

Research Activities in ISHIGAKI Island and MIKAWA Bay Area, Japan: Towards transdisciplinary research

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Towards “Area Capability Enhancement” in ISHIGAKI Island and MIKAWA-bay area of Japan, this component has been focusing on a new way of improving interactions between human and nature through conducting a large number of activities in interdisciplinary perspective. The following are the details of our activities divided into three categories: 1.natural scientific research; 2.social scientific research; and 3.educational activities etc. in each area.

● ISHIGAKI Island

1. Natural scientific research

One research topic in ISHIGAKI Island is to study the influence of the spring water on the biological production processes. Water samples were collected at 20 sites in the island. We are analysing the water samples by the ICP-MS (Inductively Coupled Plasma Mass Spectrometry) method and are planning to measure the stable isotope from the samples. We plan to make the water quality distribution map of the ISHIGAKI Island to describe the linking material flow at this site. Additionally, we focus on the environment of the mangrove area that provides the base of marine food chain and the ecosystem services. Short term intensive observation about the material flow around the mangrove area has been conducted.

Another research activity is to conduct an underwater archaeological survey around coastal area of ISHIGAKI, TAKETOMI, and KUROSHIMA Island. The underwater surveys have been conducted by divers mainly archaeologists with underwater robots made by our team. The purpose of these surveys is to make the detailed underwater map and to identify the cultural and historical significance of each underwater site. Our past studies already confirmed the archaeological significance of these sites, hence they are also potential as a marine resource for education and tourism for local communities. With such understanding, we also have tied to provide our archaeological results and information sites to local schools, students, and professional divers by conducting of environmental education, special exhibition at the local museum, and town meeting.

2. Social scientific research

Study on ocean policy is one of the outputs of this category. Dr. Yamada in this team has conducted a survey on conservation and sustainable use of ecosystems in ISHIGAKI Island from the viewpoint of ocean policy. He has analysed current situation and ocean policy of neighbourhood areas, and also successfully drew up the “*Basic Plan on Ocean Policy for ISHIGAKI Island*” in collaboration with local governmental office and communities.

Another topic is a survey on actual situation of the coastal use in ISHIGAKI Island. In spite of the fact that there are various types of coastal uses (e.g. fishery use, recreational use, conservational use etc.), there have been no huge conflicts among coastal activities, and a harmonized coastal use has been formed in the area. And this fact has significantly contributed to the regional development as well. This study has clarified above situation and indicated challenges that the area faces towards further development.

3. Educational activities etc.

We have been holding a variety of environmental education classes aiming to improve the perceptions of local residents on natural environment, eventually aiming to improve the human-nature interactions in the area. We are not only aiming to hold the classes, but also aiming to grasp the perception changes of local residents on regional resource conservation and the usage. “Underwater robot class”, “Mangrove class”, “Underwater heritage class” are the environmental classes we have held for the time being.

In addition, we also hold town meetings with local residents in annual basis with various topics such as “The ways of ocean use in ISHIGAKI Island” in 2012, “A new appeal point of ISHIGAKI Island-Underwater robot and heritage” in 2013, “The future of YAEYAMA from environmental education” in 2014.

4. Selected Contributions

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- R.Ono, “Under water cultural heritages in Okinawa and future concept for underwater site museums”, *Ocean Newsletter* 333: 4-5, 2014. (in Japanese)
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● MIKAWA Bay Area

1. Natural scientific research

The purpose of the scientific investigation is to understand biogeochemical cycles and ecosystem structure in MIKAWA Bay area. We are doing research on marine environment and biological resources including water, ocean bed sediments, benthos, seaweeds, bivalve species, and zooplanktons. We collected water samples at 20 sites, ocean bed sediments at 20 sites, 25 species of benthic animal samples, and three species of seaweed samples. Water and sediment samples were analyzed by stable strontium isotope analysis. The map as to the distribution of the strontium isotope shows the characteristics of watershed about each Toyo River and Yahagi River which are the largest river in observation area. Thirteen bivalve samples from 7 sites were collected to investigate the genetic variability and population structure of the bivalve species in MIKAWA Bay. Among these samples, universal primers (LCO1490 and HCO2198) amplified the CO1 gene (mtDNA) of 8 bivalve species (*Dosinia japonica*, *Moerella rutila*, *Mactra chinensis*, *Ruditapes philippinarum*, *Scapharca subcrenata*, *Solen strictus*, *Mactra veneriformis*). We will investigate the genetic variation of these species based on the DNA analysis. We also study seasonal variations of the zooplankton community in MIKAWA Bay to discuss environmental factors to maintain species diversity and interspecific relationships. We have made a database of those marine species and are updating it in regular bases.

2. Social scientific research

On one hand, we focus on the traditional fire festival and seaweed use in MIKAWA area. The purpose of the survey on fire festival is to understand the socio-spatial structure and the historical transformation of the local communities. In the survey on the seaweed use, we are trying to clarify the social role of the seaweed use in the community from the viewpoint of minor subsistence.

On the other hand, we focused on ocean education activities, clarified the functions and functional requirements of Fisheries Cooperative Association (FCA), as well as its social significances in ocean education through a case study of HIGASHIHAZU FCA in MIKAWA area. In the long history of Japanese fishery, the FCA has played an important role not only in fisheries industry, but also in supporting overall fishing communities.

3. Educational activities etc.

We have conducted a training class to study natural observation at the tidal land as our university lecture in Mikawa bay area. We have been holding a series of “Natural Observation Meeting” in collaboration with local residents (HIGASHIHAZU FCA and local governmental office etc.) in MIKAWA bay area as well. And also continue to hold town seminars in annual basis with various topics, such as “The power of the nature and the treasure of the CHIYIKI (local area)” in 2012, “The people and the ocean of HAZU” in 2013, “Activity Report in Mikawa bay” in 2014.

4. Selected Contributions

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