

Air quality management

Air atmosphere is a huge mass and continuous from all over, and hence there is no problem with volume and concentration of pollutants emitted. The problem is with establishing continuity to transfer the same to the voluminous mass, to make it negligible with any point of concern, be it health, atmospheric changes, weather, and ecosystem and so on. Human activities are more pronounced at the ground level which extends to the upper troposphere within which the emissions reach the atmosphere. The concentration will hence be more pronounced at the ground level which is the boundary layer within which the dispersion, atmospheric reactions, changes and the entrainment, residual, precipitation prevails.

This lower layer of troposphere experiences a diurnal cycle in day and night influenced by space, time and inversion height and they decide the maximum dispersion and which depends only on the flux, transport and dilution in a wide area and height. During day time, for the pronounced emission and atmospheric reactivity, the air remains in turbulence, in completely mixed stage to favour stable conversion with atmospheric components and they rise up with atmospheric agents, meteorological components as temperature, pressure, humidity, wind direction and speed.

With these atmospheric components the pollutants undergo mixing, updraft, downdraft and by entrainment in the upper atmosphere and appears back at night as residual layer which found no way for dispersion. This activity results in cumulus and stratocumulus clouds which lead to precipitation and this is the reason we see in recent times uneven precipitation in the micro areal extent, which was not there in preindustrial and pre urbanized era.

Atmospheric reactivity includes a lot of multidisciplinary aspects as environmental chemistry, physics, meteorology, hyper physics, ecology, oceanography, computer modeling, geology and volcanology that what all we predict and summarise as atmospheric behavior and pollutant dispersion are those perceived, understood and not the facts of truth ever, they are evolving with evolving combinations and what we infer are with our own reserve of exposure and knowledge and cannot be said the ultimatum of concepts.



Primary atmospheric reactivity is in convection of temperature and dispersion of pollutants, whereas the other activities of heat transfer are, conduction and radiation. The pollutant laden atmospheric air in the boundary layer is warm and lighter and hence moves up which replaces the cool clean air from above which causes mixing and wind movement. The increased pressure further reduces temperature and causes wind movement and alters the velocity and direction too, for the rotation of earth. All these favour dispersion and when the flux gets stagnated, when the temperature all around becomes the same, the conditions of the air pockets and consequent fragmentation, cumulous clouds happen and that is the reason for global warming, acid rain and all.

When there is balance of updraft and down draft, light warm air to upper atmosphere and cool dense air as down pour, there will be continuous carbon flow within the ecosystem that keeps life going. Hence this problem is to be viewed as, the carbon di oxide emissions with heat from the solar radiation remains stable and fragment the atmosphere, disturbs the carbon cycle. The global warming furthers atmospheric instability to have interactions in melting ice glaciers rising water levels, and the fragmentation within the urban sector causing temperature inversion.

The inversion as rise in temperature with increase in altitude is not due to the flux rate, not due to meeting the emission rate, but which need to be balanced with using the heat energy trapped by which the carbon cycle too will continue to reach all components of ecosystem. More of carbon to available form is good for environment, only thing is the reactivity getting slowed down due to heat which needs to be trapped from the carbon source to precipitate and reach ground level.

The increase in atmospheric pressure which is the weight of the air parcel making an impact on the objects is unavoidable and is being balanced, by the pressure of air from within the object which keeps the body withstand atmospheric pressure, and give up and so on. When the atmospheric air composition decreases with the particulates, the pressure decreases and the density of clean air is much more than the density of the gas laden air that the same imparts rise in temperature. It gives us an understanding that all natural components can only be used by us but not to be controlled for us, which are the assets of nature and finds their way into nature on their own.

The dust comes back to earth as dust because the air is dry and there is no humidity to cause precipitation for which the dust laden air has to rise up which will happen only if the temperature from below is warmer than the upper regions which need to accelerate the transport. At higher attitude the moisture will be more and the condensation washes the dust and makes them reach the ground level to continue the carbon cycle.

The organic components are carbon, hydrogen, oxygen and nitrogen in all forms of ecosystem and they dominate in different proportions with the predominance of science. If biology dominates, the majority is nitrogen, if chemistry dominates it is carbon and the hydrogen and oxygen are the media to carry them in different forms with molecules absorbed to carry on the action. This gives rise to acids and bases, more elemental forms and we need to understand all of them are the metamorphic forms of these basic elements in interaction with the environmental components.

For building life cycle, the carbohydrates form the major elements and the carbon in most available forms exponentially increases the lush and greenery and regenerates the environment and hence we need to encourage conversion of carbon and promote the connectivity to accelerate the rate of transformation and not to stop the same by control measures. The nitrogen cycle study shows that it mainly depends on bacterial activity and forms humus, rich in nitrogen which is fine and clogs soil structure whereas the study of carbon cycle reveals that the same is extended longevity of organics, porous in nature and makes them available in required ratio to promote lives on earth. The excess of heat in the carbon compounds is not mainly because of the solar radiation alone but from human activities which can be trapped back again as heat energy and used, that will solve the issues associated with the difference in rate of cycling of nutrients and energy.

Threads

1. Discuss on the atmospheric composition and structure.
2. Discuss on the chemical reactivity in the atmosphere which lead to air pollution episodes.

3. Discuss on the chemistry of troposphere.
4. Discuss on the interrelationships of various factors that alter the atmospheric stability?
5. Discuss on the atmospheric transport of pollutants
6. Urbanization leads to fragmentation in atmospheric behavior. Comment on it.
7. Discuss the aqueous phase chemistry which takes a lead in carbon cycle between the interaction of atmosphere with land and water.
8. What do you mean by aerosols? Discuss on the occurrence of primary and secondary air pollution.
9. Discuss on the chemistry of mid latitude stratosphere?
10. Comment on the polar ozone chemistry and how it helps in retaining atmospheric air quality?
11. What do you mean by ozone hole and how could it be repaired?
12. Discuss on the atmospheric changes before and after industrial era?
13. Discuss on the climate change before and after urbanization and globalization.
14. Conduct a study on the global policy to be framed to retain the continuity of environmental components.
15. Air quality management is in the transport of plume rise safely to the atmosphere with vertical and horizontal transport to form the connectedness that there will not be pollution. How will you improve the connectedness?
16. Anthropogenic activities must be in balance with environmental components to have a balanced ecosystem which not only balances the air environment but to the core of human development which is the need of the hour.

Global warming contributes to vertical and horizontal transport of pollutants that the heat need to be focused as being held up by the pollutants as reservoir which need to be trapped to form a smooth transition to maintain air quality uniform everywhere. The wave spectrum that facilitates the wireless distant communication via internet and mobile technology possible is due to the new wave lengths emerging out due to diffraction with particulates and reactions of atmospheric components that is an evidence to go with nature which helps us to live comfortably. This is using the technology offered by nature as against nuclear energy technology, and radioactive substances used up in medical treatments which are harmful on long time exposure.

Virtual technology makes life simple, makes effective personal and professional balance in carrying life, promotes individual satisfaction and assures each individual the dignity and comfort zone to give his best. Progressive life is possible always and which makes the approach of governance with simplicity. The environment pollution is for the mindless greed of the administrators. The people who take their own life, lives with the environment, for whom the same is not a threat, but opportunity.

