New Program-Project Proposal

Upwelling studies through ocean data integration towards sustaining ocean health and productivity

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Upwelling system
Motivation

Lack understanding

Ocean Productivity
Fisheries Management
Habitat Degradation
Ocean Health
Upwelling, climate and marine ecosystem

Black et. al, 2014 (SCIENCE)
Climate science: The future of coastal ocean upwelling

Emanuele Di Lorenzo

Nature 518, 310–311 (19 February 2015) | doi:10.1038/518310a
Published online 18 February 2015

An ensemble of climate models predicts that winds along the world’s coasts will intensify because of global warming, inducing more ocean upwelling — a process that will affect the health of coastal marine ecosystems. See Letter p.390

Subject terms: Climate sciences • Ocean sciences

Intensification and spatial homogenization of coastal upwelling under climate change

Daiwei Wang, Tarik C. Gouhier, Bruce A. Menge & Auroop R. Ganguly

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Received 30 July 2014 | Accepted 15 January 2015 | Published online 18 February 2015

The timing and strength of wind-driven coastal upwelling along the eastern margins of major ocean basins regulate the productivity of critical fisheries and marine ecosystems by bringing deep and nutrient-rich waters to the sunlit surface, where photosynthesis can occur\textsuperscript{1, 2, 3}. How coastal upwelling regimes might change in a warming climate is therefore a question of vital
Upwelling Area in South China Sea
Program Objectives

- To **explore new upwelling** site and increase understanding of the physical-biological interaction dynamics of upwelling region in the SCS and surrounding seas through comparative studies.
- To plan **integrated data gathering** which involve field data, satellite data and numerical model in understanding upwelling dynamics.
- To **disseminate scientific information** on upwelling for establishment of better management planning tool for marine environment and fisheries.
Expected Outcomes

• Contribute to the regional understanding of upwelling dynamics and possibly a discovery of new upwelling area through comparative studies and learning exchange

• Build a standard data monitoring technique that is more cost-effective and simplify task in providing continuous spatial data monitoring related to upwelling site

• Provide important information and share new findings with different groups that involves with relevant stakeholders including fisheries related industries, scientific community and local community
DATA INTEGRATION

- MODELING
- SCIENTIFIC CRUISES
- SATELLITE OBSERVATIONS
- IN-SITU DATA/OCEAN BUOY
- LAB ANALYSIS FOR BIOLOGICAL/CHEMICAL
Group Meeting

Upwelling Program/Plan

Field trip for Young Marine Scientist

Field data collection and data integration

Brief Review on South China Sea upwelling
Relation to previous work
Halocline Lifting

(a) Halocline Lifting

(b) Halocline Lifting
Satellite SST (MODIS)
Summary

• Upwelling is important to understand the ocean productivity and health
• Managing ocean resources under this challenging ages of pollution, overfishing, climate change etc.
• Develop the cost-effective data integration method
Committed Members

• Dr. Mohd Fadzil Mohd Akhir (Malaysia) – Project Proposer
• Prof. Dato’ Dr. Noraieni Haji Mokhtar (Malaysia)
• Prof. Weidong Yu (China)
• Dr. Anna Kuswardani (Indonesia)
• Dr. Zainal Arifin (Indonesia)
• Thailand
• Vietnam
• Korea
Thank You