

Report of 2020 External Evaluation -Evaluation and Recommendations-

<Contents>

1. Introduction
 2. Overall valuation
 3. Recommendations
 4. Concluding remarks
-

1. Introduction

This '2020 External Evaluation' to the Atmosphere and Ocean Research Institute (AORI), the University of Tokyo (UTokyo), was originally scheduled on March 5th and 6th, 2020. However, due to the COVID-19, all overseas travels were banned in most of the world, and the meeting had to be postponed. Since the COVID-19 pandemic still continues to the present, the meeting was newly set on March 3rd, 2021, as an on-line meeting, almost one-year later than the originally scheduled one.

During this one-year period, there were three major steps of the external evaluation. These are as follows.

1) The first: inquiries, evaluation and recommendations from the committee members based on the '(draft) Materials for External Evaluation, January 2020' version, and AORI's replies-and-responses were exchanged just before the originally scheduled meeting; 2) The second: the same process was repeated among the committee members and AORI people, based on the '(draft) Materials for External Evaluation, December 2020' version; 3) The third: the meeting by Japanese committee members, i.e., Hanawa, Satoh and Yoden, was held on December 21st, 2020, which was regarded as a preparatory meeting for the formal meeting.

This comprehensive evaluation and recommendations described below are those partly summarized based on the opinions exchange among committee members and AORI side made in above mentioned steps.

It seems that there are three ways on how to classify and align our committee's comments and recommendations: 1) Directly answer the 'Key Questions' asked by AORI to the committee; 2) Describe our recommendations along with the items and order of the 'Materials for External Evaluation'; 3) Discuss along with the items and order of the 'Future Plans' as presented by Director Kawamura in this meeting. Here we would like to adopt the third way, i.e., along with the items and order of the 'Future Plans', since it is very simple and clear for understanding.

2. Overall evaluation

First, we recognize that each of the AORI's faculty/staff members show high research performance both in quality and quantity, which is very impressive. We learned this from several indices shown in the 'Materials for External Evaluation', i.e., number of published papers, impact factors of the journals, and h-index for individual researchers, etc.

Second, we also understand that AORI's faculty/staff make enormous contributions to international research programs and academic organizations. That is, many of AORI's faculty/staff are involved in many international cooperative research programs and play active parts. Further, many faculty/staff are also involved in international organizations and take important positions. We are very impressed with the fact that many of AORI's faculty/staff take responsibilities in managements of international academic and research organizations.

Third, AORI as a Joint Usage/Research institute provides occasional usage of large cutting-edge research facilities to the research community. AORI also takes care of operations of two research vessels; R/V *Hakuho Maru* and R/V *Shinsei Maru*, and provides occasional research meetings at Kashiwa Campus and ICRC (International Coastal Research Center) at Otsuchi. A mid-term evaluation for Joint Usage/Research Institutes by MEXT (Ministry of Education, Culture, Sports, Science and Technology) was made in 2018, and AORI was awarded as highest rank of 'S'. From these facts, we can say that AORI can provide adequate opportunities to users as the Joint Usage /Research Institute.

Fourth, for education activities, AORI also provides a unique education program, 'Interdisciplinary Education Program on Ocean Science and Policy' as a potential member of the UTokyo Ocean Alliance for graduate students. This program is very good for AORI's students, who want to expand their horizon and communicate with students in other research fields.

As an overall evaluation, we would like to say that AORI is a world-class research institute, and secures appropriate researchers as a world-leading research center in atmosphere and ocean sciences.

3. Recommendations

(1) Direction of research

Recommendation 1.1: To formulate comprehensive strategic plan towards the 4th 'Mid-term Targets and Mid-term Plans' (period of 2022-2027)

Since the 4th 'Mid-term Target and Mid-term Plan' Period starts from 2022 fiscal year, it is the right time for AORI to undertake the process of formulating a future comprehensive strategic plan. This task is not a heavy load for AORI's faculty/staff, as the major part of the plan has been formulated in the process of preparation of the Self Evaluation Report, and because the 'Future Vision Working Group' has already been established and has worked. We

understand that, in the working group, young faculty/staff who are the main players in the next era, are very involved. The plan for the 4th 'Mid-term Targets and Mid-term Plans' should be announced to the public using a website and/or leaflets. The strategic plan should build on the Future Concept document and should identify key research questions which will inform the priorities for hiring staff and the purchase of equipment. It should also include consideration of hiring at least one more social scientist to increase the interdisciplinary nature of the faculty members.

Recommendation 1.2: To regularly check-and-review research fields covered and the corresponding organizational structure

This is part of Recommendation 1.1 made in the 2014 External Evaluation. We recommend that AORI regularly checks and reviews new research trends and evaluates AORI's research structure against these. Since the President of UTokyo is replaced every 6 years, and 'Mid-term Targets and Mid-term Plans' should be proposed every 6 years, the check-and-review process of the strategic plan should also be made once every 6-year period in harmony with this.

In AORI, the centerpiece center is CESSD (Center for Earth Surface System Dynamics). Since this center was established in 2010, its research direction and corresponding manpower, etc. should be reviewed at the same time.

(2)Joint Usage/Research

Recommendation 2.1: To strategically aim for replacements of cutting-edge facilities and research vessels

AORI has many cutting-edge facilities such as AMS and NANO-SIMS in ACES (Analytical Center of Environmental Study), among others, and also responsibility for replacement of its two research vessels. It goes without saying that their replacements need a huge amount of budget. In order to smoothly replace their facilities and research vessels, AORI should continuously appeal their need and importance to the Headquarters of UTokyo and MEXT.

Recommendation 2.2: To secure operation days of two research vessels

Initially, operation days of two research vessels, R/V *Hakuho Maru* and R/V *Shinsei Maru*, were set as 300 days each per year. However, at present, the operational days are reduced to less than 200 days each. Although we understand this is due to the soaring price of marine fuel, AORI should negotiate with JAMSTEC (Japan Agency for Marine Science and Technology) and MEXT to secure operation days of 300 days each per year. If they are not in operation, they are useless treasures (in Japanese, Takarano-Mochigusare).

(3)Educational activities

Recommendation 3.1: To recruit potential graduate school students utilizing various occasions

It goes without saying that recruiting enough excellent graduate school students, especially doctoral course students, is important for nurturing the next-generation researchers in atmospheric and oceanic sciences. We understand that since AORI has no direct connection with undergraduate student education in UTokyo, except for general education, recruiting of students, who are interested in atmosphere and ocean sciences is very difficult. In order to overcome this situation, AORI has already introduced various kinds of events and programs. It is recommended that AORI continue these activities. In addition, new events and programs should be explored. For example, to recruit excellent master course students, AORI should hold explanatory seminars about AORI, open to undergraduate students belonging to all universities in Japan, beyond UTokyo and universities in the metropolitan area.

Recommendation 3.2: To encourage students to take unique education program provided by UTokyo Ocean Alliance

'Interdisciplinary Education Program on Ocean Science and Policy' provided by the UTokyo Ocean Alliance is a very good program for AORI's students who want to expand their horizons and communicate with students in other research fields. Present AORI students who join this course represent only about 20% of all AORI students. The AORI should encourage students to join the education program, in order to foster researchers in atmosphere and ocean sciences who have sufficient knowledge of policy making and social sciences.

(4)International joint research

Recommendation 4.1: To further strengthen CIC (Center for International Collaboration) activities

The CIC is the center responsible for enhancement of AORI's activities in international research programs and academic organizations. At present, the CIC consists of three dedicated professors and 5 concurrent professors and associate professors. It goes without saying that to enhance the activities of the CIC requires more human resources. Although we understand that securing dedicated professors or associate professors is quite difficult, nevertheless, the CIC should seek a way to enhance staff resources, such as using project research professors or project research associate professors hired by research project money. It is also important to invite young scientists into the CIC, who are interested in or familiar with international affairs, in order to foster young scientists who will lead the AORI's international cooperation in the future.

Recommendation 4.2: To formulate AORI's contribution to 'UN-Decade of Ocean Science' and take a leadership in the Japanese contribution

We strongly believe that AORI should play a leading role in various future international programs related to atmosphere and ocean sciences, especially in UN-Decade of Ocean Science (UNDOS, 2021-2030), in order to achieve the goal of SDGs-14. In the Self Evaluation Report in 2020 for the External Evaluation in 2020, several research groups already declared their commitment to the UN-Decade for Ocean Science. The CIC should organize a comprehensive contribution of AORI, and should lead the coordination of Japanese activities which contribute to international UN-Decade for Ocean Science, as soon as possible. AORI should become a leading institute of Japanese UN-Decade of Ocean Science activities.

(5) Society-level returns from research outcomes

Recommendation 5.1: To enhance outreach activities using various kinds of tools at different levels

To disseminate the many wonderful science results achieved by AORI's staff, AORI should enhance outreach activities through various kinds of communication tools, i.e., lectures, science cafes, publications, SNS, and MOOC (Massive Online Open Course). The use of social media should also be considered.

Among others, MOOCs are becoming popular methods to transfer the state-of-the-art research and/or scientific basics of many academic field to the general public. The UTokyo already introduced MOOC lectures several years ago, and many MOOC lectures have already been released. These are available to anyone through the website or YouTube. The AORI should evaluate whether or not MOOCs are an effective way for advertisement of AORI's scientific achievements to the general public, or would be effective in recruiting graduate students.

Recommendation 5.2: To return to society from research outcomes of 'Tohoku Ecosystem-Associated Marine Sciences (TEAMS) Project'

The academic year of 2020 is the last year of the "Tohoku Ecosystem-Associated Marine Sciences (TEAMS) Project" financially supported by MEXT. Since AORI has deeply committed this project as one of three major research organizations, we highly recommend that AORI should deliver the research outcomes obtained and accumulated by the project, especially to people in the coastal disaster areas. These research results need to be translated to easily-understandable expressions for the general public. These dissemination activities should be a duty for AORI. The ICRC (International Coastal Research Center) should lead this project.

Recommendation 5.3: To build on its excellent outreach programme to develop

significant conversations with the wider community and use this information to identify key research priorities.

These outreach activities will support the wider community, policymakers and marine managers.

Recommendation 5.4: To build on their excellent outreach programme to develop opportunities for citizen science projects.

These will also increase community interest and support for research at AORI.

(6)Research environment and support system

Recommendation 6.1: To secure the space for Division of Climate System Research (DCSR)

This was also recommended by the previous 2014 External Evaluation Committee. We hope for AORI to secure the space for the Division of Climate System Research much closer to the main building of AORI, in order to enhance communication and interaction among groups. In the current severe budget situation, we understand it is very difficult to construct a new building for the Division of Climate System Research, whose building is now located on the opposite side of the campus. Nevertheless, AORI should continuously explore the solution of this matter.

Recommendation 6.2: To secure enough technical staff members

Under the condition of the continuous budget cut for hiring human resources in national universities, to secure enough technical and administrative staff is very difficult. However, in order to enhance usage of the cutting-edge facilities and to conduct high-level field observations on the research vessels, support by technical staff is essential and crucial. The AORI should pay attention to the future situation of technical staff, and should have strategic plans to secure enough technical staff, and to improve the skill and ability of individual technical staff members. The AORI should appeal more severely to the head quarters of UTokyo, that the technical staff plays a crucial role in AORI's activities as Joint Usage/Research Institute.

(7)Organization and administration

Recommendation 7.1: To improve gender balance and to hire additional international staff

At present, the number of female researchers is low, and it goes without saying that this situation has to be solved as soon as possible. In personnel matters, the Director's office

should commit to hiring more female faculty members. They should also develop mentoring programmes for female staff to provide support for their professional development.

The AORI should also consider hiring more international staff and faculty with degrees from outside UTokyo to increase staff diversity in the Institute.

Recommendation 7.2: To group present research units into larger/wider ones i.e., to break present three-layer structure in research group

The present AORI research organization has a so-called three-layer structure; that is, division, department and section. One division consists of 2 to 3 departments, and one department consists of 3 sections. In one section, in general, there are 3 faculty members: one professor, one associate professor and one research assistant. We are very concerned that since personnel funding is now gradually shrinking, this structure will not be maintained in the future. In addition, this structure may inhibit the free expansion of the research fields. We strongly recommend restructuring of the research units with more flexibility, and the abolishment of the sections.

Recommendation 7.3: To establish AORI alumni organization

Although this item was one pointed out in the previous 2014 External Evaluation, we would like to again point out the importance of establishment of an alumni organization in AORI, which is independent from those of the graduate schools. Although each student belongs to one of the graduate schools, they spend most their time at AORI. This means that for most graduate students, AORI would be the place they grow up, that is, their so-called 'old home'. In order to maintain a 'spirit of unity' and to improve networking among the alumni, the existence of an alumni organization is very important. It goes without saying that all people related to AORI, i.e., academic/research, technical and administrative staff should be involved in the alumni organization.

4. Concluding remarks

We recognize that AORI's staff have high potential in conducting research and administrative activities. As far as we heard, we can judge that the direction of future plans is surely the correct way to develop their research further, and to take a leadership in the atmospheric and oceanographic communities in Japan, and in the world.

It goes without saying that in future activities, the leadership of the Director and the Directors' office is crucial. In this evaluation process, we know that the present Director and members of Director's office deeply understand this point and want to realize it. We expect, in fact, that it will be so.

'Future Vision Committee' activities are now being undertaken and many young

researchers are involved. We believe that, in the future they will construct the next brilliant era of AORI.

Finally, we strongly hope that this present 2020 External Evaluation will be able to give some contribution to AORI's smooth-sailing progress in the future.