WE ARE RUNNING OUT OF TIME

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We will think about our day to day life style. Every day, every morning, everybody not even human bodies; start their new day. In every single second, many factories such as transportations systems consume large amount of fossil fuel emitting green house gasses and other by products. As we all aware that greenhouse gases cause global warming whereas the by-products cause global dimming.

Let me see what global dimming is. In detail, it can be simply defined as the; due to the usage of fossil fuel, greenhouse gases, as well as other by-products are formed. These by-products such as sulphur dioxide, soot, and ash are also pollutants. Due to the increased presence of aerosol particles in the atmosphere, caused by human action, the properties of clouds can be changed [1]. As we all know, when water droplets are seeded by air-borne particles, such as pollen, clouds are formed. Solar energy is absorbed, and sunlight is reflected back into the space by aerosols and other particulates, which are associated with the clouds. The pollutants can also become nuclei for cloud, and water droplets that coalesce around the particles. The pollution can create a greater number of smaller droplets in clouds which can be rapidly increased and extremely more particulates are formed. More reflective clouds are made by these created smaller droplets, so that more incoming sunlight is reflected back into space and less reaches the Earth's surface [2]. This same effect can be seen, where the radiation reflect from the surface of the earth, trapping it in the lower atmosphere. This resulting reduction of heat reaching the earth is known as Global Dimming. Both heat radiated from the Earth and heat from the sun, are intercepted by the clouds. The natures of the clouds are not only complex but also varied with time, location, and altitude.

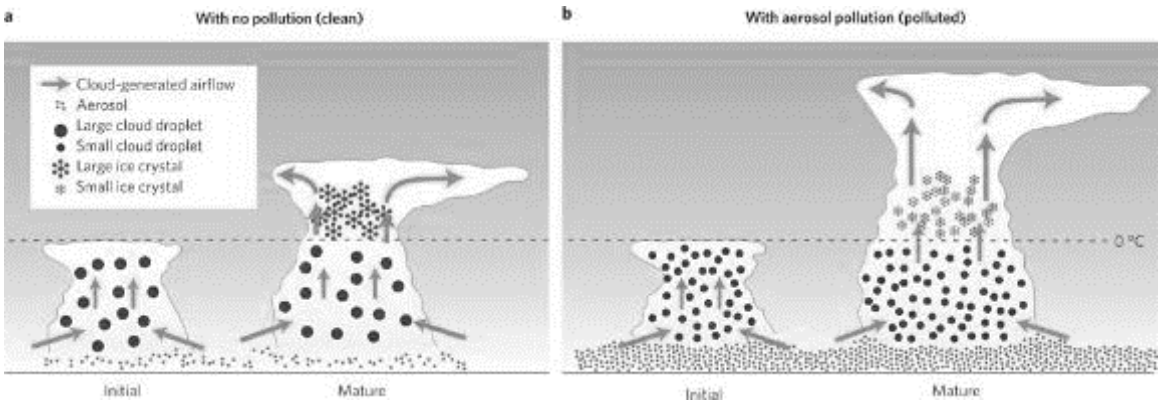

Figure 1: formation of cloud (a) in clean environment, (b) In polluted environment [3].

Mainly black carbon is released into the air by the incomplete combustion of fossil fuels (such as diesel) and wood. The soot, is an extremely small component of air pollution at land surface levels, which creates through black carbon. This phenomenon has a significant heating effect on the atmosphere at altitudes above 2 km (6,562 ft), and also the vapor from air planes, flying high in the sky, were identified as another significant cause of heat reflection [4]. However the other by-products, which cause global dimming, may be an ironic savior. Unfortunately, a deeper look at this, shows that this is not the case. It dims the radiation that falls on the surface of the ocean. That will be the great issue. As an example, vast areas in northern Africa are affected due to the lack of rain fall. This is mainly because the strength of the radiation of sun light is insufficient; therefore, it has interfered with the hydrological cycle by reducing evaporation form Atlantic Ocean.

According to the scientific investigations, it is reported that the impact of global dimming might not be in the millions, but in billions. Rainfall to half the world's population is brought by Our Asian monsoons. If the impacts of global dimming is persistent alone, it has a detrimental impact on the Asian monsoons so that some 3 billion people could be affected. In addition, it can be devastating because global dimming also lead to various human and environmental problems, such as smog, respiratory problems, and acid rain. This may have already lessened the severity of droughts and lack of rain in the Sahel as well [5]. In 2001, scientists highlighted that this as an interesting finding. In that year, in the United States all commercial flights were grounded for the next three days during the aftermath terrorist attacks (September 11, 2001). This allowed climate scientists to look at the effect on the climate when there were no contrails and no heat reflection. What scientists found was that the temperature rose by some 1 °C in that period of 3 days [6]. In my point of view, what I always feel is Global Dimming is hiding the true power of Global Warming. Modern climate change models predict that over the next century temperature can be increased by 5 °C, which is already considered as a global threat. However, global dimming has led to an underestimation of the power of global warming. Global dimming can be dealt by cleaning up emissions. If global dimming problems are only

Observed tendencies in surface solar radiation

	1950s-1980s	1980s-2000	after 2000
USA	-6	5	8
Europe	-3	2	3
China/Mongolia	-7	3	-4
Japan	-5	8	0
India	-3	-8	-10

Figure 2: Changes in surface solar radiation observed in regions with good station

Coverage during three periods (left column). The 1950s-1980s show predominant declines (diming) (middle column). The 1980s-2000s indicate partial recoveries (brightening) at many locations, except India and (right column) recent development after 2000 show mix tendencies. Numbers donates typical literature estimates for the specified region and period W m^{-2} per decade. Based on various sources as referred in Wild (2009).

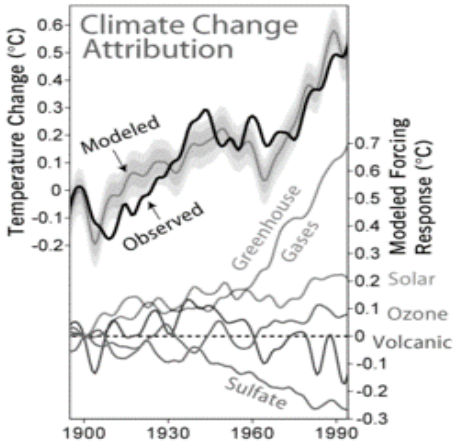

Figure 3: The trend of changing the temperature with years [7]

addressed as what was happened to Europe in 2003, then the effects of global warming will increase even more.

In coming century, it can be the melting of ice in Greenland, which would lead sea levels rising. This in turn would impact many of our major world cities and also it can increase the risk catch fires in rain forests. This would release even more carbon dioxide into the atmosphere, causing increasing the level of global warming, over the next 100 years these and other effects could combine to lead huge temperature rise. Therefore, there is a huge possibility to increase this temperature levels not only by 5 °C but also by 10 °C. The vegetation will die off even more quickly as soil erosion will increase and food production will fall down. Severe climate changes, a Sahara type of climate can be happened in places such as England, while other parts of the world may even become worse. As a result of huge temperature change in the earth there is a possibility to release one of the biggest stores of greenhouse gases such as, methane hydrate, which are presently located at the bottom of the earth's oceans and known to be destabilized with warming. This gas is eight times stronger than carbon dioxide in its greenhouse effect. This will not be a kind of imagination but it is a warning because earth will definitely face to that if the roots of both global dimming and global warming have to be dealt together and as soon as possible. In doing so, we may have to change our way of life. Through this has been a message for over 20 years, as part of the climate change concerns, a little has actually been done. "**We are running out of time."**

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