Research Activities on Ocean-Climate Variability Impact to Marine & Fisheries Sector

United Nation/Indonesia International Conference on Integrated Space Technology Application to Climate Change
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Research & Development Center for Marine & Coastal Resources

Acknowledge contributions:
The global ocean “Conveyor Belt” System
Climate Drivers

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Agency for Marine & Fisheries Research & Development
Ministry of Marine Affairs & Fisheries of the Republic of Indonesia

El Nino
Warm pool
Indian Ocean Dipole
Monsoon

Courtesy: Weidong YU
Major Current Circulation

Wyrtki Jet

Monsoon Current

(Wijffels, 2005)
Indonesian Region

- Tropical Seas → High primary productivity to absorb massive Carbon dioxide, but in short period.
- Warm Sea Surface Temperature → Tend to be source of Carbon.
- Coastal Peatland in several area → Tend to be source of Carbon.
- Coastal ecosystem (Mangrove & Seagrass) → Potential to be a Carbon sequestration (Blue Carbon).
- Coastal & Marine Ecosystem – Climate has a dynamic interaction.
Vision:
the vision of the acceleration and expansion of Indonesia’s economic development is to create a self-sufficient, advanced, Just, and prosperous Indonesia.

**2010**
- GDP: USD 700 Billion
- Income/Capita: USD 3,000

**2025**
- GDP: ~ USD 4.0 – 4.5 Trillion
- Income/Capita: estimated ~ USD 14,250 – 15,500 (country with high income)

**2045**
- GDP: ~ USD 15.0 – 17.5 Trillion
- Income/Capita: ~ USD 44,500 – 49,000
NAP – Mitigation (GHGs Reduction)

Financial and Planning System
Law No. 25 Year 2004 - Law No. 17 Year 2003

RPJPN 2005 – 2025

RPJMN 2010 – 2014

RKP/RAPBN

To Accelerate National Economic Transformation

Masterplan of Acceleration and Expansion of Indonesia Economic Development

Action Planning/Project

Private Investment and PPP

Development adaptation, integration, and acceleration: FOCUS and CONCRETE

NAP on Climate Change Adaptation (RAN-API)
National Action Plan for the GHG’s reduction (RAN-GRK)

4 Research Programme of AMFRD are mentioned being supporting activities in the Presidential Regulation No. 61/2011 for RAN GRK signed at 20 September 2011

<table>
<thead>
<tr>
<th>No.</th>
<th>Action Plan</th>
<th>Activity/Target</th>
<th>Period</th>
<th>Location</th>
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<tbody>
<tr>
<td>1</td>
<td>Marine Research Carbon in Indonesia</td>
<td>5 Research Packages</td>
<td>2010 - 2014</td>
<td>Indonesian coastal zone &amp; Coral Triangle Initiative area</td>
</tr>
<tr>
<td>2</td>
<td>Study Marine Hazard Response to Climate Change in Southeast Asia Region</td>
<td>2 Research Packages</td>
<td>2010 - 2014</td>
<td>South China sea &amp; Karimata strait</td>
</tr>
<tr>
<td>3</td>
<td>Implementation of the Indonesia Global Ocean Observing System (INAGOOS)</td>
<td>2 Research Packages</td>
<td>2010 - 2014</td>
<td>Jakarta, Bali &amp; Indonesian seas</td>
</tr>
<tr>
<td>4</td>
<td>Implementation of the Indo-China Ocean &amp; Climate Research Centre</td>
<td>3 Research Packages</td>
<td>2010 - 2014</td>
<td>Sunda strait, Indian Ocean, &amp; Karimata strait</td>
</tr>
</tbody>
</table>
3 Research Programme of RDCMCR are mentioned being parts of the main streaming activities in the RAN API for Food Security Status draft of 22 January 2013

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<td>1</td>
<td>Kajian Perubahan Monsun di Perairan Indonesia (MOMSEI)</td>
<td>2 Research Packages</td>
<td>2013 – 2016</td>
<td>East Indian Ocean, South of Java</td>
</tr>
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<td>2</td>
<td>Penerapan kebijakan ekonomi biru dengan pendekatan daya dukung perairan di Sumatera Barat sebagai Sentra Tuna</td>
<td>2 Research Packages</td>
<td>2013 - 2019</td>
<td>East Indian Ocean, Western Sumatra</td>
</tr>
<tr>
<td>3</td>
<td>Pembuatan Peta Wilayah Pengelolaan Perikanan (WPP) yang terintegrasi</td>
<td>1 Research Packages</td>
<td>2010 - 2014</td>
<td>Indonesian seas</td>
</tr>
</tbody>
</table>
Kajian Perubahan Monsun di Perairan Indonesia (MOMSEI)
(Study of Monsoon Variability in Indonesia Seas - MOMSEI)

Coordinator: Dr.-Ing. Widodo S. Pranowo

Activities Plan:
1. Development of Science Plan for MOMSEI (Partner Prof. Dr. Weidong Yu – FIO) → March - May
2. Development & Signation of IA MOMSEI → May – Jun
3. Clearances process → Jun-Jul
4. South Java Cruise for capturing of Upwelling Signal → Aug
5. Labs & data analysis → Oct - Nov
Kajian Variabilitas Laut, Iklim dan Monsun di Perairan Indonesia
(Study on Ocean Climate Variability of Indonesian Seas)

activities Plan:
1. Development of Science Plan for “The Transport, Internal Wave & Mixing in The ITF Regions (TIMIT) & Impacts on Seasonal Fish Migration” (Partner Prof. Dr. We Zexun – FIO);
2. Development & Signation of IA TIMIT;
3. FGD on research have been done in ITF region;
4. Labs & data analysis.
Research project on Marine Resources (2013)

Analisis Sumberdaya Kelautan di WPP 717 dan WPP 718 dalam Rangka Pengelolaan Sumberdaya Kelautan dan Perikanan
(Development of Marine Resources Information for Fisheries Manag. Area)

Coordinator: Rizki Anggoro Adi

WPP (Full region) PC/Offline System
Developed by Dr. Ifan R. Suhelmi (2011-2012)

Adopted to
WEB ARCGIS SYSTEM & P3SDLP DATABASE SERVER

Published via
P3SDLP’s WEBSITE
http://www.p3sdlp.litbang.kkp.go.id
**Monsoon Onset Monitoring & Its Social & Ecosystem Impacts - 2014**

**FIO - SOA**

- **Monsoon Onset**

**AMFRD**

- **Marine Environment** (RDCMCR - Dr. Anastasia Kuswardhani)
- **Blue Carbon** (RDCMCR- Dr. Andreas Hutahaean)
- **Salt Production** (RDCMCR – Dr. Ifan Suhelmi)
- **Coastal Vulnerability** (RDCMCR – Gunardi Kusumah, M.Sc)
- **Fisheries** (P4KSDI – Dr. Duto Nugroho/Dr. Renny Puspasari)

- CTD observations
- Meteorology observation
- Ocean-atmosphere heat flux
- Ocean-atmosphere CO₂ flux
- Zoo-/Phito-plankton Net
- Water sampling with CTD with rosettle bottles
- Secchi disk depth (water transparency)
- Echo intensity (Backscattering) / Fish finder
- Trawl
Institutes & facilities

New Initiative FIO & AMFRD
Natuna Marine Station
Research Institute for Vulnerability & Coastal Resources
Research Institute for Salt

[1]. The R & D Center
[2]. ICCOC
[3]. ATSEA
[4]. Marine & Coastal Data Lab
Sea Salt Production Area

Gambar 1 Peta sentra garam rakyat.
Indonesian Longline Tuna Vessels Location
(Source: BRKP, 2003)

Peta Sebaran Tangkapan Tuna Albacore
Bulan Januari 1997

Peta Sebaran Tangkapan Tuna Albacore
Bulan April 1997

Peta Sebaran Tangkapan Tuna Albacore
Bulan Juli 1997

Peta Sebaran Tangkapan Tuna Albacore
Bulan Agustus 1997

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Indonesia

July 1997

August 1997
Indonesian Longline Tuna Vessels Location
(Source: Balitbang KP, 2012)
Indonesian Longline Tuna Vessels Location
(Source: Balitbang KP, 2012)
Indonesian Longline Tuna Vessels Location 2011 & 2012
(Source: Balitbang KP, 2012 for IOTC)
Satellite → Chlorophyll, Wind, SSH, Argo Floats

Correlation of OPP & Temperature

Float 53547

- Ocean Primary Productivity
- $-1^*T$ at 10 dbar, $\text{cor}=0.98$
- $-1^*T$ at 100 dbar, $\text{cor}=0.27$

Expedition to investigating Marine-Climate characteristic of Indonesian Seas

Has been done by International and national scientists since Dutch Colonial

The colonial gunboat *Siboga* in its role as research vessel (1899–1900)

The naval survey ship *Willebrord Snellius* (1929-1930)

(Courtesy: H.M. Aken & Weidong Yu)

A seminar, attended by a 12-man American scientific team from the U.S. Oceanographic vessel *ARGO*, was held jointly with scientists of the Indonesian Council for Sciences at the latter's headquarters, Djalan Medan Merdeka Selatan, Djarkta. Principles of the seminar are left to right: Mr. Taufik, of the Indonesian Council for Sciences; Dr. Robert L. Fisher, of the University of California's Scripps Institution of Oceanography; Capt. Lumanau, Chief of Navy Hydrography and Mr. Radhie, Head of Division for General Affairs of the Indonesian Council for Sciences. Date:1963-01-23.

Sources: Scripps Institution of Oceanography Library Archives
International Nusantara Stratification & Transport (2003-2011)

(1st deployment: Dec 24, 2003 – Feb 1, 2004; rotation @ 1 years; finished 2006)

- Instrument Deployment:
  - Current Meter (Pengukur Arus)
  - Sensor Temperatur dan Salinitas
  - Shallow Pressure Gauges (Pengukur Tekanan Paras Laut)

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Head of R & D Programme
Marine & Coastal Resources & Development Centre of the Republic of Indonesia

Makassar Strait
Lifamatola Passage
Lombok Strait
Bali
Ombai Strait & Timor Passage

Kalimantan
Sulawesi
Halmahera
Java
Banda
Flores
Timor
Australia
Indonesia – German SPICE III (2012 -2015)

Carbon Sequestration in the Indonesian Seas and Its Global Significance: Generation of Scientific Knowledge for Formulating Strategies For Adaptation to Climate Change

Cruise 2013
Malacca Strait

Cruise 2014
Spermonde Islands

Cruise 2012
Eastern Karimata Strait
Kajian Perubahan Monsun di Perairan Indonesia (MOMSEI)

Cruise Plan 20 s/d 29 Agustus 2013, menggunakan Kapal Riset Baruna Jaya VIII dengan rute Muara Baru – Benoa Bali dengan 15 titik sampling station C1-C5, E1-E5, G1-G5

2013 - 2016
The Transport, Internal Waves and Mixing in the Indonesia Throughflow regions (TIMIT) and Impacts on Seasonal Fish Migration – (2014 – 2017)
RESEARCH OUTCOME 2011-(2013)

• Intermediate outcomes
  – Oceanographic Dataset including CO₂ Data and Fisheries parameters.
  – Report on Fisheries Oceanographic Data Analysis.
  – Students: 3 Bachelors graduated.
  – Development of Marine Ecoregion (E.L.01).
  – Ph.D Student will be start April 2013 @ Xiamen Univ.

• (Plan for) Publications
  – Scientific Papers on Fisheries Oceanography, Blue Carbon and Fisheries
  – Other (outreach) publications → Mooring buoy response Storm, Tsunami/ Earthquake signal.
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Thank you
Terima Kasih