Application of Remote Sensing to predict extreme Oceanic-Atmospheric-Climatic Changes and develop Numerical Ocean-Atmospheric-Climate Forecast Models (NOACFM).

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INTRODUCTION & OBJECTIVES : @There are places on Earth that are so cold that water is frozen solid. These areas of snow or ice compose the cryosphere. The understanding of impacts of multiple stressors on the ocean and the associated risks of abrupt state shifts can be explored through the comprehensive studies of Ocean Systems Interactions, Risks, Instabilities and Synergies (OSIRIS).

@ Numerical Ocean-Atmospheric- Forecasts Models (N-OACFM), are to be developed to understand the major Atmospheric challenges due to extreme weather events caused due to mesoscale convective systems, Global Carbon Cycle, Ocean Salinity, and Marine Pollution.

@ Marine Pollution results due to the toxin, toxic gases, Global Warming due to Green House Gases over the Oceanic and sub-surface Oceanic regions.

@The Ocean Circulations, Ocean-Atmospheric-Cryosphere (OAC) interactions, and the inorganic contaminants get affected by the Ocean Salinity.

OBJECTIVES

@The studies are focused to explore multiple stressors on the ocean, sea-level variability mechanism, sub-mesoscale dynamics, cryosphere ice sheet stability, ice and bedrock coring and ice sheet processes (oceanic, physical, chemical) by the comprehensive studies of Ocean Systems Interactions, Risks, Instabilities and Synergies (OSIRIS) by making use of the conventional data and Satellite imageries, HPC and cloud computing for real time analysis.

@ Next, the physicochemical and spectroscopic methods would be used to characterize the in-situ chemical speciation of the inorganic contaminants and develop technologies for remediation of water pollution by catalytic-oxidants, and by regeneration of Granular Activated Carbon (GAC) using High Affinity Toxin Receptors (HART)to entrap toxins.

@ The kinematic features of the **mesoscale convective systems over Cryosphere- Oceanic 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 in order to bring out a few optimum values of the OSIRIS to develop the (NOACFM), within the (1 x 1) deg. grid-box through the process of Initialization, Computation, Parameterization, by the computer algorithm,

2.BACKGROUNG & RELEVANCE TO PREVIOUS WORK

* @Researchers found that the Sea-level rise was due to rising levels of Carbon Dioxide and other GHG, as opposed to other types of forces. Hence, it's imperative to analyse Satellite imageries (IR & VR) over the Oceanic regions comprising Transitional areas (TAs: areas of strong gradients & are the potential oceanic regions of early detection of Climate variability.) & (WBCs: Ocean Carbon Hot Spots)..

*The Canadian Scientists in 2016 found that the Ocean- Atmosphere-Cryosphere (OAC) interaction is more evident on North pole i.e. Arctic regions than over Antarctic & Southern Ocean region resulting the significant changes in Climate parameters.

* *In CLIVAR-Ocean Workshop,May'21,Dr. Kakha NADIRADZE et.al*, studied Eutrophication and Acidification problems of the Black Sea and found that Climate Change, Pollution, Rising Carbon dioxide (CO 2 levels, are causing increases in Black Sea water CO 2 and inorganic carbon levels.

@Goswami V.K,(1999)studied Satellite observed cloud fields and inter-hemispheric (NH & SH) confluence zones during summer Monsoon& found that NH- Confluence zones are more of mesoscale convective nature than that of SH

3.General Methodology and Procedure to be followed:

@ It's imperative to investigate sub mesoscale dynamics of Arctic ice sheet stability, ice and bedrock coring, ice sheet modelling, and ice sheet processes viz. physical, chemical, and biological oceanographic for climate modelling study through the computation of Correlation of Cryosphere Ice Sheet Stability with Sea-level Variability Mechanism ,Sub-Mesoscale Dynamics and Climate variability by developing Ocean Systems Interactions, Risks, Instabilities and Synergies (OSIRIS) & Ocean Climate Predicting Models (OCPM).

@ The kinematic features of the mesoscale convective systems over Arctic- 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 the few optimum values of these to develop (OSIRIS) &Numerical Ocean-Atmospheric-Climate Forecast Models (NOACFM), by using High Resolution Satellite imageries, data access, assimilation; HPC &cloud computing for real-time analysis.

4.DEVELOPMENT OF Numerical Ocean-Atmospheric-Climate Forecast Models (NOACFM)

- **In order to study Tele-Connection of of ARCTIC and ANTARCTIC's Physical & Dynamical Processes in Coupled Climate System ; an extensive analysis of Satellite pictures viz. DMSP/GOES/TIROS/INSAT, covering the complete region of the study would be undertaken, in order to correlate the sub mesoscale dynamics , ice sheet stability, ice and bedrock coring, ice sheet modelling, and ice sheet processes viz. physical, chemical, and biological oceanographic for climate modelling study through the computation of Correlation of Cryosphere Ice Sheet Stability with Sea-level Variability Mechanism ,Sub-Mesoscale Dynamics and Climate variability by developing Ocean Systems Interactions, Risks, Instabilities and Synergies (OSIRIS) & Ocean Climate Predicting Models (ARCTIC-OCPM) & (ANTARCTIC-OCPM). Next, through the process of Initialization, Computation, Parameterization, within the (1 x 1)deg. grid-box by the computer algorithm, the Numerical Prediction Models for Ocean Climate Prediction over cryospheric regions would be developed i.e. Numerical Ocean-Atmospheric-Climate Forecast Models(NOACFM).THANKS**