



Message

from DIWPA Chair

Shin-ichi Nakano

International Cooperation Team members of National Institute of Ecology (NIE), South Korea, visited CER to establish “CER-NIE Joint Research Lab” at CER from 17 to 19 May 2019 (**Fig. 1**). We have held some symposiums and sessions since concluding the Memorandum of Understanding for Academic and Research Cooperation for our new partnership in December 2016. South Korea and Japan are close in terms of geographical distance, climate, history and culture. Ecologists in those two countries have been going hand-in-hand in hope of the development of sciences. We will collaborate to recognize the importance of academic and research development as well as to enhance

mutual understanding and establishing long-term cooperation between the two institutions for ecology and biodiversity in Asia (**Fig. 2**).

As I have previously reported in DIWPA News Letter No. 40, International Field Biology Course (IFBC) in 2019 would be held in Indonesia this summer (**Fig. 3**). IFBC 2019 is a one-day workshop for basic methods in stream ecology. We are going to visit to the upstream of Citarum River which has a pristine ecosystem, and to conduct measurement of some physical variables, collection of biological samples, identification of biological organisms and so on. In addition, the participants of IFBC will receive a certificate. If you are interested in it, please visit the website: <https://www.troplimno2019.or.id/2019/05/11/ifbc-workshop/>.



Fig. 1. The tape-cut ceremony for CER-NIE Joint Research Lab.



Fig. 2. NIE colleagues visited the research vessel “Hasu” in Lake Biwa.



Fig. 3. The flyer of 2019 International Field Biology Course (IFBC)



Message from the Secretary General

Atsushi Ishida

Center for Ecological Research (CER) in Kyoto University organized a symposium related to Macro Ecology and Ecology on 21 and 22 February 2019 at Kyoto University. For this symposium, DIWPA invited a researcher, Dr. Chu The Cuong, in Vietnam Academy of Science and Technology (**Figs. 1 and 2**). He is a specialist of unmanned aerial vehicles (UAVs) technology for coastal and marine ecology. He introduces the symposium and his activity on page 3 in this newsletter. This symposium had 158 Japanese and 65 foreigner participants over 20 countries. Because many researchers with broad areas in macro biology and ecology participated the symposium, we could share many newly information and had very exciting

time with great success. DIWPA will be able to hold this symposium in November 2019 again. We will invite a few researchers for the next symposium. If you, your friends or your students are

interested in the symposium, please inform them to see the back of this newsletter. We are looking forward to your application.

For DIWPA Newsletter, we always invite your papers related to the urgent topics of biodiversity, ecosystem services, sustainable society, and its translational research. We hope that the DIWPA activity as the platform of biodiversity and its conservation increases further.



Fig. 2. Dr. Chu The Cuong from Vietnam



Fig. 1. "Symposium of Integrative Biology 2019: Biodiversity in Asia" at Kyoto University

Symposium of Integrative Biology 2019: Biodiversity in Asia

Chu The Cuong

Institute of Marine Environment and Resources, Vietnam Academy of Science and Technology (Vietnam)

In recent years, the UAVs (Unmanned Aerial Vehicle) offers an effective and inexpensive tool to acquire aerial imagery, giving a potential quick and cost-effective method to monitor of ecological processes and become a trend in many countries. This technology has been applied to assess the landscape, environment and ecological researches such as: assessing changes in biodiversity, studying wildlife behaviors in the field, mapping river ecosystem and evaluating ecosystems. However, in the developing countries like Vietnam, the research on this application is still limited.

Fortunately, I have been selected to attend the "Symposium of Integrative Biology 2019: Biodiversity in Asia" and the valuable workshop: "The application of drone mapping techniques to the environmental science", which held on February 21-22, 2019 at Kyoto University, Japan, with the financial support from the International Network for DIVERSISAS in Western Pacific and Asia (DIWPA). This was a great opportunity for myself to learn the UAV's techniques and presented the initiative result of our research. Now, I also introduce my study in DIWPA News Letter No. 41.

Although my background is sea

turtle biology, the original intention was using the unmanned aerial vehicles (UAVs) to study sea turtles, through practical surveys I have learnt that this tool can be also applied in study of coastal ecosystems, especially in remote areas and very suitable for developing countries like Vietnam. My study named: **"Unmanned aerial vehicles (UAVs) for surveying marine ecosystems in Vietnam: a case of seagrass beds in Phu Quoc island and My Tuong area"**. By using a lightweight UAV (DJI Mavic Pro Platinum) equipped with a consumer-grade RGB digital camera (Sensor 1/2.3" (CMOS), Effective pixels: 12.35 M, Lens FOV 78.8° 26 mm, f/2.2, Distortion < 1.5%, Focus from 0.5 m to ∞, Electronic Shutter Speed 8s - 1/8000 s, Image size 4000×3000 pxl) and Drone Deploy application to take photos at 75m attitude. The high spatial resolution (3 cm pixel⁻¹) orthomosaic maps of the seagrass meadows in Phu Quoc island (Kien Giang province) and My Tuong (Ninh Thuan province) have been produced by using Drone Deploy solution: upload images to their website and got results after 4 hours. Export the result includes: 2D orthophoto mosaic as GeoTIFF file (and/or JPEG) (WGS84/UTMzone 48N), Google KML file and TFW file, each map

cover 30 to 90 ha, resolutions 3 cm/pix (Figs. 1 and 2).

Image processing and classification procedures: We used the software eCognition Developer 9 for Object-based image analysis (OBIA) to discriminate cover classes (Fig. 3). Rule sets were developed based on the segmentation process of images into homogenous segments (multiresolution segmentation algorithm followed by a spectral difference segmentation algorithm). The subsequent object-based classification (nearest neighbor algorithm) was realized by selecting thresholds of class specific image features (mean RGB values, mean brightness, standard deviation RGB, position, and shape). These thresholds of these features were automatic registered by selecting manually class specific samples via an on-screen interpretation (40 training

areas for each class, basing on field surveys). Only 5 classes have been used in this study: seagrass <50%, seagrass > 50% living coverage percentage, sand, rocks and corals and constructions.

Our results, with assistance from field survey data, it was very difficult to classify species seagrass by aerial images (short seagrass leaves type *Cymodocea serrulata*, *Thalassia hemprichii* and long seagrass leaves type *Enhalus acoroides*). However, these imageries could be useful to identify area, distribution and coverage of seagrass meadows in the shallow zone (depth less than 2.5 m) and clear water. In Phu Quoc island, 6 species of seagrass: *Enhalus acoroides*, *Halodule uninervis*, *Halodule pinifolia*, *Cymodocea serrulata*, *Cymodocea rotundata*, *Thalassia hemprichii*, *Cymodocea rotundata*, *Thalassia hemprichii* and *Enhalus*

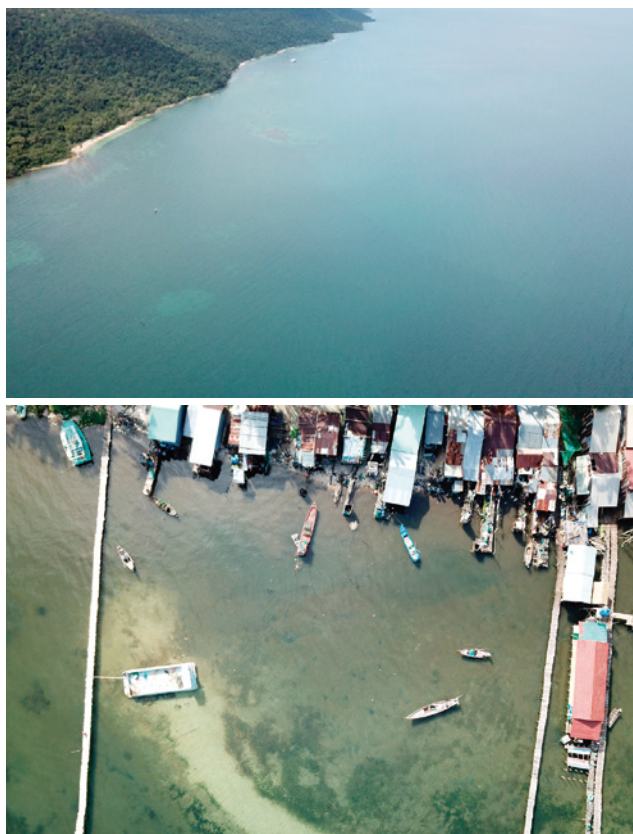


Fig. 1. Seagrass meadow in Phu Quoc

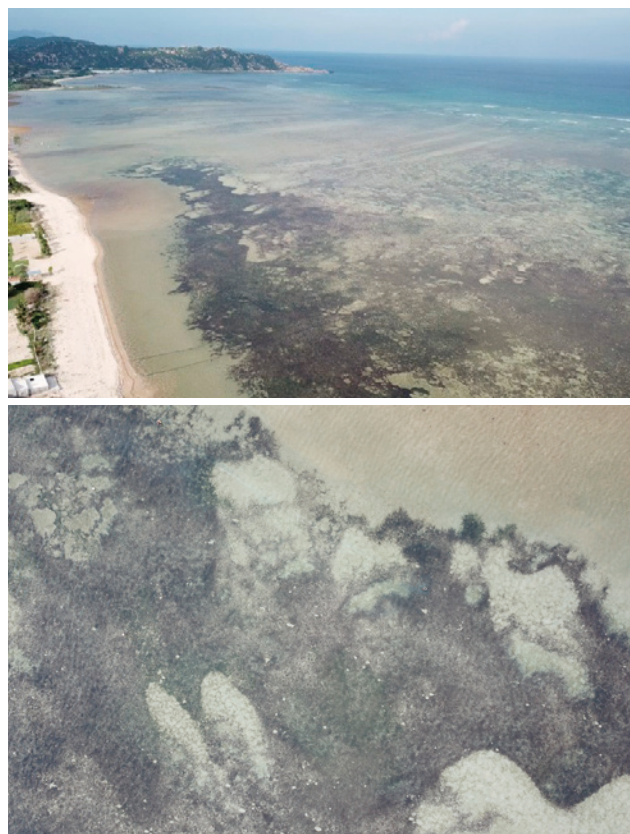


Fig. 2. Seagrass meadow in My Tuong

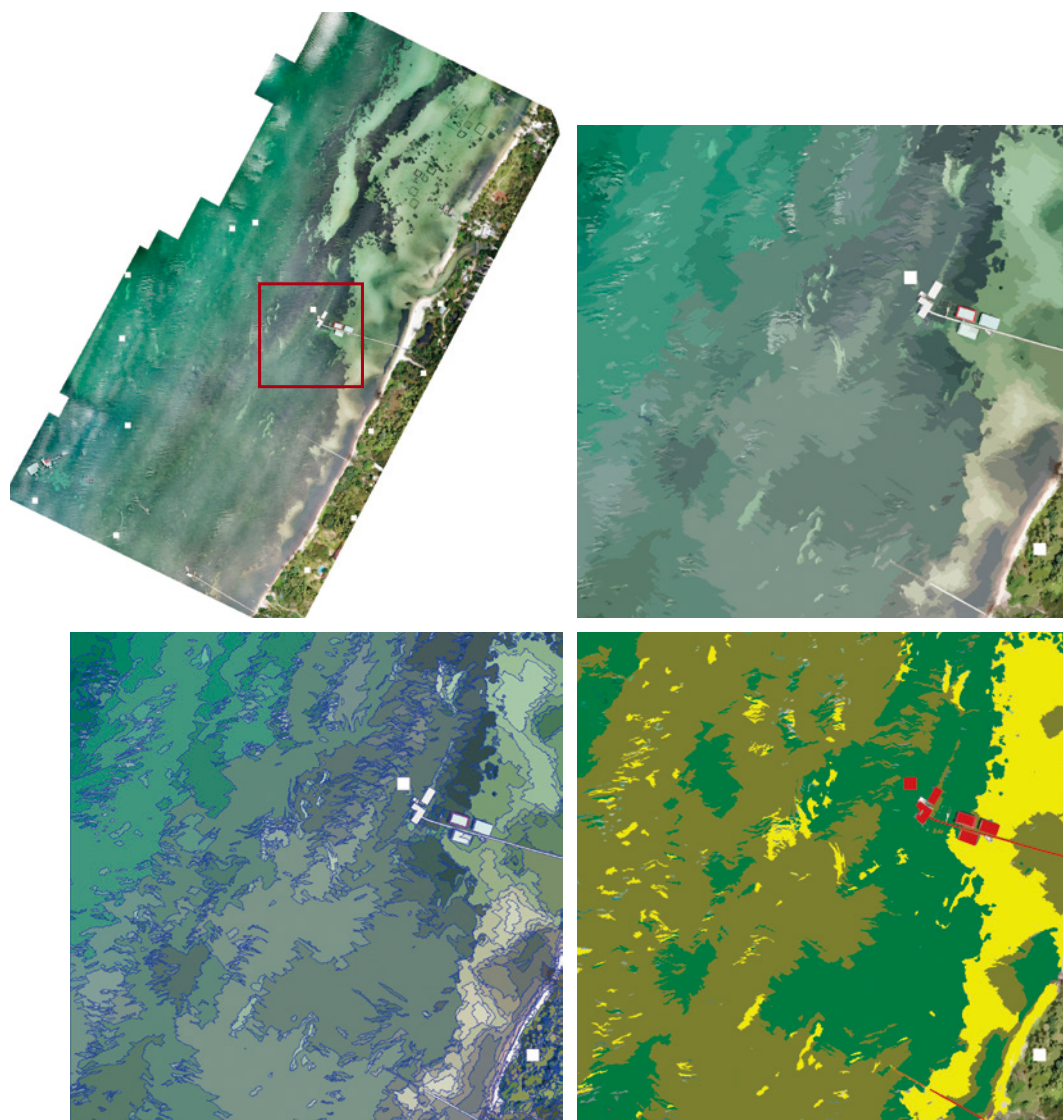


Fig. 3. An example of Object-based image analysis process

acoroides have been found, with total area is 952 ha and living coverage percentage 5-50%: 343.1ha (36%), > 51%: 444.3 ha (47%) and sand 164 ha (17%). In My Tuong area, 5 species: *Enhalus acoroides*, *Thalassia hemprichii*, *Cymodocea rotundata*, *Halodule uninervis*, *H. Pinifolia*, total area is 326 ha and living coverage percentage: 5-50%: 163 ha (45%), > 51%: 82 ha (25%), sand: 108 ha (30%).

Even though successful applied the UAVs to monitor seagrass meadows, but this tool needs to be developed, such as using multispectral, hyperspectral cameras,

longer battery life, can fly in the stronger wind or bad weather.



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The Yahagi River and Toyota Yahagi River Institute

Toko Suzuki and Toshiya Yamamoto

Toyota Yahagi River Institute (Japan)

The Yahagi River is one of Japan's class A rivers that flows from Mt. Ohkawa-iriyama (1,908 m above sea level) in Nagano Prefecture and through three prefectures (Nagano, Gifu and Aichi) in central Japan before flowing into Mikawa Bay. The length of the main stream is 118 km (the 39th longest class A river out of 109 domestic class A rivers) and the drainage area is 1830 km² (the 35th biggest area) (**Fig. 1**).

A rich natural environment surrounds the basin area and various living creatures, including natural “ayu” (sweet fish) inhabit. However several problems have arisen due to the fact that the river water is highly utilized by the seven dams located in the main stream between 34 km to 80 km from the mouth of the river.

The Toyota Yahagi River Institute was founded in 1994 as a third-sector entity comprising of the Yahagi River Fishermen's Cooperative, Shidare Irrigation Creek Land District (now re-named as Toyota land Improvement District) and Toyota city, under the slogan of “one research institute for each river”. In 2003, the institute was incorporated into the administrative organization of Toyota City.

The three major activities of the institute are:

- 1) Biological and humanistic research of the drainage basin
- 2) Disclosure of research results and Information of the basin.
- 3) Providing support and collaborating with various organizations involved in the conservation of the basin's environment.

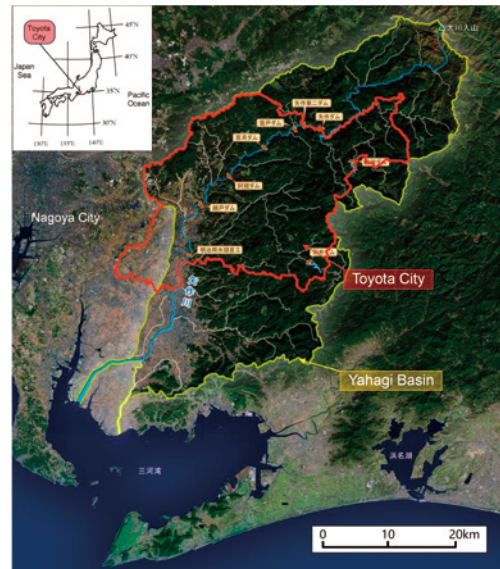


Fig. 1. The Yahagi River

Through these three activities, we aim to restore clean and abundant water to the Yahagi River resulting in supporting high biodiversity of the region, and to enrich people's life.

“Ayu”: the key fish and restoration study of the habitat

“Ayu” is an amphidromous fish with a 1-year lifespan. It is one of the most abundant fish in summer and possesses two unique ecological characteristics : first, it is an herbivorous species feeding on epilithic algae during both young and adult stages; second, it has a feeding territory with an area of approximately 1 m². The territory is usually established in lotic part of rivers with cobbles.

The Yahagi River is locally famous for “ayu” angling, however the catch has declined remarkably in the past 30 years. Although the number of ayu fishes that migrate upstream in

recent years has been stable, the annual catches remain stagnant. We are conducting our research to resolve this issue.

The flow of the river is heavily regulated by dams. The riverbed in the middle reach is stable and severely armored due to decreases in the sediment flow. On an armored riffle, moss becomes dominant in some areas. In 2017, we have started the riverbed-restoring-experiment by placing new and algae-free cobbles under the hypothesis that ayu fishes avoid the armored river bottoms and prefer the newly placed cobbles where relatively fresh epilithic algae, main food organisms of ayu fishes, are available (**Fig. 2**). The experiments showed that ayu fishes prefer to feed on the newly-placed-cobbles and tend to make the feeding territory there. However the trends are likely to be temporal and we are monitoring the persistence continuously.



Fig. 2. The study site of riverbed restoration

Riparian environment improvement by the collaboration with local inhabitants

The pitch differences between bottom of a river and river bank have increased by a decrease in river flow quantity with the increase of water use in the Yahagi River. In addition, the use of plants at riverside had decreased with a change of lifestyle in the rapid economic growth period, 1960s. Consequently, bamboo forests that had planted for the revetment have densely spread

and various livings in the forests decreased drastically.

The environmental manipulation by the river administrator alone is not enough. 18 "riverfront conservation and management groups" formed by local inhabitants have fallen the bamboos, mowed the grasses and picked up garbage voluntarily at the riverside. Their activities have dramatically improved the riparian landscape and the familiar to water (**Fig. 3**). However there are some issues such as aging of group members or shortage of successors, and decline in the habitat quality by excessive mowing of grasses. How do we continue and develop the environment conservation by the collaboration with local inhabitants to solve these issues? We have investigated biotic resources and supported to make more pleasure activities using them effectively. As an example, we have investigated grassland management technique to increase the plant population and flowering for the honey and pollen source and supported apicultures of the Japanese bee at the activity place. In addition, we offer the information of the natural characteristics and resources at the activity place to the groups and support the members to draw the goal image in the future including the manner of resource utilization.



Fig. 3. The landscape before and after the environmental manipulation

DIWPA scholarship for “Symposium of Integrative Biology II : World Tour”

DIWPA invites applications for a scholarship to attend “Symposium of Integrative Biology II: World Tour” which will be held on November 11-12, 2019 at Kyoto University, Japan. Kyoto University is proud of its diverse and large pool of ecologists and environmental scientists. Some studies behavior of mammals, others studies diversity of plants, and still others study ecological function of microbial organisms. Here we aim to integrate such biological knowledge to tackle further understanding of the nature, and share its efforts with diverse group of biologists around the world.

This year, we will also have an additional workshop on field science in Ashiu Forest Research Station, where pristine natural forest is preserved for research and education. One of the main functions of DIWPA is “capacity building of scientists in particular young scientists from developing countries”. We look forward to your applications.

DIVERSITAS in the Western Pacific and Asia (DIWPA) is an international network for the promotion of cooperative studies and information exchange on biodiversity in the Western Pacific and Asia. The term of “Western Pacific and Asia” is used in this proposal to intend to cover East Asia, South Asia, Southeast Asia, Melanesia, Micronesia, Australia and New Zealand. DIWPA aims to connect existing networks of people working on biodiversity and research projects in Asia and the Western Pacific. For more information, please visit our URL: <http://diwpa.ecology.kyoto-u.ac.jp/index.html>

Details (Please see <http://www.ecology.kyoto-u.ac.jp/hyakka-world/> for more detail information.)

1. **Date** : November 11-12, 2019

2. **Place** : Memorial Hall of Centennial Clock Tower, Kyoto University, Kyoto, Japan
Ashiu Forest Research Station, Kyoto University, Kyoto, Japan

3. **Application** :

Applicants should be a member of DIWPA at the time of application.

If you would like to join DIWPA, please contact to DIWPA@ecology.kyoto-u.ac.jp before August 20, 2019.

Applicants should prepare the following documents.

- 1) CV
- 2) A statement of their interests in the field of ecology (1 page)
- 3) A recommendation letter

4. **Application submission and deadline** :

Submit an application to DIWPA office by e-mail before **September 1, 2019**.

5. **Financial support** :

Kyoto University provides a scholarship to cover his/her expenses for accommodations and travel.

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And we always welcome your articles, news or any information related to biodiversity for DIWPA News Letter. Please send them to us.