Chair Marine Biological Resources

2.4.11 Laboratory : Fisheries and Environmental Oceanography

Member :	Professor	Fujiwara, Tateki, Dr. Agric. Sci.
	Associate Professor	Kasai, Akihide, Dr. Agric. Sci.
	Assistant Professor	Kobayashi, Shiho, Dr. Agric. Sci.
	Master's Program	6
	Undergraduate	5
	Other	1

A. Research Activities (2010.4-2011.3)

A-1. Main Subjects

a) Analysis of the mechanism maintaining high productivity of coastal seas

Coastal seas are highly productive areas. To reveal mechanisms maintaining this high productivity and to find effective measures to sustain this productivity, we are studying nutrient dynamics in coastal areas. In recent years, shortage of nutrients has become prominent and economically damaged to the aquaculture of seaweed. We are trying to quantify the amount of nutrient input both from outer sea and rivers, elucidate nutrient dynamics in coastal seas, and develop a three-dimensional numerical model consisting of hydrographical and biological parts. Using this model, we aim to determine the adequate anthropogenic load which sustains both abundant biological production and preferable water quality. This year, study on dynamics of carbon, as well as those of nitrogen and phosphorous, has been developed.

b) Study on eutrophication and hypoxia in semi-enclosed coastal seas

Excess amount of loads of anthropogenic nitrogen and phosphorus flowing into Ise Bay, Tokyo Bay and Seto Inland Sea causes eutrophication and hypoxia in these seas. Basin-scale mechanisms generating hypoxic water mass have been studied. This year, we have studied on hypoxia in harbors which are important as water amenity zone.

c) Analysis of long term variability in coastal water qualities

To restore water qualities in semi-enclosed coastal seas (Ise Bay, Tokyo Bay and Seto Inland Sea), reduction of anthropogenic loads of organic matter (COD), phosphorus and nitrogen have been conducted for more than 30 years. Owing to these measures, near-shore water quality has been significantly improved. However, water qualities in basin-wide scale (WQBS) are still deteriorated. We gathered data of water qualities, hydrographic parameters and meteorological parameters over 20 ~ 30 years to make data-base. It was revealed that WQBS is not correlated with the amount of pollutant

d) Modeling physical-biological interaction in coastal waters

The needs to understand the integrated physical-biological functioning of marine ecosystem are increasing in response to the concern about the depletion of living marine resources both in local and global scales. In coastal regions, horizontal flow systems such as density-driven circulations largely control water mass structure and hence biological productivity. Nutrient dynamics in the Seto Inland Sea in a large scale have been investigated, focusing on the mechanism of the variation of density-driven circulation and its impact. 30-year variation of nutrient transport has been simulated using coupled physical-biological and the model applied to predict the productivity of seaweeds.

e) Studies on ecosystem in estuaries

Estuaries connect rivers and ocean, and support water quality and high productivity in the sea. We try to clarify the ecosystem in estuaries such as Yura River and Yodo River estuaries. Understanding of movements and feeding habit of seabass and role of shijimi clam on water qualification has been progressed.

A-2.Publications and presentations

a) Publications

Original Papers(including book-reviews)

- Fujiwara, T.:
Hypoxia and anoxia in semi-enclosed coastal seas, Bulletin of Coastal Oceanography, 48; 3-16，2010

- Mazda Y., T. Imai, Y. Ajioka and T. Fujiwara:
Long-term change in hypoxia in an enclosed bay, Lake Hamana. Bulletin of Coastal Oceanography, 48; 45-56, 2010

- Kawasaki, K., K. Toda, T. Fujiwara, N. Yoshioka:
Long-term Simulation of Hypoxia Behavior in Ise Bay Using Ocean Estimation System Data, Bulletin of Coastal Oceanography, 48; 57-64, 2010

- Fujii, T., Y. Komai, T. Fujiwara and T. Yokoi:
Generation Mechanism and Movement of Hypoxia in Strongly Enclosed Waters of Ports and Harbors. Journal of Japan Society of Civil Engineers, Ser. B2 (Coastal Engineering), vol.66, No.1; 1046-1050, 2010

- Kawasaki, K., K. Toda, T. Fujiwara and N. Yoshioka:
Numerical analysis of formation mechanism of intermittent subsurface-layer hypoxia in summer in Ise bay. Journal of Japan Society of Civil Engineers, Ser. B2 (Coastal Engineering), vol.66, No.1; 1056-1060, 2010

- Kawasaki, K., K. Toda, T. Fujiwara and N. Yoshioka:
Utility of ocean variational estimation system data in enclosed bay. Annual Journal of Civil Engineering in the Ocean, JSCE, 26; 777-782, 2010

- Kobayashi, S., T. Fujiwara, H. Zenitani, Nagamoto, K., Futamura, A.:
Gravitational circulation and its response to the variation in river discharge in the Seto Inland Sea, Japan. Journal of Geophysical Research, 115: C03009; doi:10.1029/2007JC004503, 2010

- Taguchi, F., T. Fujiwara:
Carbon dioxide stored and acidified low oxygen bottom waters in coastal sea, Japan. Estuarine, Coastal and Shelf Science, 86; 429-433, 2010

- Kasai, A., Y. Kurikawa, M. Ueno, D. Robert and Y. Yamashita:
Salt-wedge intrusion of seawater and its implication for phytoplankton dynamics in the Yura Estuary, Japan. Estuarine, Coastal and Shelf Science, 86; 408-414, 2010

- Sugimoto, R., A. Kasai, T. Miyajima, and K. Fujita:
Modeling phytoplankton production in Ise Bay, Japan: Use of nitrogen isotopes to identify dissolved inorganic nitrogen sources. Estuarine, Coastal and Shelf Science, 86; 450-466, 2010

- Shoji, J., T. Kudoh, H. Takatsuji, O. Kawaguchi and A. Kasai:
Distribution of moon jellyfish Aurelia aurita in relation to summer hypoxia in Hiroshima Bay, Seto Inland Sea. Estuarine, Coastal and Shelf Science, 86; 485-490, 2010

- Antonio, E.S., A. Kasai, M. Ueno, Y. Ishihi, H. Yokoyama and Y. Yamashita:
Spatial variation in organic matter utilization by benthic communities from Yura River-Estuary to offshore of Tango Sea, Japan. Estuarine, Coastal and Shelf Science, 86; 107-117, 2010

- Antonio, E.S., A. Kasai, M. Ueno, Y. Kurikawa, K. Tsuchiya, H. Toyohara, Y. Ishihi, H. Yokoyama and Y. Yamashita:
Consumption of terrestrial organic matter by estuarine molluscs determined by analysis of their stable isotopes and cellulase activity. Estuarine, Coastal and Shelf Science, 86; 401-407, 2010

- Fuji, T., A. Kasai, K.W. Suzuki, M. Ueno and Y. Yamashita:
Freshwater migration and feeding habits of juvenile temperate seabass, Lateolabrax japonicus, in the stratified Yura River estuary, the Sea of Japan. Fisheries Science, 76; 643-652, 2010

Reviews

- Kasai, A.:
Do clams defecate water? -Analisys of food source of bivalves using stable isotope-. Radioisotopes, 41; 11-15, 2010

Reports,others

- Fujiwara, T. and T. Yanagi: Asummary of the symposium on "Hypoxic waterin coastal seas". Bulletin of Coastal Oceanography, 48; 1, 2010

- Fujiwara, T., and Y. Watanabe: Oligotrophication in the Seto Inland Sea. Nippon Suisan Gakkaishi, 77; 110, 2011

- Fujiwara, T.: Nutrient and production in the Seto Inland Sea. Nippon Suisan Gakkaishi, 77; 111, 2011

- Fujiwara, T.: Oceanographic condition, nutrient and production in the Harima sound. Scientific Forum of the Seto Inland Sea, 59; 4-9, 2010

- Fuji, T., A. Kasai, K. Suzuki, M. Ueno and Y. Yamashita: Early life of the temperate seabass Lateolabrax japonicus in the stratified Yura River estuary, Japan. Proceedings of Techno-Ocean 2010, CD-ROM, \common\gs\pdf\16-3 \001.pdf, 2010

- Emily Antonio, Akihide Kasai, Masahiro Ueno and Yoh Yamashita: Land-sea connection: Key for management of estuary-marine systems. Book of abstracts of ECSA 47 Symposium, 53-54, 2010

- Taiki Fuji, Akihide Kasai, Masahiro Ueno and Yoh Yamashita: Migration and growth pattern of the temperate seabass Lateorabrax japonicus in the Yura River estuary revealed by d13C. Proceedings of International symposium on isotope ecology 2010 in Kyoto, 40, 2010

- Hiroshi Morioka, Akihide Kasai and Shingo Kimura: Spatial variability of food environment for bivalves in a narrow strait using stable isotope analysis. Proceedings of International symposium on isotope ecology 2010 in Kyoto, 35, 2010

b) Conference and seminar papers presented

- 2010 Spring meeting of the Oceanographic Soc. Japan: 1 presentation

- Mini smposium of the Japan. Soc. Fish. Sci.: 1 presentation

- 2010 Autumn meeting of the Oceanographic Soc. Japan: 2 presentation

- 66th Coastal Engineerig Conference: 1 presentation

- 2010 Spring meeting of the Japan. Soc. Fish. Sci.: 2 presentations

- 2010 Annual meeting of the Japan. Soc. Fish. Oceanogr.: 2 presentations

- 2010 Autumn meeting of Kinki Branch of the Fisheries Soc. Japan: 3 presentations

- 41st meetinf of the Japan radioisotope Soc.: 1 presentation

- 2010 Seto Inland Sea Forum 1 presentation

- ECSA (The Estuarine & Coastal Sciences Association) 47 symposium: 1presentation

- Symposium on Connection of forest-land-marine system 1 presentation

- Techno-Ocean 2010: 2presentations

- International symposium on isotope ecology 2010 in Kyoto: 2 presentations

- 5th Symposium of ecology in Iwaki River: 1 presentation

- Forum on Ariake Bay 1 presentation

A-3.Off-campus activities 1

Membership in academic societies

- Fujiwara, Tateki : The Oceanographic Society of Japan (Councilor), Coastal Oceanography Division of the Oceanographic Society of Japan (Committeeman), The Marine Meteorological Society (Director, Editor), The Japanese Society of Fisheries Oceanography (Committeeman)

- Kasai, Akihide : Coastal Oceanography Division of the Oceanographic Society of Japan (Editor, Committeeman), The Japanese Society of Fisheries Oceanography (Councilor), The Japanese Society of Fisheries Science (Councilor of Kinki Branch)

A-3.Off-campus activities 2

Research grants

1. Grants-in-aid for Scientific Research(KAKENHI)

- Scientific Research (B) : Kasai Akihide : Quantitative assessment of estuaries for nurseries of important fisheries resources

- Scientific Research (B) : Kasai Akihide : Molecular biochemistry on ecological functions of meiobenthos in coastal marsh

- Scientific Research (A) : Kasai Akihide : Renovation of envrionment in semi-enclosed hypoxic sea

2.Other Research Grants

- Research and development projects for application in promoting new policy of Agriculture Forestry and Fisheries : Kasai Akihide : Increase and management of biomass of freshwater clam in estuaries

A-4.International cooperations and overseas activities 1

International meetings(country,roles)

- Kasai Akihide : ECSA (The Estuarine & Coastal Sciences Association) 47th symposium (Portugal, Oral presentation), Techno-Ocean 2010 (Japan, Oral presentation), International symposium on isotope ecology 2010 (Japan, Poster presentation)

International joint research, overseas research surveys

- Cooperative research on the physics and high production in Menai Strait, Kasai Akihide, University of Wales (UK)

B.Educational Activities (2010.4-2011.3)

B-1.On-campus teaching

a) Courses given

- Undergraduate level : Marine Environment (Fujiwara), Marine Ecosystem (Kasai), Practical Course in Marine Bioscience and Technology (Fujiwara, Kasai), Laboratory Course in Bioresource Science (Kasai, Kobayashi), Outline of Bioresource Science (Fujiwara), Seminar in Marine Bioresources Science (Fujiwara, Kasai, Kobayashi)
- Graduate level : Seminar in Fisheries Physics (Fujiwara, Kasai), Laboratory Course in Fisheries Physics (Fujiwara, Kasai), Marine Ecosystem Dynamics (Kasai)

B-2.Off-campus teaching etc.

Part-time lecturer

- Kasai, A.: Faculty of Agriculture, Kinki University (Statistics)

- Kasai, A.: Faculty of applied biological science, Hiroshima University (Biosphere environment)

B-3.Overseas teaching 1

International students

- International students : Master 1 (China) Research Students 1 (Brazil)

C.Other Remarks

- Fujiwara, Tateki : Maritime Safety Agency (Researcher), Disaster Prevention Research Institute (Researcher), International EMECS Center (Science and Policy Commissioner)

- Kasai, Akihide : Center for science and technology trends (Researcher), Environmental function in rivers and coastal areas (Researcher), Environmental assessment of Ohmura Bay (Researcher)

Special notes：

Award of best paper in 2010 of Soc. Fish. Oceanogr. (Kasai, A.)