is a very essential process that results in the formation of all organic compounds in plants using sun light and other natural materials like carbon dioxide and moisture. Additionally, nitrogen can be used in the synthesis of many industrial compounds for example ammonia, nitric acid, cycanides and other gases like nitrogen monoxide which are used industrially for various purposes. Just to mention, ammonia is industrially used in the manufacture of fertilizers which are used in boosting agricultural output. Nitrogen gas can also be manufactured in large scale and used: In its pure state as a preservative in packaged foods; in electric

bulbs, manufacture of steel; in automobiles as fuel for airplanes and in liquefied form as a refrigerating agent (Ahrens, 2008, Pp. 1-8).

The second very crucial and fundamental constituent of the earth's atmosphere is oxygen gas. This gas makes up to about 20. 9 percent of the total atmospheric elements. Oxygen plays a fundamental role in support of life processes like breathing, respiration and also combustion of materials. All body processes utilize oxygen for metabolism and catabolism while carbon dioxide is released as an end-product. Additionally, oxygen is always a by-product of photosynthesis which utilizes carbon dioxide and nitrogen. Oxygen also reacts with many other elements to form almost half of the earth's crust (

Another important constituent of the earth's atmosphere is argon gas. This gas is arguably about one percent of the atmospheric elements. In addition, argon gas is very " inert" or " noble". It is a non-reactive gas hence does not support any life process. On the other hand, argon gas has been utilized industrially in light bulbs, welding and some laser technology (McKnight 1984, p. 43).

Besides these three gases, carbon dioxide is also found in the atmosphere in smaller amounts. Carbon dioxide comprises of about 0. 037% of the total atmospheric gases and is very significant in the process of photosynthesis in plants. Carbon dioxide together with nitrogen, oxygen and other essential compounds like sulpher, phosphorous and hydrogen are used in the synthesis of most of the organic compounds in nature by plants. Plants take

in these compounds and use them to synthesize organic compounds like proteins, carbohydrates, fatty acids and lipids. On the contrary, increase or accumulation of carbon dioxide in the atmosphere leads to increase in the atmospheric temperatures, a process referred to as “ green house effect” which generally results to global warming. This is caused by its ability to absorb infrared radiant energy, which actually maintains the warm temperatures in the lower atmosphere (Gabler et at., 1977, Pp 33-34).

Also water vapor which is usually referred to as humidity makes up the atmosphere. It comprises a small percentage of the atmosphere though it is an essential component. Moreover, humidity is normally located in regions just above the ground surfaces especially in warm, moist tropical regions especially along the oceans located in the tropics. Presence of water vapor in the atmosphere is a combination of evaporation and precipitation processes. Additionally, humidity helps greatly in the formation of clouds and which are the main sources of precipitation especially rainfall and fog. Rainfall supports a variety of processes on earth which include growth of vegetation, formation of rivers and generally the entire human life. Apart from these, water vapor in the atmosphere also assists in the absorption, scattering and reflection of the incoming solar radiations (insolation) from the sun. This really plays a very crucial role in determination of the earth’s radiation budget. Moreover, water vapor gives the atmosphere the qualities of insulation like those of a “ blanket” which really prevents the rapid escape or loss of heat from the surface of the earth by the process of radiation (Christopherson, 2005, Pp. 65-67).

Ozone layer is also one of the most important gases in the atmosphere. It actually plays one of the most significant roles in ensuring that the ultraviolet radiations from the sun are absorbed. Scientists argue that the ozone layer is located in the stratosphere and is made up of three oxygen molecules. These ultraviolet radiations from the sun are really damaging to humans and plants at large therefore it is important for them to be absorbed hence depletion of this ozone layer can lead to increase in temperatures in the lower sections of the atmosphere. For example, excessive ultraviolet radiation is the main cause of cancer and sunburns in human beings. On the contrary, an increase in the concentration of the ozone layer in the atmosphere can consequently lead to lowered atmospheric temperatures (Christie, 2001, Pp. 10-25). Apart from the ozone layer, dust particles also constitute a small percentage of the atmosphere. Moreover, dust particles result from natural processes like volcanic eruptions or from industrial processes. In addition, they also may result from: Strong winds blowing over the oceans lifting smaller droplets of spray into the air; strong winds sweeping into the air from dry desert areas and also from forest bush fires. They really play a very crucial role in scattering solar radiations which consequently impact the earth’s temperatures. Also some certain types of dust particles are essential in formation of the nuclei which are really essential in the condensation of water vapor or humidity to form clouds (Christopherson, 2005, p. 66).

Works Cited

Ahrens, C. D. 2007. Essentials of meteorology: An invitation to the atmosphere. Cengage Learning, Pp. 1-8.

Christie, M. 2001. The ozone layer: A philosophy of science perspective. Cambridge: Cambridge University Press, Pp. 5-40.

Christopherson, R. W. 2005. Geosystems: An introduction to physical geography. New Jersey, NJ: Person Education Inc., Pp. 65-87.

Gabler, E. R. et al. 1977. Essentials of physical geography. New York, NY: Holt, Rinehart and Winston, Pp. 32-39

McKnight, T. L. 1984. Physical geography: A landscape appreciation. New Jersey, NJ: Prentice-Hall Inc., Pp. 41-49.