ACTIVITIES ON IRZ & PRZ IN KOREAN CONTRACT AREA

Berlin, Germany
September 2017
• 1994 : Registration as a pioneer investor (150,000 km²)
• 1997 : 1st relinquishment (30,000 km²)
• 1999 : 2nd relinquishment (15,000 km²)
• 2002 : Selection of final contract area (75,000 km²)
Exploration Summary

- **Stage I (1994-2010)**: Resource assessment and environmental baseline study
  - 925 days (ave. 62 days/year)
- **Stage II (2011-2015)**: High resolution topographic and acoustic seafloor mapping in a prospective area and environment data collection for BIE (195 days)
- Selection of a Long-term Monitoring Site in 1995
- Representative of the environmental characteristics of the southern Korea Contract Blocks
- KOMO (KODES Long-term Monitoring Station)
  - 10.5°N, 131.3°W
  - Chemical oceanographic observation since 1995
  - Operation of mooring system from 2003
- Can be served as the PRZ for ‘Benthic Impact Experiment’
- Can be impacted by mining activities
• Conductivity-temperature-depth (CTD) system
• Temperature, Salinity, Dissolved oxygen, etc.
- Long-term mooring system
- Current profiles at three different depths (1250m, 4550m, 5000m)

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Observation period</th>
<th>Mean Scalar Speed (cm/s)</th>
<th>Mean Vector Velocity (KOMO1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>u(cm/s)</td>
<td>v(cm/s)</td>
</tr>
<tr>
<td>1,250</td>
<td>2008-2013</td>
<td>4.68</td>
<td>-0.65</td>
</tr>
<tr>
<td>4,550</td>
<td>2003-2013</td>
<td>3.64</td>
<td>1.07</td>
</tr>
<tr>
<td>5,000</td>
<td>2003-2013</td>
<td>3.63</td>
<td>1.27</td>
</tr>
</tbody>
</table>
- Conductivity-temperature-depth (CTD) system
- Annual and depth variation of the major nutrients
• Long-term Mooring System (Sediment trap)
• Annual variation of particle flux at three depth (1200m, 4500m, 4950m)
- Natural variation of total particle flux at three different depth
- Monthly variation
  - 2008: PDO regime shift (warm to cold)
- Bongo Net
- Abundance, biomass and species structure
  - Zooplankton
• Multiple Corer
• Abundance, biomass and species structure
  - Meiofauna, Microfauna
PRZ _ Biological community

- Box Corer, Deep-towed Camera System
- Abundance, biomass and species structure
  - Macrofauna, Megafauna
Impact Reference Zone

- Selection for ‘Benthic Impact Experiment’ Site in 2010 (not as an Impact Reference Zone)
- Similar conditions with PRZ in environmental characteristics
- Dimension (100㎢, 10x10㎢)
  - 10°27’ ~ 10°33’N, 131°53’ ~ 131°58’W
  - Distance between IRZ & PRZ: ~70km
- Baseline studies from 2011 to 2014 for comparison between IRZ & PRZ
### IRZ vs. PRZ Particle flux

<table>
<thead>
<tr>
<th></th>
<th>Range</th>
<th>Average</th>
<th>Winter-Spring (Dec. – May)</th>
<th>Summer-Fall (June – Nov.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KOMO</td>
<td>10.5 - 132.6</td>
<td>40.2</td>
<td>55.0</td>
<td>19.9</td>
</tr>
<tr>
<td>BIS</td>
<td>11.4 - 115.2</td>
<td>34.3</td>
<td>47.7</td>
<td>16.0</td>
</tr>
</tbody>
</table>

**(mg m\(^{-2}\) day\(^{-1}\))**

- **Figure (a)**: Total mass flux at KOMO station (mg m\(^{-2}\) day\(^{-1}\)) and BIS station (mg m\(^{-2}\) day\(^{-1}\)).
- **Figure (b)**: Y = 0.8181X, \(R^2 = 0.8167\).
IRZ vs. PRZ – Meiofauna

KODOS13_Leg02 Stations Map

- Abundance (ind./10cm²)
- Biomass (mg/10cm²)

Total Abundance of Meiobenthos
Abundance of Nematodes
Abundance of Harpacticoids
Abundance of Foraminifers
Abundance of Nauplius
Number of Taxa
Total Biomass of Meiobenthos
Bathymetric Maps

Abundance (ind./10cm²) vs. Biomass (µg/10cm²)
IRZ vs. PRZ _ Macrofauna

Korea Institute of Ocean Science & Technology
• **Five year extension contract**: 2016.4 – 2020.4
• **Objectives of activity programme** (Two exploration cruises: 2018, 2019)
  - Estimation of polymetallic nodule abundance
  - Gathering additional environmental and biological data
• **Exploration Plan for 2018 cruise (provisional)**
  - RV Kilo Moana (Univ. of Hawaii)
  - Duration: 30 days (20 May to 19 June)
  - Biological baseline data from IRZ, PRZ, and APEI
  - DCS data for mega-fauna distribution in KR5 area
Thank you !!!