

PROCESS TO MAXIMISE MONSOON BENEFITS BY CLOUD-SUPPRESSION

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During monsoon season, low pressure in the atmosphere is formed on Indian Subcontinent due to heating up of landmass as the Sun is in the northern hemisphere. This low pressure on the subcontinent induces the cold and moist winds (clouds) from the sea, which will ultimately yield monsoon rains. The monsoon activity starts every year in Indian Ocean near equator few months before it is set on the Indian Subcontinent in June month. Unfortunately, substantial amount of monsoon clouds before reaching landmass convert in to rain on the sea. The annual rainfall on Indian Ocean is ranging from 150 cm to 350 cm. (refer www.botany.hawaii.edu/faculty/duffy/ARB/137-148/147.pdf). This sea area encompasses two times the area of Indian Subcontinent. This data implies that enormous rainfall is taking place on the sea even during the weak monsoon years. The monsoon season near equator is nearly nine months from its onset to retreat. Though monsoon clouds are carrying plenty of rainwater, the purposeless rainfall on the sea is diminishing yield of rain on the landmass. If we could prevent partially the clouds converting in to rain on the Sea, these clouds ultimately reach the landmass and convert in to useful rain.

Recently NASA scientists observed that the smoke / soot from forest fires are retarding (refer <http://www.sciencedaily.com/releases/2006/07/060714082130.htm>) the raining process when mixed with clouds. NASA scientists explained this phenomenon stating that when dark aerosols (particulates) are present in the clouds, these aerosols are absorbing more light both from space as well as earth surface (long wave radiation) making clouds warmer and retarding clouds to rain. NASA scientists also found that when the aerosols are of lighter colors, they are helping in reflecting the light. They are reducing the temperature of clouds and creating favorable conditions for clouds to rain.

NASA scientists also observed that these aerosol particulates would remain in the atmosphere for a week's duration only unlike green house gases, which stay for many decades.

I would like to project an idea / feasibility to improve the rainfall on the land and also achieve the prolonged and effective monsoon by diminishing the rainfall on Indian Ocean.

The mapping of clouds formation on the sea is to be carried out from the equator in the Indian Ocean. The year round atmospheric data such as wind directions, isobars, isohyets, clouds modeling, etc shall be collected on daily basis by satellites and ship-based observations.

Depending on favorable wind directions and presence of rain forming clouds, dark aerosols are to be sprayed in to the clouds to prevent rain formation on sea. This can be

done from airplanes. This would delay the rain process by nearly one week and allow time for the moist clouds to reach the landmass.

One possible source of dark color aerosol is the finely ground charcoal or coal. Black color aerosols would be sprayed in the clouds by airplanes to delay the cloud precipitation or drastically reduce the cloud precipitation efficiency. One-micron order dark aerosols would be released in to the plume of the cumulonimbus clouds such that large number of condensation nuclei is available. The resultant majority undersized condensation droplets formed would be thrown out from the top of the cloud by the updraft in the cloud formation. Thus clouds are either dispersed or made to rain less by ejecting its moisture source.

Cumulonimbus clouds contribute most of the rain on the Indian Ocean surrounding the subcontinent. Thus the rainfall on the ocean is diminished artificially and the dispersed clouds would reform to yield rain subsequently when monsoon winds reach the landmass.

By conducting this process we are not using the clouds, which would have precipitated elsewhere on land. There is no conflict of interest either among nations or regions. Clouds are only prevented to yield rain on the sea such that they precipitate more rain naturally on the nearby landmass subsequently.

The following benefits are visualized if this technique is well mastered with accuracy.

The rainfall on the subcontinent will be at normal levels even during supposed to be bad / worse monsoon. A 20% increase in normal rainfall would eliminate drought conditions in the subcontinent. The benefits of this process would accrue both to southwest monsoon and northeast monsoon as long as the winds are blowing towards landmass from the sea.

The coastal areas with inadequate rainfall would also get enhanced rainfall. Tamilnadu, coastal Andhra Pradesh, Rayalaseema, interior Karnataka, interior Maharashtra, Gujarat and Rajasthan would benefit enormously.

This process can also be used to reduce the excessive/ unwanted rainfall on the west coast and to transfer more clouds to eastern face of Western Ghats. This would enhance rainfall in the rain shadow areas of Western Ghats and also make available adequate water in the rivers Cauvery, Krishna and Godavari obviating the need of peninsular rivers interlinking.

Before the onset of monsoon, the temperature on the subcontinent soars to 45 deg C causing severe discomfort to the people, flora and fauna. If we are able to advance the onset of monsoon by one month, subcontinent could escape from the severe summer conditions. This is a tremendous relief to the people in many ways. It can avoid power shortages, water scarcity, etc.

Similarly the end of monsoon is extended by one month, it would benefit the rain fed agriculture, ground water based irrigation and augment the water availability in the rivers for hydropower generation & canal irrigation.

Africa, Middle East and Far East also receive rainfall from monsoon phenomena. There is a possibility with this process to mitigate droughts in Africa and convert deserts in to agriculture lands.

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Further reading material on this topic:

Global winds and oceans currents: http://www.sci.ccny.cuny.edu/~stan/e31_glob.ppt

Cloud seeding for India:

<http://www.gitam.edu/old/www.gitam.edu/science/envstud/English-Book.pdf>

Introduction to the atmosphere: <http://physicalgeography.net/fundamentals/7o.html>

The importance of understanding clouds:

eosps0.gsfc.nasa.gov/ftp_docs/NASA-Facts-UnderstandingClouds.pdf