Application of Remote Sensing in the Co-evolution of climate and life in the Antarctic & Southern Ocean Through Correlation of Ocean-atmosphere-cryosphere interactions with Climate Variability & Development of Cryosphere Climate Predicting Models (CCPM)

Virendra Goswami[1]

[1]Indian Institute Of Technology, Kharagpur

Abstract

There are places on Earth that are so cold that water is frozen solid. These areas of snow or ice compose the cryosphere. The term "cryosphere" comes from the Greek word, "krios," which means cold e.g. Greenland and Antarctica.

Lately (Feb'17), Researchers in University of Washington ,USA & University of Edinburgh found that the pools underneath the glacier, Thwaites, are draining out at an unprecedented rate and emptying themselves. Thwaites, which is on the edge of West Antarctica, Amundsen Sea is 4000m thick and is considered key to making projections of global sea level rise. The study finds four interconnected lakes drained in the eight months from June 2013-Jan'2014 with the increased speed by 10% of the glacier melting. This unstoppably melting of the glacier into the ocean mainly because of warmer seawater lapping at its underside.

Prof. Peter Clark, OSU attributed that the Glacier retreat was due to rising levels of Carbon Dioxide and other GHG, as opposed to other types of forces. If, this continues then the most of Glaciers would disappear in the next few centuries & the Glaciers loss in future will contributing to rising sea levels & environmental pollution. This ocean- atmosphere-cryosphere (OAC) interaction is more evident over the Antarctic & Southern Ocean region resulting the significant changes in Climate parameters. Its also evident on North pole as the temp raised above freezing point on 20 Dec'15.(Canadian Scientist 01/01/2016-HT)

Hence, efforts art on Co-evolution of climate and life in the Antarctic & Southern Ocean through Correlation of Ocean-atmosphere-cryosphere interactions with Climate Variability & to evaluate correlation between the rise of GHG level , rising of sea level, retreat ,melting of the glaciers, vis-à-vis climate variability.

Next, how can these be controlled through chemical processes e.g. creating the Temperature Absorption Sinks (TAS) to control unstoppably melting of the glaciers into the ocean mainly because of warmer seawater lapping at its underside & Carbon Absorption Sinks (CAS),GHG Detoxifiers to check the rising levels of Carbon Dioxide and other GHG as well as to develop Cryosphere Climate Predicting Models (CCPM).

Also, an attempt would be made through (CCPM). to study the Correlation of Antarctic-Southern Ocean Regional Ocean-Atmospheric-cryosphere (OAC) Variability Mechanism , Sub-Mesoscale Dynamics & its impact on ,Climate Variability. Antarctic- Southern Ocean regional Variability of the Sub-Mesoscale Dynamics study includes to examine satellite imageries with emphasis on the large scale kinematic and thermodynamic behavior of selected mesoscale convective systems.

The kinematic features of the mesoscale convective systems over Antarctic- Southern Ocean regions would be correlated with ocean-atmosphere-cryosphere variability on time & Space

Scales; at the local, regional and global levels through the extracted Sea Surface Temperature (SSTs) over the grid box , attributing the regional change to natural and anthropogenic radiative forcing agents & to bring out a few optimum values of these to develop (OAC – CCPM)

Keywords: Remote Sensing ,Co-evolution of climate ,Correlation Ocean-atmosphere-cryosphere interactions, Climate Variability, Cryosphere Climate Predicting Models (CCPM)

References:

'DEVELOPMENT OF COMPUTATIONAL CORRELATION PREDICTING MODELS (CCPM) FOR DETOXYFICATION OF GREEN HOUSE GASES THROUGH PHYSICO_CHEMICAL PROPERTIES OF SOLID CATALYSTS' Proc .of International Workshop on Coupled Data Assimilation (CADW) Toulouse, 18th-21st Octobe*r 2016.*