

# Newsletter

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International Centre for Water  
Hazard and Risk Management  
under the auspices of UNESCO



Public Works Research Institute  
National Research and  
Development Agency, Japan



# ICHARM

International Centre for Water Hazard and Risk Management  
under the auspices of UNESCO

## Message from Director

### Facilitator - an ace in the hole for water-related disaster risk reduction

Water-related hazard have been affecting our life more significantly under climate change, and the situation can be aggravated through human-related activities and issues. Water-related disasters have become more frequent and costly in both developed and developing countries, which suggests that reducing disaster risks is not merely a matter of science and technology, economic growth, and development. We have a better understanding of disaster risks and disaster management. Then, why is it that we cannot fully exploit advanced science and technology to stop disaster damage from increasing?



Speech at the 4th UN Special Thematic Session on Water and Disasters, ECOSOC Chamber, UNHQ, June 24th, 2019.  
第4回国連水と災害の特別会合での講演 (2019年6月24日、国連経済社会理事会会議室)

In November 2017, the Global Forum on Science and Technology for Disaster Resilience 2017 was held at the Science Council of Japan (SCJ) in Tokyo, Japan, in cooperation among national and international organizations in disaster risk reduction. Based on the Tokyo Statement 2017, adopted by the Forum, the SCJ has continued discussing strategies for overcoming the "last one-mile" challenge towards disaster risk reduction and proposed training up facilitators who can promote dialogue between society and science and technology and strengthen their functions, which include the capabilities of building a trust-based relationship at individual, community, local and national levels, clarifying problem structures, proposing possible solutions and effective governance, setting specific goals to achieve, and leading various stakeholders to consent. To realize this proposal, we should encourage sharing integrated scientific knowledge and lessons learnt by using a world-wide on-line synthesis system, which should be constructed in cooperation among national and international stakeholders.

Committed to these discussions as the chair of the SCJ committee, I have come to the realization that ICHARM is strongly requested to work as a facilitator as a whole. ICHARM is training facilitators by providing the master's and Ph.D. degree programs for young policymakers and practitioners of various countries. ICHARM is also working as a facilitator together with several domestic municipalities for making effective use of water-related disaster information and with several countries in Asia and Africa for promoting dialogue and sharing knowledge through managing multi-stakeholder platforms. ICHARM will strengthen the functions as a facilitator while seeking innovative, cutting-edge science and technology at the same time.

July 31, 2019  
Toshio Koike  
Director of ICHARM

### ファシリテータ ー水災害リスク軽減の切り札

気候変動の下で水災害ハザードが激化し、人間由来の活動とも相俟って、水災害は深刻な状況を呈しています。被害の増加は先進国、発展途上国両方にみられ、科学・技術や経済の成長、発展が必ずしも水災害リスクの軽減につながっていません。ハザードや災害に関する学術的理解が深まっているのに、その成果が十分に活用されずに、損失は増加し続けているのはなぜでしょうか。

2017年11月、防災・減災に関わる国内外機関の協力により、「災害レジリエンス構築のための科学・技術国際フォーラム2017」が日本学術会議にて開催され、「東京宣言2017」が採択されました。この宣言に沿って議論を重ねた結果、災害リスク軽減のためのラストワンマイルを乗り越えるための戦略として、社会と科学・技術を埋めるファシリテータを育て、その機能の強化が必要という結論に至りました。つまり、個人・自治会・地方自治体・国家のそれぞれのレベルに対して、信頼関係を構築して、問題の構造を明らかにし、解決方法やその組織体制を提案し、目標を提示するもので、これらを人々が納得できる説明をする機能の強化です。そのためには統合的な科学・技術の知見、成功事例などの経験知が不可欠で、国内外の利害関係者が相互に協力してオンラインで利用できる体制づくりが必要です。

委員長としてこの議論に加わらせて頂きながら、ICHARMにはファシリテータとしての役割が強く求められていることに気づきました。各国の若い政策決定者や実務者を対象とした修士・博士課程の教育はファシリテータを育てる活動であり、国内での市町村との水災害情報の効果的利用の協力や、アジア・アフリカ各国とのプラットフォームを通じた協働の推進は、ファシリテータとしての活動なのです。科学・技術の最先端を極めつつ、ファシリテータとしての機能の向上に尽力していく所存です。

**International Flood Initiative (IFI)**

3. Launch of a real-time flood forecasting system in the Pampanga River basin, Philippines / フィリピン・パンパンガ川流域を対象としたリアルタイム洪水予測システムの運用開始

**Research**

4. Activity of the SATREPS program "Regional Resilience Enhancement through Establishment of Area-BCM at Industry Complexes in Thailand" / タイにおける SATREPS 課題「産業集積地における Area-BCM の構築を通じた地域レジリエンスの強化」の活動
5. Conduct of general experience and questionnaire of "flood simulated experience application" developed by ICHARM / ICHARM が開発した「洪水疑似体験アプリ」の一般体験とアンケート
6. New research will start in the Philippines under the Science and Technology Research Partnership for Sustainable Development (SATREPS) program / 地球規模課題対応国際科学技術協力プログラム (SATREPS) でのフィリピン共和国を対象とした新規研究課題の採択
8. K. Abdulla Bava, Senior Research Scientist, Advanced Technology Institute, Japan, [My experience at ICHARM as a Visiting Foreign Researcher
9. Introduction of ICHARM research projects / 研究紹介
9. Daisuke Kuribayashi, Senior Researcher [Development of a disaster related information sharing system for municipalities (ICHARM Disaster Risk Information System: IDRIS) ] / 栗林大輔 主任研究員「市町村向け災害情報共有システムの開発 (ICHARM Disaster Risk Information System: IDRIS 仮)」
11. Masatoshi Denda, Senior Researcher [Importance of natural disturbance due to floods in river ecosystem conservation] / 傳田正利 主任研究員「河川生態系保全における洪水による自然攪乱の重要性」

**Training & Education**

12. Activity report on "Disaster Prevention Town Watching Exercise in Sakai Town" in JICA short-term training / JICA 短期研修での「境町タウンウォッチング」の実施報告
13. Field trips by M.Sc. students / 修士課程研修 現地見学
15. Mr. Leandro Galvanese Kuhlmann, Researcher B, CPRM - Serviço Geológico do Brasil, [Action Reports from ICHARM Graduates]

**Information Networking**

16. Presentation in the GEO Data Technology Workshop / GEO データ技術ワークショップにおける発表
17. Panel on Water and Disasters at the UNESCO International Water Conference / ユネスコ国際水会議における水と災害パネル
18. The 15th IAEA International Symposium on Isotope Hydrology in Vienna / 第 15 回 IAEA 国際同位体水文学シンポジウムがウィーンで開催
19. Kick-off meeting of the 9th World Water Forum / 第 9 回世界水フォーラム・キックオフ会合
19. Fourth UN Special Thematic Session on Water and Disasters / 第 4 回国連「水と災害」に関する特別テーマ会合
21. ICHARM held a technical session on "Water and Disasters - Toward Building Resilient Society under Climate Change -" at CECAR8 / 第 8 回アジア土木技術国際会議 (CECAR8) において ICHARM テクニカルセッション「水と災害—気候変動下での強靱な社会づくり—」を開催しました
22. UNESCO Pakistan Project / ユネスコパキスタンプロジェクト

**Field Survey**

23. The preparatory meeting of the Platform on Water Resilience and Disasters in Indonesia and field surveys in the Solo River / インドネシアにおける水のレジリエンスと災害プラットフォーム準備会議及びソロ川現地調査

**Others**

24. ICHARM Open Day 2019 held for local school students / ICHARM Open Day 2019 ～茨城県立竹園高等学校・茨城県立並木中等教育学校 ICHARM 訪問～
26. Comment from internship student / インターン生からのコメント
26. Personnel change announcement / 人事異動のお知らせ
27. Awards / 受賞リスト
27. Business trips / 海外出張リスト
28. Visitors / 訪問者リスト
29. Publications / 発表論文リスト

# International Flood Initiative (IFI)

The International Flood Initiative (IFI) is a worldwide framework to promote collaboration in flood management among international organizations such as UNESCO, the World Meteorological Organization (WMO), the United Nations University (UNU) and the United Nations International Strategy for Disaster Reduction (UNISDR). ICHARM has been its secretariat since the establishment of IFI.

In October 2016, the Jakarta Statement towards an interdisciplinary and transdisciplinary partnership to consolidate flood risk reduction and sustainable development, was adopted by the member organizations of IFI. As part of this effort, the Philippines, Sri Lanka, Pakistan and Myanmar have already decided to establish a Platform on Water Resilience and Disasters involving various government agencies, and ICHARM has been supporting their decision as facilitator.

This article reports Launch of a real-time flood forecasting system in the Pampanga River basin, Philippines

国際洪水イニシアティブ (International Flood Initiative: IFI) はユネスコ (UNESCO)、世界気象機関 (WMO)、国連大学 (UNU)、国連国際防災戦略 (UNISDR) などの国際機関が世界の洪水管理推進のために協力する枠組みで、ICHARM は、IFI の事務局を担当しています。

2016年10月に承認された「洪水リスク軽減と持続可能な開発を強固にするための学際的な協力に向けた宣言文 (ジャカルタ宣言)」を受け、各国および関係機関と協働しながら、統合洪水マネジメントに貢献する活動を進めています。特に、フィリピン・スリランカ・パキスタン・ミャンマーにおいては、各国の関係機関による「水のレジリエンスと災害に関するプラットフォーム」の構築に向けた取り組みが始まり、ICHARM はファシリテーターとしてその活動の促進を図ってきました。

本号では、フィリピン・パンパンガ川流域を対象としたリアルタイム洪水予測システムの運用の開始について報告します。

## Launch of a real-time flood forecasting system in the Pampanga River basin, Philippines フィリピン・パンパンガ川流域を対象としたリアルタイム洪水予測システムの運用開始

The Pampanga River in the Republic of the Philippines flows into the northern part of Manila Bay and has the second largest drainage area (10,430 km<sup>2</sup>) in Luzon Island. The Pampanga River basin has suffered serious damage from flood disasters due to typhoons, such as Ondoy in 2009 and Pedring in 2011, and monsoonal rainfall, and flood risk reduction and sustainable development are critical issues in the basin. Through research activities and support for the Platform on Water Resilience and Disasters, established in March 2017 by administrative and research organizations of the Philippines, ICHARM has been carrying out several tasks such as flood simulation, damage data collection, and risk assessment for local communities in this basin.

In February 2019, ICHARM developed a real-time flood forecasting system for the Pampanga River basin on the Data Integration and Analysis System (DIAS) in collaboration with the Earth Observation Data Integration and Fusion Research Initiative (EDITORIA), managed by the University of Tokyo, and started to provide flood forecasting information to related organizations in the Philippines. Using 17 ground rain gauges of the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), hourly rainfall data are collected and accumulated on DIAS in real time and automatically input into the Rainfall-Runoff-Inundation (RRI) model developed by ICHARM. The system visualizes calculated results, such as flood discharge, river water levels, and inundation areas and depths. As shown in Fig. 1, calculated inundation

### Flood Forecasting for Pampanga Basin in Philippines

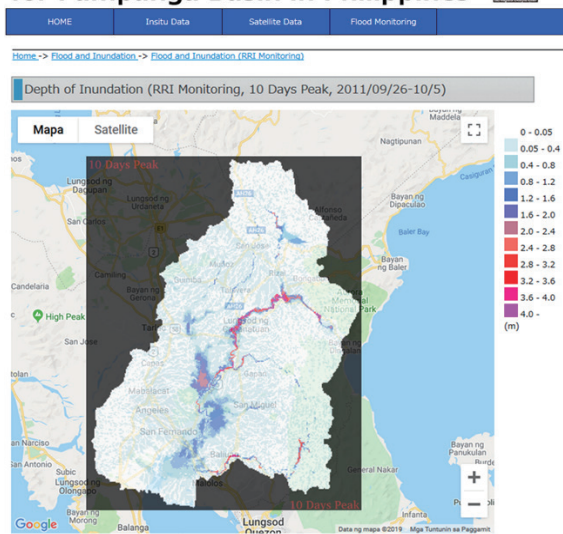


Fig. 1 An example of screen display on the real-time flood forecasting system. (Showing the flood by Typhoon Pedring in 2011)

図1 リアルタイム洪水予測システムの画面表示の例 (2011年台風ペドリンによる氾濫を表示)

フィリピン共和国にあるパンパンガ川はマニラ湾北部に流入する河川で、ルソン島で2番目に大きな流域面積 (10,430 km<sup>2</sup>) を持っています。ここでは、2009年のオンドイや2011年のペドリンといった台風の襲来や、雨季の降雨による深刻な洪水災害が頻発しており、被害の軽減と持続可能な発展が重要な課題となっています。ICHARM ではこれまでの研究や、フィリピンの行政機関および研究機関からなる「水のレジリエンスと災害のプラットフォーム (2017年3月発足)」の支援を通じて、パンパンガ川流域における洪水氾濫解析や被害データの収集、コミュニティの洪水リスク評価、といった活動を推進してきました。

2019年2月、ICHARM では東京大学地球観測データ統合連携研究機構 (EDITORIA) と協働し、データ統合・解析システム (DIAS) を用いたパンパンガ川流域のリアルタイム洪水予測システムを開発し、フィリピンの関係機関へ情報提供を開始しました。このシステムは、フィリピン大気地球物理天文局が流域に設置した17の地上雨量観測所のデータに基づくもので、取得された地上観測データは1時間ごとにデータ統合・解析システムにリアルタイムに蓄積され、ICHARM が開発した降雨流出氾濫モデルに自動入力されて氾濫解析が行われます。そして、算出された洪水流量や河川水位、流域の浸水域や浸水深を可視化しています。このうち、浸水深と浸水域は図1に示すように地図上に表現されます。また、日本の気象庁が提供するひまわり8号の雲の分布も動画で閲覧できるようになっています。このように、データ統合・解析システムにおいて、降雨を引き起こす雲の

様子や雨量などの関係データの収集、氾濫解析、画面での表示を自動、かつリアルタイムで行えるのが本システムの特徴です。

2019年2月にマニラで開催された「水のレジリエンスと災害のプラットフォーム第3回会合」において、本システムの開発と情報提供を開始する旨、東京大学の安川雅紀特任助教が参加者に説明したところ、ぜひ活用したい、といった好意的な意見が寄せられました。本システムにより、実際に洪水が発生した際に、その影響範囲の予測、住民避難や水防活動といった危機管理対応に役立つ情報提供が可能となり、洪水による人的被害の軽減、効果的な応急復旧が図られることが期待されます。

areas and depths can be illustrated on a map. It can also display video clips of Himawari-8 cloud images provided by the Japan Meteorological Agency (JMA). In sum, this system is capable of real-time, automatic operation of data collection (i.e., cloud cover and rainfall), flood simulation, and visualization of outcomes through DIAS.

In February 2019, Project Research Associate Masanori Yasukawa of the University of Tokyo made a presentation on the development of this system and the launch of information delivery at the 3rd Plenary Meeting of the Platform on Water Resilience and Disasters, held in Metro Manila. The response was very positive; many participants wished to use the system and information. Information provided by this system will enable people and organizations in charge of disaster management to disseminate effective flood forecasts and early evacuation alerts, which will lead to human damage reduction and efficient emergency response.

(Written by Naoko Nagumo)

## Research

### Activity of the SATREPS program “Regional Resilience Enhancement through Establishment of Area-BCM at Industry Complexes in Thailand”

タイにおける SATREPS 課題「産業集積地における Area-BCM の構築を通じた地域レジリエンスの強化」の活動

ICHARM では、タイで実施中の SATREPS\* 課題「産業集積地における Area-BCM\*\* の構築を通じた地域レジリエンスの強化（研究代表：渡辺研司名古屋工業大学教授、2017年度採択）」に参画しています。本研究課題は、タイの産業集積地において Area-BCM の構築を通じた地域レジリエンスの強化を図ることにより、同国における持続可能な社会・経済の発展に貢献することを目的としています。また、その成果を ASEAN 諸国に展開することも目指しています。本研究課題における4つの研究題目（研究題目0：地域社会の実態調査、研究題目1：災害リスク解析・評価、研究題目2：ビジネスインパクト分析、研究題目3：Area-BCM 運用体制の確立・展開）のうち、ICHARM は研究題目1の代表機関として地域社会の災害レジリエンス向上のための Area-BCM 構築に資する水災害リスクの解析・評価を担っています。

2019年3月28日には研究題目1の活動の一環として、タイ側研究機関のチュラロンコン大学工学部と協働で対象地域の1つであるロジャナ工業団地の現地調査を行いました。ロジャナ工業団地は2011年の大規模な洪水で社会的・経済的に甚大な被害を受けましたが、その教訓を活かし洪水防護壁やポンプ排水機場の建設を進めてきました。現地調査では、ロジャナ工業団地管理事務所において洪水監視・対策施設の概要をヒアリングし、その後、リアルタイム水位監視システム、洪水防護壁、ポンプ排水機場、排水路を視察しました。研究題目1の水害リスク解析では、流域スケールの洪水氾濫解析モデルに加え産業集積地スケールの

ICHARM is participating in the ongoing program of SATREPS\*, “Regional Resilience Enhancement through Establishment of Area-BCM\*\* at Industry Complexes in Thailand.” This research project was adopted in 2017 and has been conducted under the leadership of Professor Kenji Watanabe of the Nagoya Institute of Technology. It aims to contribute to the sustainable development of society and economy in Thailand by enhancing local resilience through the establishment of Area-BCM. The expansion of its achievements to ASEAN countries is also expected. The program consists of four research items: Item 0. Survey on the current conditions of local communities; Item 1. Disaster risk analysis and assessment; Item 2. Business impact analysis; and Item 3. Establishment and expansion of the Area-BCM management system. Assigned as the representative organization of Item 1, ICHARM is in charge of the analysis and assessment of water-related disaster risk. The findings will be provided to design Area-BCM to improve the disaster resilience of local communities.

As a part of the activities of Item 1, ICHARM conducted a field survey in the Rojana Industrial Park, one of the target areas in this program, in collaboration with counterpart researchers from the Faculty of Engineering, Chulalongkorn University. Although the Rojana Industrial Park suffered severe socio-economic damage from the flood in 2011, the park has advanced the construction of flood walls and drainage pumping stations in the light of lessons learned from the flood. In the field survey, we implemented a hearing at the management office of the Rojana Industrial Park and were given a chance to have a close look at real-time water-level monitoring systems, flood walls, drainage pumping systems, and drainage channels. As an Item 1 task related to water-related disaster risk analysis, we are also planning to develop a fine-resolution



Hearing survey at the management office of Rojana Industrial Park  
ロジャナ工業団地管理事務所におけるヒアリング調査

inundation analysis model on an industrial cluster scale in addition to a basin-scale model. This new model will be capable of including the effects of flood management structures in its simulation. ICHARM will create the risk information of water-related disasters for business impact analysis and the effective operation of Area-BCM, based on the flood inundation analysis mentioned above.

\*SATREPS: Science and Technology Research Partnership for Sustainable Development

\*\*Area-BCM: Area Business Continuity Management



Drainage pumping station in Rojana Industrial Park  
ロジャナ工業団地内のポンプ排水機場

(Written by Mamoru Miyamoto)

高解像度のモデルの開発を予定しており、洪水氾濫対策施設による効果は産業集積地スケールのモデルで考慮される予定です。今後は、これらの洪水氾濫解析に基づきビジネスインパクト解析や Area-BCM の効果的運用のための水災害リスク情報を創出する予定です。

\*SATREPS: 地球規模課題対応国際科学技術協力

\*\*Area-BCM: 地域型事業継続マネジメント

JST SATREPS HP「産業集積地における Area-BCM の構築を通じた地域レジリエンスの強化」

[https://www.jst.go.jp/global/kadai/h2908\\_thailand.html](https://www.jst.go.jp/global/kadai/h2908_thailand.html)

## Conduct of general experience and questionnaire of "flood simulated experience application" developed by ICHARM

ICHARM が開発した「洪水疑似体験アプリ」の一般体験とアンケート

ICHARM is developing a computer application for people to experience a simulated flood using virtual reality (VR) technology, which has been used in various fields in recent years. This application can be easily installed on commercially available VR goggles, and people can experience a virtual flood simply by wearing them.



Simulated flood by the application  
「洪水疑似体験アプリ」で体験できる洪水の様子

On April 19, 2019, when an open house event was jointly held by the National Institute for Land and Infrastructure Management and the Public Works Research Institute, ICHARM offered opportunity for general visitors to try out high-tech flood simulation goggles. The visitors were also asked to fill out a 10-question sheet after they had a virtual flood experience. A total of 111 people answered the questions, which were analyzed to see if a virtual flood experience can contribute

ICHARM では、近年様々な分野で活用が進められている仮想現実 (Virtual Reality: VR) 技術を活用して、洪水を疑似体験できるアプリの開発を進めています。このアプリは市販の VR ゴーグル上で起動し、VR ゴーグルを装着するだけで洪水を体験できます。

4月19日に行われた「国総研・土研一般公開」の機会を捉え、一般の来場者にこの VR による仮想洪水を体験して頂き、この体験が洪水に対する意識向上に寄与するかどうか、アンケートを行い、分析しました。111名の方に10問ほどのアンケートに回答して頂きました。回答者の年齢属性は、40歳代が26%、30歳代が17%、また回答者の男女の性別比は約半々でした。

アンケート回答結果を簡単に紹介します。

質問1「今回の体験アプリで、洪水は怖いと感じましたか」については、約6割の方が「強く感じた」と回答し、質問3「VRによる今回の洪水体験で、実際に洪水が来るように感じましたか」では、その半数の約3割の方が「強く感じた」と回答しました。つまり、VRゴーグルによる洪水の疑似体験では、洪水の動きをそれほどリアルに感じなかった方でも、「洪水は怖い」と感じるようになったと推測され、仮想洪水映像の内容や見せ方に大きな示唆を与えました。

また、質問6「あなたは例年、梅雨や台風シーズンになると洪水を心配していましたか」では、38%



Venue of the open house event  
一般公開での体験会場



Scene of experience of simulated flood using 3D VR goggles  
3D ゴーグルによる「洪水疑似体験アプリ」の体験の様子

の方は「あまり心配していない」、34%の方が「多少心配している」との回答でしたが、洪水疑似体験後の意識の変化を尋ねる質問9「今年の梅雨や台風シーズンに向けて洪水災害が心配になりましたか」では、22%の方が「かなり心配になった」、57%の方が「多少心配になった」と回答しました。質問6と9を比較すると、洪水前は約4割の方が「洪水を心配していた」のに対し、洪水疑似体験後は2倍となる約8割の方が「洪水が心配になった」と回答し、今回の洪水疑似体験で洪水災害に対する意識が向上したことが明らかになりました。

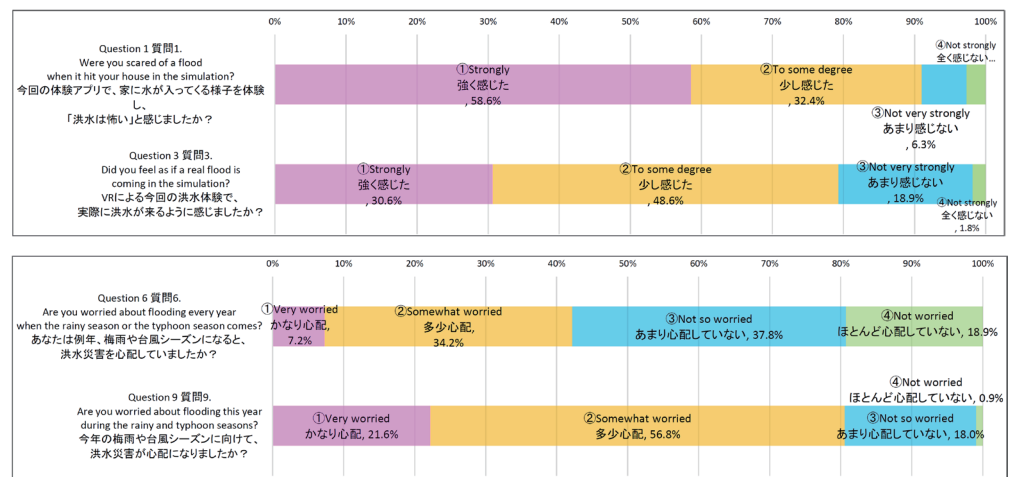
自由回答では、「自身が水没するときに恐怖を感じた」や「水の様子がカーペットみたいであまりリアルでなかった」などの感想が寄せられました。

なお、詳細なアンケートの分析結果は、追って論文等で紹介させていただきます。

to raising people’s awareness towards floods. The respondents consisted of the roughly same number of men and women, 26% of whom were in their 40s and 17% in their 30s. The following paragraphs summarize the results.

When asked “Were you scared of a virtual flood?” (Question 1), about 60% of the respondents answered the question by choosing “Very scared.” In the meantime, when asked, “Did you feel as if a real flood were coming?” (Question 3), merely about 30% answered “Felt so strongly.” These results suggest that even people who did not feel as if a real flood were coming realized that a flood can be life-threatening through a virtual flood experience. This insightful finding will be very helpful in improving the application in terms of how virtual flood images should be created and presented.

The respondents were asked to answer another question: “Are you worried about flooding every year when the rainy season or the typhoon season comes?” (Question 6). Those who answered “Not worried too much” accounted for 38% and those who answered “Somewhat worried” for 34%. In addition, when asked, “Are you worried about flooding this year during the rainy and typhoon seasons?” (Question 9), 57% of the respondents answered “Somewhat worried” and 22% “Very worried.” When the responses to questions 6 and 9 are compared, about 40% were worried about flooding before the flood simulation experience, while about 80%, roughly twice as many, came to be worried about flooding after the flood simulation experience. These results indicate that a virtual flood experience contributed to raising people’s awareness of flood disasters.



In addition, asked for comments, some people wrote, “I was very scared when I went under the floodwaters,” while others replied, “The flood didn’t look like a real one. It looked like a carpet laid on the floor.”

The detailed results of this questionnaire survey are planned to be published in the future as a journal paper and in other forms.

(Written by Daisuke Kuribayashi)

## New research will start in the Philippines under the Science and Technology Research Partnership for Sustainable Development (SATREPS) program

地球規模課題対応国際科学技術協力プログラム (SATREPS) でのフィリピン共和国を対象とした新規研究課題の採択

ICHARMの大原美保主任研究員が研究代表者として応募した研究課題が、令和元年度の国際科学技術共同研究推進事業 地球規模課題対応国際科学技術協力プログラム (Science and Technology Research Partnership for Sustainable Development, SATREPS) の防災分野での新規課題として採択されました。

The project proposed by Senior Researcher Miho OHARA has been selected as a new research project for FY2019 in the disaster management category under the Science and Technology Research Partnership for Sustainable Development (SATREPS) program. The project title is “The Project for Development of a Hybrid Water-Related Disaster Risk Assessment Technology for Sustainable Local Economic Development Policy”. The research period is 5 years (FY2020-2024) after the one-year preparation in FY2019. The principle research organization is the

University of Philippines Los Banos (UPLB), while co-research organizations are the University of Philippines Diliman and Mindanao. The Japanese co-organizations are the University of Tokyo, Tohoku University and Kyoto University.

SATREPS is the collaborative program between two Japanese government agencies: the Japan Science and Technology Agency (JST) and the Japan International Cooperation Agency (JICA). Based on the needs of developing countries, JST and JICA cooperate to promote international joint research targeting global issues with an objective of utilization of research outcomes. Implemented through collaboration with Official Development Assistance (ODA), the aim of the program is to acquire new knowledge and technology that lead to the resolution of global issues and the advancement of science and technology, and through this process, to create innovations.

In the Philippines, over-centralization in Metropolitan Area is the accelerating social problems as a consequence of insufficient economic development in local areas due to the frequent water-related disasters under climate change. The proposed project aims to achieve the highly accurate assessment of flood and drought risks by developing and using a hybrid assessment model covering climate change, hydrological processes, agriculture (crop growth) and socio-economic activity with a big-data platform. By applying the hybrid assessment model to the target local municipalities, the benefits of pre-disaster investments are evaluated. Based on these outputs, the policy for the sustainable economic development of local municipalities will be proposed.

Senior Researcher Ohara, Research Specialist Naoko Nagumo and Research Specialist Ralph Allen Acierto visited the UPLB, principle research organization and had a preparatory meeting with three Universities during June 23-27.

They also attended the "Program Development Workshop on Sustainable Water Resources Management for Food Security in Southeast Asia" organized by the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA). OHARA gave a presentation about the recent researches in ICHARM and the outline of a new SATREPS Project. They also visited the JICA Philippines Office and Department of Public Works and Highways (DPWH). They will continue preparatory activity with co-research organizations for the coming research period.



Group photo with counterpart members in the Philippines  
フィリピン側研究メンバーとの集合写真

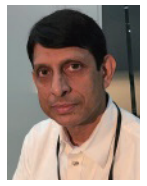
(Written by Miho Ohara)

た。研究課題名は「気候変動下での持続的な地域経済発展への政策立案のためのハイブリッド型水災害リスク評価の活用」で、研究期間は5年間（令和2年度～6年度）であり、今年度は準備期間です。相手国側の研究代表機関はフィリピン大学ロスバニョス校、共同研究機関はディリマン校、ミンダナオ校であり、日本側共同研究機関は東京大学、東北大学、京都大学です。

SATREPSは、科学技術と外交を連携し、相互に発展させる「科学技術外交」の強化の一環として、文部科学省、外務省の支援の下、科学技術振興機構（JST）と国際協力機構（JICA）が連携して実施するプログラムです。開発途上国のニーズを基に、地球規模課題を対象とし、社会実装の構想を持つ国際共同研究を政府開発援助（ODA）と連携して推進することによって、地球規模課題の解決および科学技術水準の向上につながる新たな知見や技術を獲得することやこれらを通じたイノベーションの創出を目的とします。

フィリピン共和国では将来、気候変動による水災害の頻発により地方都市の持続的な発展が阻害され、マニラ首都圏への一極集中が加速することが懸念されます。本研究は、従来の気候変動・水理水文・農業（作物成長）・社会経済モデルを結合させ、分野横断による新たなハイブリッド型洪水・渇水リスク評価モデルを創出し、データ統合・解析システム（DIAS）を基盤としたビッグデータもあわせて活用することにより、高精度な水災害リスク評価を実現します。本評価モデルを水災害が頻発するフィリピン共和国の地方都市に適用し、事前の防災対策投資効果の客観的な評価と地方都市の健全な発展に向けた政策提言を行うことを目指します。

大原主任研究員、南雲直子専門研究員、Ralph Allen Acierto 専門研究員は、2019年6月23日～27日にかけて、相手国側代表機関であるフィリピン大学ロスバニョス校を訪問し、相手国側研究機関との準備打合せを行いました。また、東南アジア農学系大学院学術研究地域センター（SEARCA）が主催する「東南アジアにおける食料安全保障のための持続可能な水資源管理に関する課題開発ワークショップ」に参加し、大原主任研究員が ICHARM での研究活動ならびに SATREPS の活動開始についての話題提供を行いました。その他、JICA フィリピン事務所、公共事業道路省も訪問しました。今後も共同研究機関と連携しながら、SATREPS の本格的な研究活動に向けた準備を進めていく予定です。



## My experience at ICHARM as a Visiting Foreign Researcher

**K. Abdulla Bava, Ph.D., Senior Research Scientist, Advanced Technology Institute, Japan**

It was a great honor for me to be a Visiting Foreign Researcher (VFR) at ICHARM from January 2019. That was happened by my first meeting with Prof. Toshio Koike at GEO Week in October 2018 at Kyoto. That was immediately after a great flood occurred in my home state Kerala, India in August 2018, so I requested Prof. Koike to support government of Kerala by involving it's flood mitigation activities. He introduced me to Dr. Tetsuya Ikeda for further discussion at a stall of ICHARM in the same conference. Eventually ICHARM invited me as a VFR to do analysis on Kerala flood and carried out flood simulation using RRI model.

I am thankful to Prof. Koike and PWRI for arranging my stay at ICHARM as a Visiting Foreign Researcher.

I am really impressed by warm welcome and support during my stay at ICHARM by all researchers and administrative staff. I observed in ICHARM that all the researchers are doing research diligently in their field and actively involved in flood and drought mitigation activities around the globe. All the researchers are collaborating with several countries and helping in mitigation activities. Most of the time one or other team from ICHARM will be abroad either for meetings or field work in another country. I am also impressed by ICHARM's collaboration with various agencies abroad to obtain real time data to integrate with DIAS system to implement flood and drought forecasting system for various countries around the world.

I am thankful to Dr. Ikeda for helping to conduct my research work at ICHARM. It was a good opportunity for me to get hands on training in IFAS and RRI models, for that I am thankful to Dr. Yoshito Kikumori and Dr. Badri Bhakta Shrestha for their sincere support. I also would like to mention Dr. Mohamed Rashmy Abdul Wahid for consultation whenever I needed clarification in simulation studies. I could create a simulation of Kerala flood of August 2018 and reported in the previous volume of Newsletter (ICHARM Newsletter Volume 14 No. 1; April 2019. P.15).

My interaction with Researchers in ICHARM helped me to improve my knowledge and understanding of Disaster management planning, Flood Control planning, Disaster information Dissemination, Effective use of information for Disaster Risk Reduction, etc.

One of the achievements of my stay here in ICHARM is that I could connect Government of Kerala state and various agencies of Japan (ICHARM, MLIT, JWA, IDI etc.) for further collaboration in flood mitigation activities in Kerala. Prof. Koike and Dr. Ikeda kindly agreed to visit Kerala on my request during India Japan workshop for Disaster Risk Reduction at New Delhi in March 2019. In fact, Cabinet Office of Japan kindly included me in Japan delegation for the Workshop at New Delhi to enable me to accompany Prof. Koike and Dr. Ikeda to Kerala to coordinate with Kerala government agencies. The Kerala government treated us as State guests with local hospitality and conveyance and arranged meetings with Engineers of Irrigation department, Kerala State Electricity Board and arranged a visit to Poringalkuthu Dam to understand the flood devastation in Chalakudy river basin. We could also meet Additional Chief Secretary of Water Resources and CEO of Rebuild Kerala Initiative for a discussion for further collaboration (Please see report in previous volume of ICHARM Newsletter Volume 14 No. 1 April 2019 P.20; prepared by Dr. Ikeda).



Prof. Koike and Dr. Bava

I found ICHARM as a good platform for me to strengthen my scientific knowledge and skills in the field of water hazard and disaster management and also to utilize my contacts and connections with Indian scientific research institutions such as Central Water Commission, National Institute of Hydrology, Center for Water Resources Development Management, CUSAT, KUFOS, and Government agencies like NDMA, KSDMA, Kerala Water Resources Department, Kerala Irrigation department, Kerala State Electricity Board etc. for further collaboration in the filed of Water hazard, Flood mitigation, Flood forecasting, Disaster management.

It was another wonderful opportunity for me during the stay in ICHARM in a role of coordinator for Japan's India mission to submit a proposal to World Bank regarding the strengthening of Integrated Water Resources



Management and flood mitigation programs in Kerala. It was a good opportunity for me to interact with Dam experts from various Japanese agencies like MLIT, IDI, JWA and Pacific Consultants.

I am looking forward to utilizing my contacts and connections in Japan especially with ICHARM, PWRI, MLIT, JWA, IDI etc. to introduce the advanced technology and expertise of Japan in the field of Integrated Water Resources Management, improved dam operations, flood mitigation programs and disaster management to help India in general and the Kerala state.

## Introduction of ICHARM research projects / 研究紹介

ICHARM sets three principal areas of activity: research, capacity building, and information network. It plans and implements projects in these areas in order to fulfill its mission, always keeping in mind "localism", a principle with which we respect local diversity of natural, social and cultural conditions, being sensitive to local needs, priorities, development stage, etc., within the context of global and regional experiences and trends of disasters.

At present, ICHARM conducts innovative research in the following five major areas:

- (1) **Data collection, storage, sharing, and statistics on water related disasters**
- (2) **Risk assessment on water related disasters**
- (3) **Monitoring and prediction of changes in water related disaster risk**
- (4) **Proposal, evaluation and application of policy ideas for water related disaster risk reduction**
- (5) **Support in constructing the applicability of water-related disaster management**

This issue introduces one researcher as listed below:

**Daisuke Kuribayashi**, Senior Researcher

Development of a disaster related information sharing system for municipalities (ICHARM Disaster Risk Information System: IDRIS)

**Masatoshi Denda**, Senior Researcher

Importance of natural disturbance due to floods in river ecosystem conservation

ICHARM は、その使命を果たすため、世界及び地域での災害の傾向及び経験と災害対応に関する地域のニーズ、重要課題、開発段階等を踏まえつつ、自然、社会及び文化といった地域の多様性を考慮する原則というローカリズムを念頭に、研究、能力育成及び情報ネットワーク構築の3本柱を有機的に連携させて、現地実践活動を実施しています。

そのうち、研究としては

- (1) 水災害データの収集、保存、共有、統計化
- (2) 水災害リスクのアセスメント
- (3) 水災害リスクの変化のモニタリングと予測
- (4) 水災害リスク軽減の政策事例の提示、評価と適用支援
- (5) 防災・減災の実践力の向上支援

の5つの柱のもと、革新的な研究活動を行っています。

本号では、栗林大輔主任研究員の行っている研究「市町村向け災害情報共有システムの開発 (ICHARM Disaster Risk Information System: IDRIS イドリス)」と傳田正利主任研究員の行っている「河川生態系保全における洪水による自然攪乱の重要性」を紹介します。



### Development of a disaster related information sharing system for municipalities (ICHARM Disaster Risk Information System: IDRIS)

市町村向け災害情報共有システムの開発

(ICHARM Disaster Risk Information System: IDRIS イドリス)

**Daisuke Kuribayashi**, Senior Researcher

#### 1. Background

In recent years, severe flood and landslide disasters have occurred almost every year. However, since flood and landslide disasters have a lead time from the start of rainfall to the occurrence of disasters, there is possibility to manage disaster response and disaster reduction by utilizing various data and information during the lead time.

In municipalities located in mountainous areas where disasters frequently occur in recent years, the lead time tend to be shorter than in plain areas, and the ratio of people who need to take care, such as elderly people, is high in such areas. Also, there are many rivers where not only flood forecasting but also flood monitoring are not carried out, and its quality and quantity of the data and information are limited. Disaster reduction by effective and efficient utilization of disaster information is strongly demanded in those area.

#### 2. Development of a disaster related information sharing system for municipalities

Based on the above background, ICHARM has developed a "Disaster Information Sharing System (Portal site)" that allows local officials to select real-time information and risk information necessary for disaster response, and create a customized web site so that they can be viewed centrally on the website. Using this portal site, officials such as municipal disaster prevention officers, flood fighting teams,

#### 1. 背景

近年毎年のように甚大な洪水・土砂災害被害が発生している。ただし、洪水・土砂災害は、降雨開始から発災まで時間的猶予があるため、この時間内に様々なデータや情報を活用して、防災・減災対応を行える可能性がある。

近年災害が頻発する中山間地の市町村においては、平地に比較して降雨から増水までの時間が短く、地域住民には高齢者などの要配慮者の割合が高い。一方で、洪水予報や水位周知が行われていない河川が多く、質・量とも利用できる情報が限られている中で、災害情報の効果的・効率的な利活用による減災が強く求められている。

#### 2. ICHARM 災害情報共有システム (IDRIS) の開発

上記背景を踏まえ、災害対応に必要なリアルタイム情報やリスク情報を市町村担当者が選択し、一元的にホームページ上で閲覧できるようにカスタマイズ作成できる、「災害

**情報共有ポータルサイト」を開発した。**本ポータルサイトを用いることによって、IDRISを開発し、これによって市町村役場の防災担当者・水防団・コミュニティリーダー・一般住民などの関係者が、浸水想定区域や過去の浸水発生域などの**リスク情報**、及び気象情報や水位情報、現地状況の画像などの**リアルタイム情報**といった危機管理や避難判断に最低限必要な情報を、**正確かつ迅速に把握し共有し、平常時から緊急時までの減災行動**に活用されることを目指す。

なお、IDRISは、生活者の立場から地域社会の安全問題を考え、地域社会の安全性の向上に寄与することを目的とする「地域安全学会」から、『2018年度地域安全学会技術賞』を受賞している。

3. IDRISの特徴

- ・洪水が発生しそうな時に、これまでは様々なホームページから入手していたリアルタイム情報を、**一つの画面上で表示することが可能**
- ・特に災害対応時に重要な情報である「現地状況」について、投稿された危険個所の写真・動画やYouTubeライブ機能により、**危険な状況を即座に関係者が共有することが可能**
- ・さらに平常時でも、洪水の危険性(リスク)に関する**様々な地図情報を、重ね合わせて閲覧可能**
- ・特殊なソフトやアプリは必要なく、**通常のホームページを見るソフトで見ることが可能**
- ・ポップアップシステムにより、危険な状況になった際は警告音とともに表示

4. IDRISのコンテンツ

IDRISは主にリアルタイム情報を表示する「リアルタイム情報ビューワ」と、様々なリスク情報を重ね合わせて表示できる「リスク情報地図ビューワ」の2つから構成される。

5. 今後の展開

今後は、2019年8月ごろを目処に、阿賀町住民による一般実証実験を実施する。また、岩手県岩泉町(平成28年台風10号で甚大な被害)における同様のシステム構築により他市町村への展開・普及可能性について検討する。将来的には、災害に関する情報だけでなく、日頃の定期点検成果の共有や生活情報や観光情報、河川の環境に関する情報などを発信できる**総合ポータルサイトを目指す**。

community leaders, general residents, etc., can understand and share various risk information such as predicted inundation area and past flooded area, and real time information such as weather information and water level information, and photos of local situation. The system is named as “ICHARM Disaster Risk Information System: IDRIS.” ICHARM hopes that the IDRIS will be utilized for disaster mitigation activities not only in emergency but also in normal time.

In addition, the IDRIS has won a prize for its technology by the Institute of Social Safety Science (ISSS) of Japan in May 2019.

3. Characteristics of IDRIS

- When floods are likely to occur, it is possible to indicate various real-time information from various websites by one screen.
- With regard to the “local situation”, which is important information when dealing with disasters, it is possible to immediately share the dangerous situation with the posted photos, videos and YouTube live movies take by drones.
- Even in normal times, various map information regarding the risk of flood can be overlaid and viewed.
- There is no need for special software or apps, and you can view it on the usual website software.
- Pop-up system displays dangerous condition with warning sound when it becomes dangerous condition.

4. Image of IDRIS

IDRIS contains two viewers; “Real time information viewer” and “Risk information map viewer.”

**Real time information viewer**

Real time information by IDRIS top page  
IDRISによるリアルタイム情報表示の例

**Risk information map viewer**

Riskmap (Sediment hazard map: Anticipated inundation area map: Evacuation center) 浸水想定区域図・土砂災害警戒区域図・避難場所が記載された「リスクマップ」の例

## 5. Future plan

Targeting in the August 2019, general demonstration experiments of the ARIS, which was developed as a prototype of the IDRIS, will be conducted by Aga town residents.

In addition, ICHARM will apply the IDRIS system to another town, Iwaizumi-cho of Iwate Prefecture, where a severe damage by typhoon No. 10 in 2016 occurred, and study and examine its applicability to other municipalities. In the future, in addition to information on disasters, ICHARM aims to develop a "comprehensive portal" site by which we can share information on regular inspections of river gates, livelihood information and tourism information, and information on the environment of rivers.

(Written by Daisuke Kuribayashi)



### Importance of natural disturbance due to floods in river ecosystem conservation

河川生態系保全における洪水による自然攪乱の重要性

Masatoshi Denda, Senior Researcher

I am Masatoshi DENDA and joined ICHARM as a senior researcher in April 2019. My previous position was a senior researcher of the River Restoration Team of the Water Environment Group, the Public Works Research Institutes (PWRI). Having studied river ecosystem conservation through biotic habitat restoration for 24 years and involved in many river restoration projects in Japan, I have come to the understanding that disturbances of river morphology and biotic community due to floods were necessary in order to conserve the river ecosystem

As an example, I introduce the results of a restoration project in the Chikuma River, which successfully controlled problems caused by overgrown woodland and restored a gravel riverbed condition using disturbances due to natural floods. Before the era of high economic growth (HEG) in the 1960s, when river management was conducted with little human intervention, floods submerged river terraces, transported sediment, inhibited vegetation growth, and restored a gravel riverbed condition. During the HEG, human intervention increased drastically. Substantial riverbed excavation was conducted to satisfy high demands for gravel in construction of buildings, roads, and other structures. In addition, levees were built to keep the river flow in the fixed course for flood control. All this contributed to lowering the riverbed elevation. This change on river morphology decreased opportunities of flood overflow on river terraces, preventing the restoration of a gravel riverbed condition and accelerating vegetation succession and woodland overgrowth.

In response, the River Restoration Team, in collaboration with the Chikuma River Management Office of the Hokuriku Regional Development Bureau, the Ministry of Land, Infrastructure, Transport and Tourism, conducted a series of river management projects by excavating river terraces to bring back disturbances due to floods. The projects were successful in controlling overgrown woodland and restoring a gravel riverbed condition. Through this successful case, the research team confirmed that this method can be one of the effective methods to achieve river restoration.

The Chikuma River projects has also revealed that further research is necessary to solve a technical problem regarding this method: how to estimate flood discharge accurately when floods occur only several times per year. Although conventional hydrology can estimate flood discharge with a certain accuracy, more accurate estimation is essential for the method to work effectively. In recent years, extreme

2019年度より、ICHARMに着任した傳田正利主任研究員です。前職は、土木研究所の水環境研究グループ河川生態チームで生物生息場保全を通じた河川生態系保全の研究を24年間継続してきました。河川生態系保全のためには、出水による河川地形や生物群の変化が必要であることが、実践的研究を通じて理解できました。

河川生態系管理の問題点である樹林化（過剰な樹林繁茂）の抑制や貴重な生物の生息域で近年減少が著しい砂礫河原の再生を、出水による作用を利用して実現した事例を示します。人間の河川管理の影響が少ない過去の時代においては、出水が高水敷（河川沿いの陸地）の上を流れ、土砂を運搬し、砂礫に生育を始めた草や樹木の成長を止め、砂礫河原へ戻す作用をしていました。高度成長期、コンクリート構造物の建設のために行われた砂利採取、川の流れを固定化し流れを一部に集中させることにより、河床（川底）の低下が起こりました。この低下は、高水敷上を出水が流下する機会を少なく、砂礫河原へ戻す作用を減少させました。この変化は、高水敷上に草や樹木の生育を促し、樹林化を進行させたと言われています。

そこで、河川生態チームは、国土交通省北陸地方整備局千曲川河川事務所と連携し、高水敷を掘削し標高を下げ、出水が高水敷を流下させる事業を行いました。その結果、樹林化の進行の抑制、砂礫河原の再生に成功し、河川生態系の保全の一つの方法を提案できたと考えています。

しかし、研究・技術的な課題が新たに生じました。それは、年に数回しか生じない出水流量の算定です。水文学により、出水流量の算定は一定の精度で可能です。しかし、近年、気候変動に起因するといわれる極端

な気象変化が生じ、それによる水災害は、地域社会に深刻な打撃を与えています。極端な気象変化を認識し、水災害から地域社会を守り、その上で、より自然豊かな河川環境を保全するというスタンスが今後の河川管理には必要と認識しています。

ICHARM には、長年培われた気候変動による雨の変化、流域に降った雨の流出、それに伴う水災害のリスクを算定する研究・技術の蓄積があります。ICHARM でこれらの研究・技術を生かし水災害に強い流域を実現するとともに、河川環境の豊かな流域の実現の両立を目指す流域マネジメント手法の研究に取り組みたいと思います。

climate phenomena due to climate change occur, causing water-related disasters frequently with serious damage to local communities. It is crucial to understand that future river management requires taking appropriate measures to protect communities from extreme climate phenomena while keeping the river environment as eco-friendly as possible.

ICHARM has conducted substantial research and had extensive technical experience regarding the simulation of precipitation change due to climate change, rainfall runoff, and water disaster risks. Taking advantages of such research and technical experience, I would like to constitute studying basin management methods that help achieve both the enhancement of the basin's resilience to water disasters and the realization of the eco-friendly river environment.



Before the project  
事業実施前

During the project  
事業実施中

One year after the project  
事業実施 1 年後

(Written by Masatoshi Denda)

## ■ Training & Education

### Activity report on "Disaster Prevention Town Watching Exercise in Sakai Town" in JICA short-term training

#### JICA 短期研修での「境町タウンウォッチング」の実施報告

国際建設技術協会 (IDI) が実施する JICA 課題別研修「水災害被害の軽減に向けた対策」において、海外の政府機関の職員 12 名 (アフガニスタン 1 名、ブラジル 2 名、フィジー 1 名、ケニア 2 名、リベリア 2 名、マレーシア 1 名、メキシコ 1 名、ソマリア 1 名、スリランカ 1 名) が日本を訪れました。その一環として ICHARM では、平成 27 年 9 月の関東・東北豪雨災害により大きな被害を受けた茨城県境町の御協力のもとで、6 月 5 日と 6 日の 2 日間「防災タウンウォッチング」演習を実施しました。

演習に先立ち、野尻智治副町長から挨拶をいただきました。次に、高桑大助境町危機管理監より「境町における防災への取り組み」に関する講義をいただきました。境町役場庁舎西側に約 200 名 (庁舎と合わせて合計 1,000 名) を緊急収容できる全国初の水害避難タワーや、町内 15 カ所に設置された非常時に住民自らが土のうを持ち出せる「土のうステーション」、移動式のコンテナ・トレーラーハウスによる可動型防災施設の設置と被災地への派遣など、町をあげての防災・減災対策への取り組みについて紹介されました。

講義後、12 名が 3 グループに分かれ、町の白地図や洪水ハザードマップなどを見ながら視察するルー

A total of 12 government officials from Afghanistan, Brazil, Fiji, Kenya, Liberia, Malaysia, Mexico, Somalia, Sri Lanka came to Japan to participate in a JICA-sponsored training course, "Water Related Disaster Risk Reduction," conducted by the Infrastructure Development Institute (IDI).

On June 5-6, 2019, the "disaster prevention town watching exercise" was conducted as one of the ICHARM-led training programs in Sakai Town, Ibaraki Prefecture, which was severely damaged by a devastating flood caused by torrential rainfall in September 2015. This exercise was conducted with the kind cooperation of town officers and community leaders who experienced the flood.

Before starting the exercise, the participants were heartily greeted by Mr. Tomoharu Nojiri, the vice mayor of Sakai Town. Then, Mr. Daisuke Takakuwa, the director for crisis management, explained the town's disaster prevention measures, such as Japan's first flood evacuation tower constructed next to the town office, 15 sand-bag stations placed around the town, and mobile disaster management facilities using mobile containers and trailer houses, which can be sent to disaster-affected areas.

After that, the 12 participants were divided into three groups and walked around the town for 1.5 hours, carrying with them a blank map and a flood hazard map and accompanied by the town officers and community leaders. While walking around the area, they checked dangerous places in terms of disaster management and were given explanations about disaster management facilities. The participants took notes and pictures carefully about the sandbag stations and utility poles displaying predicted inundation heights in case of a flood.

Each group then discussed the results and created an original disaster

management map. In the end, they shared the whole results with the other groups and discussed disaster management issues that should be addressed by the town. They also talked with Mr. Takakuwa about the effectiveness and applicability of the town watching exercise to their countries.

Overall, the participants made positive evaluations for this exercise. A participant said, "I realize that the town watching is one of the best nonstructural measures to flood mitigation."

Finally, we wish to express our deep gratitude to Sakai Town's officers for their cooperation.



Participants walk around the town.  
街を視察する研修員



Participants receive explanation about the flood evacuation tower  
洪水避難タワーの説明

(Written by Yoshimasa Morooka)

トを決め、境町防災安全課の職員や浸水被害を受けた地区の区長と一緒に、洪水対策の上で考慮すべきことを考えながら1時間半ほど街を歩き、境町の防災に関する取組みを視察しました。研修生は、土のうステーションや想定浸水深が示された電柱の前で熱心に写真やメモを取っていました。

その後、自らの目で見た防災対策についてグループで議論し、グループごとの「防災マップ」を作成しました。最後に高桑危機管理監同席のもと、全体議論を行い、タウンウォッチングの有用性、各国での適用性について議論しました。

実施後の研修生アンケートでは、「タウンウォッチングは洪水リスクの軽減策の一つであると実感した」などの回答が得られました。

最後に、本演習の実施にあたり多大な御協力をいただいた境町に対し、改めて御礼申し上げます。

## Field trips by M.Sc. students

### 修士課程研修 現地見学

ICHARM offers a master's degree program, "Water-related Disaster Management Course of Disaster Management Policy Program (JICA Training Program: Flood Disaster Risk Reduction)," in collaboration with JICA and the National Graduate Institute for Policy Studies (GRIPS). Currently, 8 students are enrolled in this 12-year-old program and studying various issues related to the management of water-related disasters. They recently visited the Shinano River basin and the Yodo River basin in their study tours as part of the program curriculum.

### Shinano River basin (April 18-19)

In April, the students visited the Shinano River basin in Niigata Prefecture, one of the best rice-producing basins in Japan. The area experienced severe flood events in 2004 and 2011 due to heavy rainfall.

On the first day, they paid a visit to the Lower Shinanogawa River Office, the Hokuriku Regional Development Bureau of the Ministry of Land, Infrastructure, Transport, and Tourism (MLIT) for a lecture on the heavy rain events in 2004 and 2011 and the effect of the preventive measures implemented after the 2004 event. The lecturer presented the successful implementation of the measures after the 2004 heavy rain, explaining that the structural damage in 2011 reduced by 90% compared with the damage in 2004 despite that the rainfall in 2011 was 1.6 times as large as that in 2004. After that, they took a short tour to the Ohkozu diversion channel, which was built in 1922.

On the second day, after visiting the Sagurigawa Dam in the morning, they moved to Ojiya City in the afternoon and participated in a discharge measurement

ICHARM では、(独)国際協力機構(JICA)及び政策研究大学院大学(GRIPS)と連携して、本年で12年目となる修士課程「防災政策プログラム水災害リスクマネジメントコース」(JICA研修「洪水防災」)を実施しています。本年の研修では、8名の研修生に対してICHARM内での講義に加えて、日本の洪水対策についてよりよく理解するための現地見学を実施しています。以下で、4月と6月に実施した現地見学の報告を行います。

### 信濃川流域 (4月18～19日)

信濃川流域は良質な穀倉地帯である一方、2004年及び2011年のような豪雨災害が発生する地域です。

現地見学初日は、信濃川下流河川事務所を訪れ、2004年及び2011年の豪雨とその対策事業の効果について講義を受けました。2004年豪雨後の対策事業の効果として、2011年の降水量は2004年の1.6倍

であったにもかかわらず、建物への被害は2004年よりも90%減らすことができたこと等の説明を受けました。その後、1922年に完成し、当時東洋一の大工事と言われた、大河津分水路を見学しました。翌日は、午前、三国川ダムを訪問しました。午後には、小千谷市へ移動し、土木学会が開催する流量観測会に参加し

て、土木研究所の研究者らと流量観測の実習を行いました。

### 淀川流域 (6月25日～28日)

淀川流域は、琵琶湖からもたらされた豊富な水資源をもとに古くから発展してきた地域です。今回は、淀川流域の治水対策並びに2013年9月の記録的豪雨をもたらした台風18号の影響及びそれに対する行政機関の対応などを学ぶために、淀川の現地見学を行いました。

初日は、台風の概要及び管内の被害状況の概要を学ぶために、国土交通省近畿地方整備局を訪問しました。台風18号は記録的な降水量を観測し甚大な被害を各地に及ぼしましたが、そのような中で、2004年の台風被害後の対策工事の効果により今回被害を免れた箇所も少なくないこと、淀川水系のダム群の連携操作及び瀬田川洗堰の操作によって更なる被害拡大を回避できたと思われることなどの説明を受けました。その後、2日間にわたり淀川河川事務所、淀川ダム統合管理事務所、伊加賀西スーパー堤防、三栖閘門、天ヶ瀬ダムなどを訪れ、具体的な説明を受けました。最終日は、淀川流域の豊かな文化を学ぶために琵琶湖疎水記念館を見学しました。現地見学は、日本の治水対策の実例を研修員に直接示す良い機会となりました。

最後に、お忙しい中、現地訪問のご対応してくださいました国土交通省北陸地方整備局信濃川下流河川事務所、同信濃川河川事務所、同三国川ダム管理所、国土交通省近畿地方整備局河川部河川計画課、同淀川河川事務所、同淀川ダム統合管理事務所、琵琶湖疎水記念館の皆様には大変お世話になりました。ここにお礼申し上げます。

workshop organized by the Japan Society of Civil Engineers. They practiced discharge measurement in the Shinano River with help from PWRI researchers.



Sagurigawa dam  
三国川ダム



Discharge measurement workshop on Shinano River  
信濃川流量観測実習

### Yodo River basin (June 25-28)

In late June, the students took another study tour, traveling along the Yodo River in Osaka Prefecture. The Yodo River basin has been developed since ancient times, thanks to rich water resources from Lake Biwa. They visited the area to learn about flood management over the Yodo River basin, damage caused by a devastating typhoon (No.18) of September 2013, and emergency response to that damage by the responsible administrative organizations.

On the first day, they visited the Kinki Regional Development Bureau of MLIT for a presentation on Typhoon No.18 and damage it caused. They learned that the collaborative operation of several dams in the Yodo River system and the timely operation of the Seta River overflow weir were very effective in avoiding the expansion of the flood damage.

On the following two days, they visited several places related to flood control for more information, including the Yodogawa River Office, the Yodogawa River Integrated Dam Management Office, the Ikaga-nishi high-standard levee, the Misu Lock Gate, and the Amagase Dam.

On the last day, they went to the Lake Biwa Canal Memorial Museum, where they learned about the diverse culture in the Yodo River basin from very interesting exhibitions. Study tours are an important part of ICHARM's educational programs, which offer students great opportunities to take a close look at Japan's flood control measures in operation.

Finally, ICHARM would like to express our deep appreciation to all the offices for their excellent support for the study tours.



Amagase dam  
天ヶ瀬ダム

(Written by Tomoki Nakamura)

# Action Reports from ICHARM Graduates

ICHARM provides graduate-level educational programs for foreign government officers in charge of flood risk management in collaboration with GRIPS and JICA: a one-year master's program, "Water-related Risk Management Course of Disaster Management Policy Program," and a three-year doctoral program, "Disaster Management Program."

Since their launches, over 100 practitioners and researchers have completed either of the programs. They have been practicing knowledge and experience acquired through the training in various fields of work after returning to their home countries. This section is devoted to such graduates sharing information about their current assignments and projects with the readers around the globe. Mr. Leandro Galvanese Kuhlmann, who graduated from the master's program in 2018, has kindly contributed the following article to this issue.

ICHARMでは、政策研究大学院大学（GRIPS）、国際協力機構（JICA）と連携して、世界各国から洪水対策の行政官を対象として、1年間の修士課程「防災政策プログラム 水災害リスクマネジメントコース」を実施するとともに、3年間の博士課程「防災学プログラム」を実施しています。これまで100名を超える実務者・研究者の方々が各課程を修了し、帰国後、本研修で習得された知識や経験を生かして、様々な分野において活躍されています。

ICHARMニュースレターでは、こうした卒業生の方々から、ご活躍の様子について寄稿していただくこととしております。本号では2017年度（11期）修士課程卒業のLeandro Galvanese Kuhlmann氏（ブラジル）から寄稿いただきましたので、ご紹介いたします。

## Mr. Leandro Galvanese Kuhlmann from Brazil Researcher B, CPRM - Serviço Geológico do Brasil

I completed the master's degree program at ICHARM in the 2018, it was a great experience. We met several impressive professionals that motivated us to challenge and improve ourselves. Upon return to my home country as a researcher of the CPRM- Geological Survey of Brazil I had the opportunity to share my experiences with my colleagues. The Thesis was presented at two Regional Offices and at the Main Office in Rio de Janeiro. I also presented a Concept Note for a pilot project in flood hazard and risk mapping, which will be based in the Master Thesis's methodology. The Pilot Project was welcome by the Department of Territorial Management, which comprises the hazard and risk management projects, and also by the Department of Hydrology, which is responsible of rainfall and river discharge data acquisition in the whole country. I was also promoted from Researcher A to Researcher B; in order to improve the workflow process I will be transferred from my current Regional Office to the Main Office and further on I will answer directly to the Head of Department, Ms. Adelaide Mansini Maia. In the meantime a big case on disaster management drew 53 researchers as well as 9 external consultants: a case of land subsidence induced by a salt solution mine area is causing cracks and fissures in buildings in the City of Maceio, capital of the State of Alagoas – Brazil, approximately 50 thousand people live in the affected area. My participation was requested and in the past three months I have been working on Synthetic Aperture Radar interferometry (InSAR), I prepared interferograms from Sentinel (NASA) images and interpreted the report of an external contractor. I also took an important role on the preparation of our current conceptual model which led me to be the appointed by the Advisor of the Director of Hydrology, Thales Queiroz Sampaio, as the spokesperson of our office in several meetings, including at the Regional Counsel of Engineers (CREA-AL) and at the Federal Public Ministry. Fukuoka sensei once said to us: "I am ahead of you and I am still running, so you should try harder if you want to keep up"; even though I may never reach him, his philosophy has kept me motivated give my best for my job in disaster risk reduction.



From left to right: Jorge Pimentel, former head of Department; Adelaide Mansini, head of Department; Sandra Fernandes, head of Division; Leandro Galvanese Kuhlmann, researcher; Thales Sampaio, advisor of the Director.

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Presentation at the Regional Counsel of Engineers of Alagoas State.



Presentation to the Federal Public Ministry. At the main table are the three Federal Attorneys.

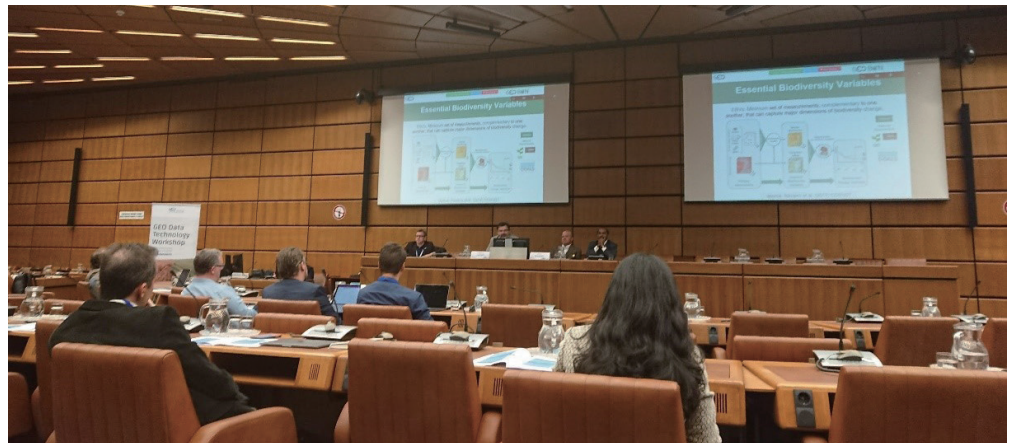
# Information Networking

## Presentation in the GEO Data Technology Workshop

### GEO データ技術ワークショップにおける発表

2019年4月23日から25日にオーストリア・ウィーンの国際連合宇宙局において地球観測に関する政府間会合（GEO）が主催する「地球観測に関するデータ技術ワークショップ（GEO Data Technology Workshop）」が開催され、宮本守研究員が参加し発表しました。ワークショップでは、持続可能な開発のための国連2030アジェンダ、仙台防災枠組、パリ協定（気候変動）を含めた、地球観測に基づいた国際的な政策の枠組みに関する知見を活用するための方法が主要テーマとして挙げられ、主にデータ管理・共有、ガバナンス等に関する国際的な専門家が参加しました。各セッションでは、CEOS Open Data Cube や GEOSS Platform、Space4Water Portal、GRID3 等具体的なプロジェクトやプロジェクトがアメリカ航空宇宙局（NASA）や欧州宇宙機関（ESA）、その他の国連機関から紹介されるとともに、地球観測システム、データガバナンス、政策課題、衛星などの国際的な問題について議論が交わされました。「革新的アプローチと社会影響」セッションでは、宮本研究員が「Japan DIAS」と題して発表を行い、DIASによるデータ統合を通して地球観測技術およびデータを活用した事例とその社会的影響・便益について説明しました。特に、社会的影響のある特筆すべき事例として、フィリピンやスリランカ等において国際洪水イニシアティブが推進している水のレジリエンスと災害に関するプラットフォームの活動で GSMaP や MODIS 等の地球観測データを活用した水災害リスク軽減のための取り組みを紹介しました。参加者からは、「理論や技術だけでなく社会実践を進めている貴重な事例である」と評価され、今後の技術的・地理的展開について質問がなされました。ICHARM では、現在のアジア各国で進めているプラットフォームの活動を今後はグローバルに展開することを予定しており、今回のような国際会議等の機会を活かして積極的に情報発信していくこととしています。

The Group on Earth Observation (GEO) held a GEO Data Technology Workshop on April 23-25, 2019, at the United Nations Office for Outer Space Affairs (UNOOSA) in Vienna, Austria, and ICHARM Researcher Mamoru Miyamoto participated along with other international experts mainly on data management, sharing, and governance. The workshop focused on exploring how to best make available Earth observations-based knowledge for international policy frameworks, including the United Nations 2030 Agenda for Sustainable Development, the Sendai Framework on Disaster Risk Reduction, and the Paris Climate Agreement. In each session, the participants discussed international issues related to, for example, the Global Earth Observation System of Systems (GEOSS), data governance, policy, and satellites. In addition, NASA, ESA, and UN agencies introduced their products and projects, e.g., CEOS Open Data Cube, GEOSS Platform, Space4Water Portal, and GRID3. In the session on innovative approaches and societal impact, Miyamoto delivered a presentation entitled "Japan DIAS," explaining examples of using earth observation technology and data through DIAS-driven data integration with resultant societal impacts and benefits. In his presentation, he particularly highlighted a project promoted by the International Flood Initiative (IFI) to build a Platform on Water Resilience and Disasters. Introducing the cases of the Philippines and Sri Lanka, he described them as excellent examples of utilizing earth observation data, such as GSMaP and MODIS, for risk reduction of water-related disasters and producing significant societal impact. Those cases were highly recognized by the workshop participants as valuable cases that has led to social implementation instead of merely theoretical and technological assistance. They also asked questions on the technical and geographical expansion of the project. To meet such expectations, ICHARM is planning to expand the Platform initiative from Asian countries to other parts of the world and disseminate achievements by making the most of international conferences and other opportunities.



Scene of GEO Data Technology Workshop  
地球観測に関するデータ技術ワークショップの様子

(Written by Mamoru Miyamoto)



## Panel on Water and Disasters at the UNESCO International Water Conference

### ユネスコ国際水会議における水と災害パネル

In order to contribute to the enhanced understanding of the connective role of water in all the SDGs, UNESCO organized the "International Water Conference" for the first time on May 13-14, 2019, at the UNESCO Headquarters in Paris, France, where ministers from about 40 countries participated together with over 1,000 experts from 126 countries. Ms. Audrey Azoulay, the UNESCO director-general, provided welcoming remarks, in which she emphasized a holistic approach to the sustainable management of water. The conference was composed of a high-level panel and several thematic panels. Together with the High-Level Experts and Leaders Panel on Water and Disasters (HELP), ICHARM convened the "Panel on Water and Disasters" at 17:30-19:00 on May 13.

In this panel, Dr. Han Seung-soo, the chair of HELP and former prime minister of the Republic of Korea, gave a keynote speech. Referring to the 4th Special Thematic Session on water and disasters to be held in the UN headquarters in New York on June 24 this year, he expressed a strong hope that the panel would make fruitful discussions leading to the UN Climate Change Summit in September 2019. Two ministers, H. E. Mr. Kefentse Mzwinila, the minister of Land Management, Water and Sanitation Services, from Botswana and H. E. Mr. Ambroise Ouedraogo, the minister of Water and Sanitation, from Burkina Faso also introduced issues on water and disasters in their countries. From ICHARM, Director Toshio Koike made a presentation on the "Role of Science and Technology in Connecting Water, Disaster Risk Reduction (DRR), and Climate Change," explaining the end-to-end approach to achieving sustainable socio-economic development against water-related disasters and climate change, the need for facilitators in implementing science and technology in society, and an online information synthesis system to support such efforts. In the panel discussion, Ms. Uschi Eid, the former chair of the UN Secretary-General Advisory Board on Water and Sanitation (UNSGAB), and Ms. Ursula Shaefer-Preus, the former chair of the Global Water Partnership (GWP), made comments from their international experiences on water and disasters. The panel discussion put importance on connecting water, DRR, and climate change adaptation and highlighted the necessity to embed water and DRR towards the UN Climate Change Summit.

After the conference was wrapped up, a UNESCO Water Family meeting was held on the afternoon of May 14, and more than 20 UNESCO Chairs and Category II Centres (C2C) met together, which made the meeting a very rare opportunity. From ICHARM, Chief Researcher Tetsuya Ikeda delivered a presentation on the recent activities of ICHARM. The meeting was very interactive and informative, with many organizations sharing their activities and exchanging views and ideas with others.

In collaboration with partners such as HELP and UNESCO, ICHARM will continue to highlight the importance of promoting actions on water and disasters as well as climate change adaptation by making the most of such international conferences and other opportunities.



Dr. Han Seung-soo, Chair of HELP gave a keynote speech at the Panel on Water and Disasters  
水と災害パネルでのHELP・Han Seung-soo議長による基調講演



Director Koike made a presentation at the panel discussion  
パネルディスカッションで発表する小池センター長

持続可能な開発目標 (SDGs) 全てに水が関係していることへの理解向上を図るため、2019年5月13-14日、ユネスコとして初めて国際水会議がフランス・パリのユネスコ本部にて開催されました。会議には約40か国からの閣僚、126か国から1,000名を超える専門家が参加しました。ユネスコのAudrey Azoulay事務局長が歓迎の挨拶を行い、その中で水の持続可能な管理を行うには包括的な取り組みが必要と強調されました。会議はハイレベル・パネルといくつかのテーマ別セッションで構成され、ICHARMは、5月13日の17:30~19:00に、水と災害ハイレベル・パネル (HELP) 事務局と「水と災害パネル」を共催しました。

本パネルでは、HELP議長で韓国元首相であるHan Seung-soo氏が基調講演を行い、今年6月24日にニューヨークの国連本部で開催される、第4回水と災害に関する特別テーマティックセッションを紹介するとともに、本パネルでの議論が、今年9月に開催される国連気候変動サミットにつながるべくいくことへの期待が表明されました。また、ボツワナの土地管理・水・衛生サービス大臣であるKefentse Mzwinila氏、ブルキナファソの水衛生大臣であるAmbroise Ouedraogo氏が、各々の国での水と災害に関する状況について紹介されました。ICHARMの小池俊雄センター長は、「水・防災・気候変動との関係性における科学技術の役割」について発表を行い、水災害や気候の変化に対して、社会経済の持続的な発展を実現する枠組みとしてのEnd to Endの取り組み、科学技術を社会に実装するためのファシリテータの必要性や、それを支えるオンライン情報統合システムを紹介しました。パネルディスカッションでは、国連水と衛生諮問委員会の元議長であるUschi Eid氏、世界水パートナーシップの元事務局長であるUrsula Shaefer-Preus氏が、それぞれ水と災害に関する国際的な経験に基づき発言されました。このパネルディスカッションでは、水と防災、気候変動を関連付けることの重要性、水と防災を国連気候変動サミットに向けて組み入れることの必要性が確認されました。

会議の終了後、5月14日午後、ユネスコWater Family会合が開催され、20を超えるユネスコ・カテゴリー2センターやユネスコ・チェアの代表者が参加しました。ICHARMからは池田鉄哉上席研究員が参加し、最近の活動状況について発表を行いました。ユネスコの水に関係する機関が集う機会はあまり多くないことから、こうした会合で他のセンター・チェアの活動を知り、意見交換を行うことは非常に双方向的で有益でした。

ICHARMではHELPやユネスコ等のパートナー機関と協働しつつ、こうした国際会議などの機会を活かし、

水と災害、そして気候変動適応策に関する行動を促進することの重要性を強調していきたいと考えています。

(Written by Tetsuya Ikeda)

## The 15th IAEA International Symposium on Isotope Hydrology in Vienna 第15回 IAEA 国際同位体水文学シンポジウムがウィーンで開催

Maksym Gusyev 専門研究員は、5月20日から24日、オーストリア・ウィーンにある国際原子力機関 (IAEA) 本部で開催された第15回国際同位体水文学シンポジウムに参加しました。本シンポジウムは、4年に一度開催される非常に注目度の高い国際会議であり、「水循環プロセス理解促進」を主要テーマとした今回は、水資源の持続可能な管理のための同位体技術の利用を推進すべく、78カ国から科学者や実務者が参加しました。

開会式では、IAEA 事務次長兼原子科学・利用局長である Najat Mokhtar 博士が挨拶し、2030年までに国連持続可能開発目標6「きれいな水と衛生」を達成すべく、同位体技術の活用推進を訴えました。博士は、水文学、廃水処理、農業における同位体利用の促進を議論する IAEA サイドイベントの議長も務められました。

基調講演や口頭発表では、同位体技術の応用に関する全球規模あるいは特定地域の事例が報告されました。特に、南アフリカ・ケープタウンにおける干ばつや、ICCHARM の活動に関連する話題として西アフリカ・アジアにおける利用可能な地下水資源調査など、水関連災害への同位体技術の利用に関する事例などがありました。続くポスター発表では、研究成果や現在進行中の活動に関する議論が盛んに行われました。

Gusyev 専門研究員は、日本国本州と北海道を対象地域として、3年間実施してきたトリチウムトレーサーの研究をまとめたポスター発表を行い、水の平均移動時間が、河川で9~31年、湧水で2~19年、井戸水で1~89年、鉱泉で204年と推定できることを報告しました。これらの先進技術の成果は、IAEA 地域協力協定 (RCA) RAS7030 プロジェクトを通じ、日本およびアジア諸国における環境トリチウムトレーサーの利用促進に役立てられています。また、同プロジェクトでは、2016年から、Gusyev 専門研究員が IAEA 専門家および日本国プロジェクト調整官代理を務めています。

Research Specialist Maksym Gusyev participated in the 15th International Symposium on Isotope Hydrology held at the International Atomic Energy Agency (IAEA) Headquarters on May 20-24, 2019, in Vienna, Austria. The IAEA international symposium titled "Advancing the Understanding of Water Cycle Processes" was attended by representatives of 78 countries and is a high profile quadrennial event bringing scientists and practitioners to advance the use of isotopic techniques for sustainable management of water resources.

IAEA Deputy Director General and the Head of the Department of Nuclear Sciences, Dr. Najat Mokhtar, gave an opening address at the international symposium emphasizing the use of isotopic techniques to achieve the United Nations Sustainable Development Goal 6 on "Clean Water and Sanitation" by 2030. She also chaired the IAEA side event titled "Water, Water Everywhere?" to promote the use of isotopes in hydrology, wastewater treatment, and agriculture.

The keynote speakers and oral presenters of the international symposium demonstrated applications of isotopic techniques globally and in selected case studies across the world. In particular, isotope applications for water-related disasters, such as the 2018 drought in Cape Town, South Africa, and for characterization of available groundwater resources in West Africa and Asia are relevant for on-going ICHARM project activities. Poster presentations that followed oral sessions gave ample opportunity to discuss research findings and on-going activities.

In the 15th symposium, Dr. Gusyev gave a poster presentation summarizing activities of the 3-year ICHARM tritium-tracer research at the main and Hokkaido islands estimating mean transit times of 9-31 years in river water, of 2-19 years in groundwater springs, of 1-89 years in wells and of 204 years in geothermal water. These results of advanced technology promote the use of environmental tritium-tracer in Japan and other Asian countries via the IAEA/Regional Cooperative Agreement (RCA) RAS7030 Project, in which Dr. Gusyev has been the IAEA expert and alternate National Project Coordinator of Japan since 2016.



IAEA Deputy Director General, Dr. Najat Mokhtar, chairs the IAEA side event サイドイベント "Water, Water Everywhere?" の議長を務める IAEA 事務次長 Mokhtar 博士

(Written by Maksym Gusyev)

## Kick-off meeting of the 9th World Water Forum

### 第9回世界水フォーラム・キックオフ会合

After the 8th World Water Forum (WWF8) held in Brasilia, Brazil, in March 2018, it was decided to organize the 9th World Water Forum (WWF9) in Dakar, Senegal, in 2021, with the central concept of "Water security for peace and development." As its preparatory process, the WWF9 kick-off meeting was held in Dakar on June 20-21, 2019, which attracted more than 600 participants from the world. Mr. Loic Fauchon, the president of the World Water Council (WWC), and Hon. Mr. Serigne Mbaye Thiam, the minister of water and sanitation of Senegal, gave an opening speech at the opening ceremony. After that, participants from the public, academic and private sectors, international organizations, and citizens' groups attended parallel sessions held under the following four themes: "Water Security," "Cooperation," "Rural Development," and "Means and tools." In each session, the participants made suggestions of the concepts of the programs for WWF9, based on their experiences.



Participants from Japan  
(From left) Chief Researcher Ikeda, Ms. Yumiko Asayama, Asia Pacific Water Forum, Mr. Kazuhisa Ito, a member of Board of Governor of WWC  
日本からの参加者  
(左から) 池田上席研究員、朝山由美子・アジア太平洋水フォーラム、伊藤和久・世界水会議理事

From ICHARM, Chief Researcher Tetsuya Ikeda participated. Exemplifying a recent flood disaster in Mozambique, he commented that water-related disaster risk reduction has become an increasingly important agenda in Africa in light of the impact of climate change and social changes such as popula-



Opening Ceremony  
開会式

tion growth and rapid development. He then emphasized that water and disasters should be highlighted as one of the key themes at WWF9, which gained full support from the participants. He also informed them of the 4th Asia-Pacific Water Summit to be held in Kumamoto, Japan, in October 2020, which will contribute to the Regional Process of Asia and the Pacific at WWF9.

As an international research center focusing on water and disasters, ICHARM will actively participate in the preparatory processes toward WWF9 and will take the initiative in creating fruitful discussions for effective solutions on this topic.

2018年3月に第8回世界水フォーラム (WWF8) がブラジル・ブラジリアで開催された後、「平和と発展のための水の安全保障」というメインコンセプトにより、第9回世界水フォーラム (WWF9) が2021年にセネガルのダカールで開催されることとなりました。その準備プロセスとして、2019年6月20～21日、ダカールでWWF9キックオフ会合が開催され、全世界から600名以上が参加しました。開会式では、世界水会議 (WWC) のロイ・フォーション会長、Serigne Mbaye Thiamセネガル水衛生大臣がそれぞれ開会挨拶を行いました。その後、政策決定者、学术界、国際機関、市民団体、そして民間企業からの参加者がWater Security (水の安全保障)、Cooperation (協力)、Rural Development (地域開発)、Means and tools (手段と手法) の4つのテーマに分かれて開かれたセッションに参加し、各々の経験を踏まえ、WWF9でのプログラムのコンセプトについて提案が行われました。

ICCHARMからは池田鉄哉上席研究員が参加し、モザンビークでの最近の洪水被害を例として、気候変動の影響、そして人口増加や急速な開発などの社会の変化によって、アフリカでも水災害対策がますます重要になってきているとコメント、WWF9においても水と災害を主要なテーマの一つとして焦点を当てるべきことを強調し、参加者から大いに支持されました。さらに、2020年10月には第4回アジア太平洋水サミットが日本・熊本で開催されることを紹介し、WWF9でのアジア太平洋Regional Processとして貢献することに言及しました。

水と災害に関する国際的な研究センターであるICCHARMは、WWF9に向けた準備プロセスに今後とも積極的に参画することによって、WWF9において有益な議論が展開され、有効な解決策が見いだされるよう、取り組んでいくこととしています。

リンク URL:

<https://www.worldwaterforum.org/>  
<http://www.worldwatercouncil.org/en/9th-world-water-forum-kick-meeting>

(Written by Tetsuya Ikeda)

## Fourth UN Special Thematic Session on Water and Disasters

### 第4回国連「水と災害」に関する特別テーマ会合

Among all types of disasters, water-related disasters account for 90% of the number of people affected, and that climate change is likely to cause devastating impacts socially and economically through extreme weather events. Therefore, political commitments must be matched by appropriate finance and policies for water-related disaster risk reduction and climate change adaptation. In March 2013, the United Nations Special Thematic Session on Water and Disasters was held for the first time, stressing that the theme of water and disasters should be recognized as a top political agenda through sharing experiences and discussing global actions

水災害はその影響者の数から見て全ての災害の90%を占めており、気候変動がもたらす異常気象は社会的・経済的に激甚な影響を及ぼすものと予想されます。そのため、水災害によるリスクの軽減、気候変動への適応に関して、政治的なコミットメントを実現させるために適切な予算・政策が必要となってきます。2013年3月には、元首・閣僚・国際

機関のトップによる経験の共有、地球規模での行動に関する議論を通じて、水と災害というテーマが高度な政治的な議題と認識されるよう、第1回国連「水と災害」に関する特別テーマ会合が初めて開催されました。この度、第4回国連「水と災害」に関する特別テーマ会合が、インドネシア、日本、韓国、メキシコ、オランダ、タジキスタンといった国連加盟国と水と災害に関するハイレベルパネル（HELP）との共催により、2019年6月24日にアメリカ・ニューヨークの国連本部で開催されました。会合では、韓国元首相でHELP議長のHan Seung-Soo氏、第73回国連総会議長のMaría Fernanda Espinosa Garcés氏らが開会挨拶を行いました。またモザンビークCarlos Agostinho do Rosário首相が基調講演を行い、同国はこの4月にサイクロン・ケネスによって甚大な被害を受けたことから、その復興への国際的な支援を訴えました。討論では、災害後の支出と比較して予防措置への投資の割合は少なく、その増額が必要であることについて、発表者全員が賛同しました。

午後にはWMO気象・水部長のJohannes Cullmann氏の進行により、水と災害に対処する科学技術セッションが開催されました。ICHARMからは小池俊雄センター長が発表を行い、科学技術は課題解決のための知見を有していることから、信頼に基づく関係性を通じて、問題構造を明らかにするとともに、可能な解決策を提示することで、科学技術コミュニティがファシリテーターとしての役割を担う必要があるとしました。全ての発表を終えて、Cullmann氏からは、どのように知見を提供していくか、コミュニティを支援していくか、リスクコミュニケーションを進めていくか、そしてどのようにして既存のシステムと情報通信技術（ICT）をリンクさせていくかがカギであると取りまとめました。

本会合では「水と災害に関するグローバルレポート」と「水災害リスク軽減のための投資・資金調達に関する原則」の2つの報告書が発表され、今年9月の国連気候変動サミットなど、国連の主要な会議に伝えていくこととされました。ICHARMは水と災害に取り組む国際センターとして、本会合で活動報告を行うとともに、世界的なハイレベル政策決定者との議論に参加したことは極めて有意義でした。

among the heads of states, ministers and the heads of international organizations.

On June 24, 2019, the fourth UN Special Thematic Session on Water and Disasters was held at the UN Headquarters in New York, USA, co-sponsored by several UN Member States (Indonesia, Japan, the Republic of Korea, Mexico, the Netherlands, and Tajikistan) and the High-level Experts and Leaders Panel on Water and Disasters (HELP). The opening remarks were delivered by Dr. Han Seung-Soo, the former prime minister of the Republic of Korea and the chair of HELP, and H.E. Ms. María Fernanda Espinosa Garcés, the president of the 73rd Session of the United Nations General Assembly, as well as some others. H.E. Mr. Carlos Agostinho do Rosário, the prime minister of the Republic of Mozambique, provided the keynote speech. As Mozambique was seriously damaged due to Cyclone Kenneth this April, he asked for international support to rebuild the country from the severe flood damage. During the discussion, all the speakers agreed on the need for increased investment in preventative measures as they are comparatively small in proportion to post-disaster expenditures.

On the afternoon of the 24th, the Science and Technology Session to Address Water and Disasters was held, facilitated by Dr. Johannes Cullmann, the director of the Climate and Water Department, World Meteorological Organization (WMO). In this session, pointing out that science and technology (S&T) can be a source of knowledge to solve the problems, ICHARM Director Toshio Koike highlighted that the S&T community needs to play the role of facilitator to clarify the mechanisms of problems and provide possible solutions through a trust-based relationship. After all the presentations, Dr. Cullmann summarized the discussions into several key points for further consideration: how to provide knowledge, support community, communicate risk, and link ICT to existing systems.

At the session, two reports, "Global Report on Water and Disasters" and "Principles on Investment and Financing for Water-related Disaster Risk Reduction," were launched and will be delivered at relevant major UN conferences such as the UN Climate Change Summit this September. As an international centre focusing on water and disasters, the session was a significant opportunity to present the activities of ICHARM and to be involved in discussions with the high-level policy makers of the world.



Opening address by Dr. Han Seung-Soo, Chair of HELP  
HELP 議長 Han Seung-Soo 氏の開会挨拶



Presentation by Director Koike, ICHARM  
ICHARM 小池センター長による発表

(Written by Tetsuya Ikeda)

## ICHARM held a technical session on “Water and Disasters - Toward Building Resilient Society under Climate Change -” at CECAR8

第8回アジア土木技術国際会議（CECAR8）において ICHARM テクニカルセッション「水と災害—気候変動下での強靱な社会づくり—」を開催しました

The 8th Civil Engineering Conference in the Asian Region (CECAR8) was held from April 16 to 19 at Hotel Metropolitan Ikebukuro, Tokyo, Japan. Since 1998, the Civil Engineering Conference in the Asian Region (CECAR) has been held every three years, covering all technical fields of civil engineering relevant to the Asia Pacific Region, such as structural, geotechnical, environmental, water resources, transportation, and disaster management. The main organizer is the Asian Civil Engineering Coordinating Council (ACECC), which consists of 13 organizations including the Japan Society of Civil Engineering (JSCE). The conference was held in Japan for the first time in 18 years after CECAR2 was held in April 2001 in Tokyo.

In this event, ICHARM organized a technical session (TS2-6) titled on “Water and Disasters – Toward Building Resilient Society under Climate Change –” on April 17. Hisaya Sawano, the deputy director of ICHARM, moderated the session, and Dr. Hiroshi Watanabe, the vice president of PWRI, gave an opening address. A series of technical presentations were then delivered by experts in different areas including Dr. Hirotada Matsuki from MLIT of Japan, Prof. Chjeng-lun Shieh from the National Cheng Kung University of Taiwan, and Mr. Irfan Sudono from the Research Centre for Water Resources of Indonesia. Mamoru Miyamoto, a researcher of ICHARM, was also among the speakers and spoke about the Philippines’ progress in disaster management efforts on behalf of Engr. Maximo L. Carvajal, the assistant secretary of DPWH.

After the technical presentations, ICHARM Director Toshio Koike chaired the panel discussion with the speakers, where they discussed how to take necessary actions to cope with changes in the scale of hazards as well as social changes such as aging and depopulation. In conclusion, the panel emphasized the necessity to encourage local authorities to build a resilient society by considering interdisciplinary cooperation with natural and social sciences, introducing a transdisciplinary approach to society, and ensuring a decision-making process based on reliable data.

The session, which gathered about 50 participants, was a good opportunity to highlight water-related disaster issues, for Japan has been suffering from so many flood disasters in recent years.



Panelists of the ICHARM Technical Session  
テクニカルセッションのパネリストの皆様

(Written by Yosuke Tomizawa)

2019年4月16日から19日にかけて東京・池袋のホテルメトロポリタンにおいて、第8回アジア土木技術国際会議（CECAR8）が開催されました。アジア土木技術国際会議（CECAR）は、構造、地盤、環境、水資源、交通、防災といったアジア太平洋地域の土木工学に関するすべての分野を対象として1998年より3年ごとに開催されています。CECARは日本の土木学会を含め各国の13の団体からなるアジア土木学協会連合協議会（ACECC）によって開催されます。日本では2001年4月にCECAR2が東京で開催されて以来、18年ぶりの開催となります。

CECAR8開催期間中の4月17日、ICHARMではテクニカルセッション（TS2-6）「水と災害—気候変動下での強靱な社会づくり—」を開催しました。セッションの進行は澤野グループ長が務め、土木研究所・渡辺博志理事が開催挨拶を行いました。セッションでは国土交通省の松木室長、台湾成功大学のChjeng-lun Shieh教授、インドネシア水資源研究センターのIrfan Sudono氏がそれぞれ発表を行い、フィリピン公共事業道路省次官補のMaximo L. Carvajal氏の代理としてICHARM宮本守研究員がフィリピンでの活動進捗報告を行いました。

発表後のパネルディスカッションでは小池俊雄センター長が司会を務め、災害規模の変化や高齢化・過疎化といった社会の変化に対してどのような行動が必要かについて議論が行われました。そこでは、地方行政が主体となった強靱な社会づくりには、自然科学と社会科学の学際的な協力、社会への分野横断的な取り組み、信頼できるデータに基づく意思決定プロセスの保証が重要であることが強調されました。セッションには約50名が参加され、昨今、日本でも数多くの洪水被害が発生していることから、こうした水災害を対象としたセッションを開催したことは良い機会となりました。

## UNESCO Pakistan Project ユネスコパキスタンプロジェクト

2011年から、ユネスコは日本政府と協力してパキスタンの洪水予測と早期警戒システム、およびインダス川流域の氾濫原のハザードマッピングを高度化することを目的とした「UNESCO Pakistan Project」を開始しました。このプロジェクトのとりまとめとして、2回のワークショップが開催されました。

2018年12月20日-21日にインドネシアのジャカルタで「Internal Technical Assessment Workshop of Second year of implementation of the Strategic Strengthening Flood Capacity and Management of Pakistan-phase 2」が開催され、プロジェクトパートナーから成果報告が行われ、インドネシア・アフガニスタンの政府関係者と共有しました。また、それぞれの国の洪水対策に関して報告がなされました。

ICHARMは1)インダス川全域の降雨流出氾濫モデルの構築とその実装、同手法のトレーニング、2) ADCPによる計測に関する機器の導入・運用の継続活用に関するトレーニングを実施してきました。本ワークショップでは、小池俊雄センター長、伊藤弘之上席研究員、望月貴文主任研究員、萬矢敦啓主任研究員が出席し、これらの成果について報告しました。小池センター長からは、今後の展開として、成果の統合と連携について提案がなされました。

また、2019年4月23日-24日にパキスタンのイスラマバードで「Strategic Strengthening of Flood Warning and Management Capacity of Pakistan/From Managing Floods to Managing Water Economies」が開催され、最新の洪水予測と浸水モデル化ツールがパキスタン政府に引き渡されました。本ワークショップにはアフガニスタン、オーストラリアの政府の代表者、国際的な寄付者およびパートナー、地元の大学のパートナー、ならびにパキスタンの連邦および州政府の高官が出席しました。本ワークショップにおいて、小池センター長は、ICHARMのプロジェクト全体の取組のレビューと次のステップへの構想について発表しました。本プロジェクトの成果がパキスタンの洪水被害軽減に寄与することを願っています。

In 2011, UNESCO launched a major project in cooperation with the government of Japan, aiming to upgrade the flood forecasting and early warning systems of Pakistan and the hazard mapping of the floodplains in the Indus River basin. Two workshops were held to conclude this project.

On December 20-21, 2018, the “Internal Technical Assessment Workshop of the Second year of Implementation of the Strategic Strengthening Flooding Capacity and Management of Pakistan-phase 2” was held in Jakarta, Indonesia. The results were reported from project partners and shared with government officials in Indonesia and Afghanistan. Furthermore, each country reported their efforts on flood control.

ICHARM conducted a series of activities in this project: 1) the development and implementation of a rainfall-runoff model in the Indus River basin and training for the effective use of the model; and 2) training for the continuous use of acoustic Doppler current profilers (ADCP), including how to set up and operate the main and peripheral equipment. In this workshop, ICHARM Director Toshio Koike, Chief Researcher Hiroyuki Ito, Senior Researchers Takafumi Mochizuki and Atsuhiko Yorozuya reported the achievements in these activities. The director also proposed a plan, “Designing a Next Step: Integration and Coordination,” for further system enhancement in his presentation.

The other workshop, “Strategic Strengthening of Flood Warning and Management Capacity of Pakistan: From Managing Floods to Managing Water Economies,” was held in Islamabad, Pakistan, on April 23-24, 2019, and newly developed flood forecasting and inundation models were officially handed over to the Pakistani government. This workshop was attended by the representatives of the governments of Afghanistan and Australia, international donors and partners, local university partners, and senior officials from the Pakistan federal and provincial governments. The director of ICHARM delivered a presentation entitled “Reviewing the Indus Project and Designing a Next Step.” ICHARM, as well as all parties involved in this project, hope that the results of the project will contribute to the reduction of flood damage in Pakistan.



Year-3 Partners International Technical Workshop and Steering Committee Meeting  
Strategic Strengthening of Flood Warning and Management Capacity of Pakistan

20-21 December 2018 | Jakarta, Indonesia

Participants of the workshop  
ワークショップの参加者

(Written by Takafumi Mochizuki)

# Field Survey

## The preparatory meeting of the Platform on Water Resilience and Disasters in Indonesia and field surveys in the Solo River

インドネシアにおける水のレジリエンスと災害プラットフォーム準備会議及びソロ川現地調査

The preparatory meeting of the Platform on Water Resilience and Disasters in Indonesia was held on April 9, 2019, at the Ministry of the Public Works and Housing (PUPR) in Jakarta, Indonesia. About 30 experts participated from the water-related government organizations of Indonesia including PUPR, the National Agency for Disaster Countermeasure (BNPB), the Agency for Meteorology, Climatology and Geophysics (BMKG), and the Ministry of Environment and Forestry (KLHK).

In the opening remarks, Mr. Lukman Hakim, the head of the Research and Development Agency of PUPR, expressed his expectations that the meeting would facilitate information sharing among the organizations related to water disasters. Director of ICHARM Toshio Koike explained the background of the meeting, its relationship with other international projects, and expected outcomes and prospects.

From the Indonesian side, Mr. Marjuki, M.Si, the deputy director for Applied Climate Information of BMKG, Mr. Mohd Robi Amri, the deputy director of BNPB, Dr. Ernawati, M.Sc, the deputy director of Monitoring & Evaluation of KLHK, and Mr. Pian, a researcher of the Research Center for Water Resources (PUSAIR), PUPR, introduced the activities of their organizations regarding disaster management in Indonesia.

In the latter part of the meeting, the participants exchanged views and ideas on future plans and other issues. Mr. Hakim proposed establishing a platform on water resilience and disasters, and his proposal was approved by the participants of each organization. During the discussion, some participants also pointed out the importance of coordinating upstream and downstream development, mapping member organizations' activities to avoid overlaps, and ensuring the initiative of the government of Indonesia for the platform. The participants also agreed with PUSAIR would be the communication hub of the platform for the time being.

Following the preparatory meeting, Senior Researchers Hitoshi Umino and Yosuke Tomizawa conducted field surveys in the Solo River basin on April 11-13. On the first day, they visited the PUPR Solo River Basin Bureau, the Solo River Basin Water Resources Management Office, and the First Water Corps Solo River Basin Office in Surakarta City (formerly Solo City). The two researchers examined the water resource management plan (RENCANA) and the reservoir operation method.

On the second day, they visited the Surakarta City Water Supply Corporation and gathered information on the current situation of water intake and future business expansion plans. In addition, they revisited the PUPR Solo River Basin Bureau and conducted interviews on groundwater wells and collected relevant data and information. On the afternoon of the second day, they went to an irrigation pond in Giriroto Village near Surakarta City, Cenklic Dam located in Margorejo Village, and a water intake facility and a water treatment plant of the Surakarta City Water Supply Corporation.

On the final day, they conducted surveys on water use in the Madium River basin, the main tributary of the Solo River, at several locations: Pondok Dam, irrigation wells in Gempol Village, Jati Fort, and Jejeruk Dam.



Hearing at irrigation wells in Gempol Village  
灌漑用地下水井でのヒアリング状況

2019年4月9日、インドネシア・ジャカルタにおいて水のレジリエンスと災害プラットフォームに関する準備会議が開催されました。この会議には ICHARM から小池俊雄センター長、澤野久弥グループ長、海野仁主任研究員、富澤洋介主任研究員が、またインドネシアからは公共事業・住宅省 (PUPR)、国家防災庁 (BNPB)、気象気候地球物理庁 (BMKG)、環境林業省 (KLHK) といった洪水に関係する機関から約 30 名が参加しました。

開会挨拶では、ルクマン・ハキム公共事業・住宅省調査開発庁長官から、水災害に係る省庁が集まって、情報共有を行う本会議への期待が示されました。

小池センター長からは本会議の背景、国際活動との関連、期待される成果と展開について発表がありました。

つづいて、インドネシア側から、BMKG のマルジュキ 課長、BNPB のモハメッド・ロビ・アムリ 課長、KLHK のエルナワティ 課長及び PUPR の水資源研究所 (PUSAIR)、ピアン氏からそれぞれ現在の防災に関する取り組みについて発表がありました。

発表の後、会議参加者の間で今後の進め方等について意見交換を行うとともに、ルクマン長官から水のレジリエンスと災害に関するプラットフォームの設立が提起され、各省庁の参加者から賛同を得られました。また、参加者からは上下流の協調や、プラットフォームの活動にあたって各機関の重複を避けるための整理、インドネシア政府が主体性を持って活動を進めることが重要との指摘がありました。最後に PUSAIR がプラットフォームの連絡担当を当面務めることを決定して、会議は閉会しました。

会議に引き続き、4月11日～13日の日程で海野主任研究員及び富澤主任研究員はソロ川流域における現地調査を行いました。11日はスラカルタ市 (旧ソロ市) にある公共事業・住宅省ソロ川流域局、ソロ川流域水資源管理事務所、第一水公園ソロ川流域事務所をそれぞれ訪問し、ソロ川流域水資源管理計画 (RENCANA) の疑問点や貯水池の運用方法について調査しました。12日はスラカルタ市水道公社を訪問し、現在の取水の状況や将来の事業拡張計画等について聞き取りを行いました。また、公共事業住宅省ソロ川流域局を再訪し、地下水井についてヒアリング、及び資料の収集を行いました。12日午後にはスラカルタ市近傍のギリロト村にあるため池、マルゴレジョ村に位置するチェ

ンクリックダム、及びスラカルタ市水道公社の取水施設と浄水場を訪問しました。

翌13日には、ソロ川の主要支川であるマディウン川流域の施設として、ボンドックダム、ゲンボル村にある灌漑用地下水井、ジャティ堰、ジェジェルク堰を訪問し、水利用について調査を行いました。

これらの現地調査の結果については、ICHARMで現在取り組んでいる統合的気候モデル高度化研究プログラム等の研究に反映していく予定です。

The results of the field surveys will be reflected in the Integrated Research Program for Advancing Climate Models (the TOUGOU program).



Participants of the preparatory meeting of the Platform on Water Resilience and Disasters in Indonesia  
水のレジリエンスと災害プラットフォームに関する準備会議の参加者

(Written by Yosuke Tomizawa)

## Others

### ICHARM Open Day 2019 held for local school students

#### ICHARM Open Day 2019～茨城県立竹園高等学校・茨城県立並木中等教育学校 ICHARM訪問～

4月23日、ICHARMは「ICHARM Open Day」を開催しました。茨城県立竹園高等学校・茨城県立並木中等教育学校の生徒112名（竹園文系クラス37名、理系クラス44名、並木中高31名）及び教諭6名の参加となりました。本イベントは、ICHARMの博士・修士課程の外国人学生及びICHARMスタッフが協力し、講演、発表及び質疑応答はすべて英語で行われました。

第1部の講演会は、ICHARM小池俊雄センター長による“Transform a Society against Floods under Climate Change”、博士課程の学生のAhmed Tanjir Saifによる“Water Related Disasters around the World in 2018”の講演が行なわれ、2018年の日本国内における水災害軽減のための取り組み、世界各国の干ばつや洪水などが紹介されました。生徒たちは、パワーポイントに映し出されたスクリーンに目を凝らすとともに、発表に熱心に耳を傾けていました。

第2部のポスターセッションでは、9カ国の修士学生およびインターン学生（バングラデシュ、インド、ネパール、パキスタン、フィリピン、スリランカ、リベリア、ミャンマー、韓国）が各々パネルを作成し、各国の文化紹介から水災害事情にわたる説明を行い

The ICHARM Open Day 2019 was held on April 23. It is organized annually as an open house event. Students studying in ICHARM's graduate programs (ICHARM students) and office assistants cooperated to prepare for this event. This year, local students, 81 from the Ibaraki Prefectural Takezono High School and 31 from the Ibaraki Prefectural Namiki Secondary School, were invited along with six teachers. The event contained brief lectures, poster presentations, and Q&A sessions, which were all conducted in English.

The open day started with a lecture entitled “Transform a Society against Floods under Climate Change” by Director Toshio Koike. Then, Mr. Ahmed Tanjir Saif, a doctoral course student, gave a short lecture entitled “Water Related Disasters around the World in 2018”. The local students were impressed with the power-point slides and listened to the lectures very earnestly.

After the lectures, the local students enjoyed poster presentations prepared by the ICHARM students including an intern student from nine countries of Bangladesh, India, Nepal, Pakistan, the Philippines, Sri Lanka, Liberia, Myanmar, and Korea. The young local students had a very exciting time communicating everything in English at each poster presentation.



Lecture by Mr. Tanjir at the auditorium  
博士課程学生Tanjirによる講演会



Bangladesh Booth  
バングラデシュブース



Afterwards, we collected comments from the local high school students who participated in the event. Many students found presentations interesting and informative. They also mentioned that they learned a lot about the world's natural disasters such as floods, landslides and debris flows. Others commented that it was a valuable opportunity in which they were able to interact with people from different countries in English. They added that, through the interaction, they enjoyed the cross-cultural experience very much and could really feel that each country has its own unique culture. The ICHARM students also had a great time talking with young Japanese students and sharing their culture and experience with them.



Poster presentation by each countries' ICHARM students  
ICHARM学生によるポスター発表セッション

The ICHARM Open Day is a unique event for local students to learn water issues around the world in English and has been fruitful for both students and ICHARM. We will continue to hold this event every spring, hoping that young students will be inspired to become hydrologists in the future.



Students and ICHARM staff at the entrance hall  
生徒さんとICHARM学生、スタッフ—エントランスホールにて

(Written by Mikiko Nakamura)

ました。生徒達は、小グループに分かれ、各々のパネルの前で説明を受けるとともに、英語による質疑応答や、外国人学生達とのコミュニケーションを楽しみました。イベント終了後に生徒達に行なったアンケートでは「水災害やそれによる被害の詳細についてまで詳しく学ぶことができた。」「いろいろな国の方々と交流でき、国それぞれで違った発音の英語が聞けた。服装なども伝統的なものを着てくれていたので、なじみやすく、とても楽しく学べた。」などイベントを評価する意見が多くありました。ICHARMの外国人学生も、「我々にとっては日本の生徒さんたちと触れ合うとてもいい機会だったし、生徒さんたちにとっては各国の水災害について学べるよい機会であったと思う。」と、喜んでいました。「ICHARM Open Day」は、日本の中高生と外国人学生双方にとって、とても有意義なものであり、次世代の水災害軽減に関する研究者及び技術者の輩出に貢献できるため、来年も引き続き行なう予定です。

## Comment from internship student

### インターン生からのコメント

ICHARMでは、Korean Meteorological Institute under the Korean Meteorological Administration からのインターン生、Yeji Shin 氏を受け入れました。

彼女からの、ICHARMでの研究活動を振り返ったコメントを紹介いたします。

ICHARM accepted an internship student Ms. Yeji Shin from Korean Meteorological Institute under the Korean Meteorological Administration from March to May.

She contributed a short message as below while looking back at her studying at ICHARM.

**Ms. Yeji Shin** (from Korea)

Korean Meteorological Institute under the Korean Meteorological Administration

Stay period: March 4 - May 31, 2019

My name is Yeji Shin and I was an education program student at Korean Meteorological Institute under the Korean Meteorological Administration. I studied at ICHARM for three months, from March to May. During my internship, I was able to learn Rainfall Runoff Inundation model under the supervision of Dr. Ushiyama Tomoki. Furthermore, because I am a meteorologist, I also could learn a Weather Research and Forecasting model under my supervisor, Dr. Ushiyama. The title of my study is Flood Forecasting of Davao River Basin caused by Typhoon rainfall which is damaged by increased typhoon due to global warming. Under the guidance of Dr. Ushiyama, I learned RRI model from a set of RRI to using necessary inputs and run the flood inundation simulation by changing various parameters. Also, I stepped the same way to learn Meteorological model. Based on this study, I figured out the result it can make early warning of flooding in Davao river basin before two days landing a typhoon using RRI model. Based on the knowledge gained from my study at ICHARM, I could expect to start a new project for forecasting flooding in Davao river basin. It would be helpful in the decision-making process for decreasing the damage from flood events and city urban planning in the future.



Ms. Yeji Shin (Right) with supervisor, Research Specialist Tomoki Ushiyama

Three months of study at ICHARM is a great opportunity for an international student like me who wants to work at the organization in Japan or other countries which one have advanced disaster management technology. Finally, I would like to appreciate all the responsible person of ICHARM for allowing me to study here and all the support during my stay.

## Personnel change announcement / 人事異動のお知らせ

### New ICHARM Members .....

Four new members joined ICHARM. They would like to say brief hello to the readers around the world.



**Yoichi Washio / 鷺尾 洋一**

Senior Researcher / 主任研究員

Japan

I am very happy to be a member of ICHARM. I worked as a technical official at the Japanese Ministry of Land, Infrastructure, Transport and Tourism (MLIT) and local governments for 15 years. Since I have been wanted to work in areas related to capacity development, I'm so excited about this chance. I would like to do my best. Thank you.



**Ralph Allen Acierto / ラルフ アレン ラチエルト**

Research Specialist / 専門研究員

Philippines

I have previously worked on a flood risk reduction project in University Tokyo, but I have recently moved to ICHARM this year. I am very excited to be a part of ICHARM'S international and local initiatives on multi-level engagement in dealing with water-related risk management. I hope to contribute to ICHARM's thriving research and various activities.


**Daiki Kakinuma / 柿沼 太貴**
*Research Specialist / 専門研究員*
*Japan*

I obtained a doctorate at Chuo University last year and was assigned to the ICHARM Water-related Hazard Team as a research specialist. I'm working on the development of flood forecasting systems and flood management for rivers in Japan by making use of hydrological knowledge. I will try my best in both domestic and overseas operations and would like to contribute to disaster risk reduction around the world through various projects.


**Kentaro Aida / 会田 健太郎**
*Research Specialist / 専門研究員*
*Japan*

I am so glad to be a member of this center, ICHARM. My research interest is surface soil moisture monitoring by satellite microwave remote sensing, especially using SAR (Synthetic Aperture Radar). Today, many SAR satellites are operated, and their global data are provided at high spatial and temporal resolutions. Based on such data, I wish to help prevent water-related disasters such as erosion, runoff, flood, and drought. I will do my best to contribute to solving water-related problems in the world.

## Leaving ICHARM

- |   |  |
|---|--|
| <p>- <b>Hisaya Sawano</b>: Deputy Director of ICHARM<br/>Director of Planning and Research Administration Department<br/>Public Works Research Institute (on July 9, 2019)</p>  | <p>○ <b>澤野 久弥</b> グループ長<br/>土木研究所<br/>企画部長 (2019年7月9日付)</p>  |
| <p>- <b>Daisuke Kuribayashi</b> : Senior Researcher<br/>Vice section chief for planning and research<br/>Reconstruction Agency (on July 9, 2019)</p>  | <p>○ <b>栗林 大輔</b> 主任研究員<br/>復興庁<br/>企画調査官 (2019年7月9日付)</p>   |
| <p>- <b>Badri Bhakta Shrestha</b> : Senior Researcher<br/>Project Researcher<br/>River and Environmental Engineering Laboratory<br/>Department of Civil Engineering<br/>School of Engineering<br/>The University of Tokyo (on July 1, 2019)</p> | <p>○ <b>Badri Bhakta Shrestha</b> 主任研究員<br/>東京大学大学院工学系研究科<br/>社会基盤学専攻<br/>河川流域環境研究室<br/>特任研究員 (2019年7月1日付)</p> |

## Position Change

- |   |                                       |
|---|---------------------------------------|
| <p>- <b>Kazuhiko Fukami</b> : Director for Special Research<br/>Deputy Director of ICHARM</p> | <p>○ <b>深見 和彦</b> 特別研究監<br/>グループ長</p> |
|---|---------------------------------------|

## Awards / 受賞リスト

\* April - June 2019

- Senior Researchers **Daisuke Kuribayashi** and **Miho Ohara** were awarded the 2018 Excellent Technology Award by the Institute of Social Safety Science (ISSS) for the development of the ICHARM Disaster Risk Information System (IDRIS), which is a disaster-related information sharing system for municipalities.

*Kuribayashi gave an award-winning presentation on IDRIS on May 24, 2019, at the ISSS spring conference held in Kiso Town, Nagano Prefecture.*



2018年度地域安全学会技術賞受賞、栗林大輔主任研究員、大原美保主任研究員、市町村向け災害情報共有システム(IDRIS)の開発

5月24日の地域安全学会春季大会(長野県木曾町)にて栗林主任研究員が受賞記念講演を行いました。

## Business trips / 海外出張リスト

\* April - June 2019

- April 7 - 11, Indonesia, Hisaya Sawano, to attend the 1st IFI plenary meeting
- April 7 - 15, Indonesia, Hitoshi Umino and Yosuke Tomizawa, 1) to attend the 1st IFI plenary meeting 2) to have a field survey along Solo river and collect related data
- April 8 - 12, Indonesia, Toshio Koike, 1) to attend the 1st IFI plenary meeting 2) to attend the 2nd Asia Oceania GEO Workshop
- April 8 - 13, Austria, Mamoru Miyamoto and Yosuke Nakamura, European Geosciences Union (EGU) General Assembly 2019
- April 14 - 32, Malaysia, Shinji Egashira, to give lectures for the Master of Disaster Risk Management (MDRM) Programme at MJIT

- April 22 – April 26, Austria, Mamoru Miyamoto, GEO Data Technology Workshop
- May 12 - 19, France and Switzerland, Toshio Koike and Tetsuya Ikeda, 1) UNESCO International Water Conference 2) Science and Policy Forum for the Implementation of Sendai Framework for Disaster Risk Reduction 3) UNISDR 2019 Global Platform for Disaster Risk Reduction
- May 18 - 25, Austria, Maksym Gusyev, International Symposium on Isotope Hydrology
- May 26 - June 1, India, Tetsuya Ikeda, Field survey in Kerala State and meetings with related institutions
- May 30 - June 1, Thailand, Mamoru Miyamoto and Yosuke Nakamura, to participate in the 2nd JCC meeting regarding SATREPS in Thailand
- June 6 - 10, Geneva, Switzerland, Mamoru Miyamoto, Hydrological Assembly (WMO)
- June 14 - 18, Nanjing, China, Badri Bhakta Shrestha, to participate in the 8th International Conference on Water Resources and Environment Research (ICWRER 2019)
- June 17 - 22, Ulsan, Korea, Yosuke Tomizawa, to participate in the 14th Annual Meeting of the Working Group on Disaster Risk Reduction of the UNESCO/WMO Typhoon Committee
- June 15 - 20, Togo, Mohamed Rasmy Abdul Wahid, Maksym Gusyev and Katsunori Tamakawa, to attend a kick off meeting of Water related Disaster Platform to Enhance Resilience to Climate Change in West-Africa
- June 16 - 22, Bangkok, Thailand, Mamoru Miyamoto and Yosuke Nakamura, to participate in the IFAS training workshop at The Royal Irrigation Department of Thailand
- June 16 - 27, New Delhi in India, Dakar in Senegal, New York and Washington .D.C. in the USA, Tetsuya Ikeda 1)follow-up mtg for 3rd Japan-India Workshop on Disaster Risk Reduction 2)the 9th World Water Forum kick-off mtg 3)4th United Nations Special Thematic Session on Water and Disasters (STSWD4) and 13th Meeting of High-level Experts and Leaders Panel on Water and Disasters(HELP13) 4)Japan-World Bank Seminar on Water and Disaster
- June 15 - 29, Brussel in Belgium, Lome in Togo, Irvine, CA and Washington .D.C. in the USA, Toshio Koike 1)UNESCO west Africa project - Inception workshop 2)12th International Conference on Precipitation (IPC12) 3)4th United Nations Special Thematic Session on Water and Disasters (STSWD4) and 13th Meeting of High-level Experts and Leaders Panel on Water and Disasters(HELP13) 4)Japan-World Bank Seminar on Water and Disaster and World bank Brazil drought project discussion
- June 23 - 27, the Philippines, Miho Ohara, Naoko Nagumo and Ralph Allen Acierto, 1)Program Development Workshop on Sustainable Water Resource Management for Food Security in Southeast Asia 2)Meeting on SATREPS with UPLB and other related organizations
- June 25 - 30, Washington D.C. in the USA, Hiroyuki Tsutsui, To attend Japan-World Bank Seminar on Water and Disaster and a meeting with World Bank on the drought project (together with Prof. Koike and Dr. Ikeda)

## Visitors / 訪問者リスト

\* April - June 2019

- Visited by Embassy of India, Mr. Raj Kumar Srivastava and Ms. Setsuko Saya, May 8, 2019  
Purpose: Discussion for collaboration on disaster risk reduction between India and Japan  
- Mr. Raj Kumar Srivastava (Deputy Chief of Mission, Embassy of India)  
- Ms. Setsuko Saya (Director, Cabinet Office, Government of Japan)



- Visited by delegates from Changjiang Water Resources Commission (CWRC), May 10, 2019  
Purpose: Technical discussion and exchange between CWRC and ICHARM  
- Zhong Zhiyu, Chief Engineer, CWRC  
- Hu Xiangyang, Division Director, CWRC  
- Ding Yi, Division Chief Engineer, CWRC  
- Li Anqiang, Section Chief, CWRC  
- Wang Xuemin, Engineer, CWRC  
- Yan Lingzhi, Engineer, CWRC



- Visited by delegates from Department of Public Works and Highways (DPWH), Davao City, JICA Philippines, JICA Tokyo and Oriental Consultants Global, May 30, 2019

Purpose: Training on project for master plan and feasibility study on flood control and drainage in Davao City

- Mr. Nuguid Jeric John Umlas (UPMO-FCMC, Engineer II, DPWH)
- Ms. Espiritu Crissa Rica Velasco (BOD, Engineer III, DPWH)
- Mr. Tolosa Renz Russel Dejos (Planning Service-PPD, Engineer II, DPWH)
- Mr. Atajar Lorenz Magallanes (UPMO-FCMC-FCSEC, Engineer II, DPWH)
- Mr. Sotto Alain John Reales (RO XI, Engineer III, DPWH)
- Mr. Apao Newton Lulab (Davao 1st DEO, Engineer II, DPWH)
- Mr. Singco Samuel Alcorido (Planning Office, Engineer II, Davao City)
- Ms. Catherine Palanca (JICA Philippines Office)
- JICA Tokyo staff and Oriental Consultants Global staff



- Visited by delegate from Indonesia Defense University, June 25, 2019

Purpose: to attend a seminar on Water Related Hazard and Risk Management Measures organized by ICHARM

- Dr. M. Adnan Madjid, S.H., M.Hum.
- Dr. IDK Kertawidana, S.KM., M.KKK.
- Agus Winarna, S.IP., M.Si. M.Tr (Han).
- Ir. Sapto Ongko Putro, M.Si.
- Dr. Arief Budiarto, DESS.
- Sri Murtiana S.Sos. M.M.
- Total of 34 lectures, staff and students from Indonesia Defense University



## Publications / 発表論文リスト

\* April - June 2019

### 1. Journal, etc / 学術雑誌 (論文誌、ジャーナル)

- Badri Bhakta Shrestha, EDP Perera, Shun Kudo, Mamoru Miyamoto, Yusuke Yamazaki, Daisuke Kuribayashi, Hisaya Sawano, Takahiro Sayama, Jun Magome, Akira Hasegawa, Tomoki Ushiyama, Yoichi Iwami and Yoshio Tokunaga, *Assessing Flood Disaster Impacts in Agriculture under Climate Change in the River Basins of Southeast Asia*, Springer, Natural Hazards, June, 2019
- Asif Naseer, Toshio Koike, Mohamad Rasmy, Tomoki Ushiyama, Maheswor Shrestha, *Distributed Hydrological Modeling Framework for Quantitative and Spatial Bias Correction for Rainfall, Snowfall, and Mixed-Phase Precipitation Using Vertical Profile of Temperature*, JGR Atmospheres, Vol.124, Issue9, pp.4985-5009, May, 2019, <https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2018JD029811>
- Stewart, M.K., Morgenstern, U., Tsujimura, M., Gusyev, M.A., Sakakibara, K., Imaizumi, Y., Rutter, H., van der Raaij, R., Etheridge, Z., Scott, L., and S.C. Cox (2019). Mean residence times and sources of Christchurch springs, *Journal of Hydrology (New Zealand)* 57(2): 81-94.
- Gusyev M.A., Morgenstern U., Nishihara T., Hayashi T., Akata N., Ichiyangi K., Sugimoto A., Hasegawa A., and M.K. Stewart (2019). Evaluating anthropogenic and environmental tritium effects using precipitation and Hokkaido snowpack at selected coastal locations in Asia. *Science of the Total Environment* 659: 1307-1321, doi: 10.1016/j.scitotenv.2018.12.342

### 2. Oral Presentation (Including invited lecture) / 口頭発表 (招待講演含む)

- 牛山朋来、中村要介、平成30年7月豪雨に伴う岡山県高梁川のアンサンブル洪水予測実験、日本気象学会2019年度春季大会予稿集、p.297、日本気象学会、2019年5月15日~18日
- Mamoru Miyamoto, Yosuke Nakamura, Anurak Sriariyawat, Supattra Visessri, *Operational inundation forecasting contributing to business continuity management in the industrial complex scale – A case of the Chao Phraya River basin, Thailand -*, EGU General Assembly 2019, vol.21, p.12486, April 4-12, 2019
- Gusyev M.A., Kikumori Y., Nishihara T., Hayashi T., Ichiyangi K., Akata N., Oda T., Morgenstern U., and M.K. Stewart (2019). *Using tritium in Japanese precipitation for tritium-tracer transit time studies across Asia*. Presentation at the JpGU 2019 Meeting, Chiba, May 20-24th, Japan.
- 栗林大輔、崔 国慶、大原美保、藤兼雅和、浸水過程を考慮した地区単位での簡便な洪水リスク評価システムの開発、地域安全学会梗概集、No.44, pp.35-38、地域安全学会春季大会、地域安全学会、長野県木曾町、2019年5月

### 3. Poster Presentation / ポスター発表

- Yosuke Nakamura, Toshio Koike, Kazuyuki Nakamura, Shiori Abe and Takahiro Sayama, Real-time flood prediction utilizing a particle filter combined with RRI model, EGU General Assembly 2019, the European Geosciences Union, Austria Center Vienna, April 7-12, 2019
- Gusyev M.A., Kikumori Y., Denda M., Mizugaki S., Machida I., Akata N., Sakakibara K., Tsujimura M., Imaizumi Y., Morgenstern U., and M. Stewart (2019). Understanding water circulation with tritium-tracer measurements in selected catchments across Japan. Poster Presentation at the International Symposium on Isotope Hydrology: Advancing the Understanding of Water Cycle Processes CN-271, International Atomic Energy Agency (IAEA), Vienna, May 20-24, Austria.
- Gusyev M.A., Kikumori Y., Nishihara T., Hayashi T., Ichiyonagi K., Akata N., Oda T., Morgenstern U., and M.K. Stewart (2019). Using tritium in Japanese precipitation for tritium-tracer transit time studies across Asia. Presentation at the JpGU 2019 Meeting, Chiba, May 20-24th, Japan.
- 原田大輔、江頭進治、ダム流域における流砂・河床変動の評価法に関する研究、河川技術論文集、25巻、pp.711-716、河川技術に関するシンポジウム、土木学会水工学委員会河川部会、東京大学農学部弥生講堂、2019年6月12日～13日
- 山崎祐介、江頭進治、土石流の支配方程式を用いた天然ダムの形成過程、河川技術論文集、25巻、pp.705-710、河川技術に関するシンポジウム、土木学会水工学委員会河川部会、東京大学農学部弥生講堂、2019年6月12日～13日

### 4. Magazine, Article / 雑誌、記事（土技資含む）

None / 該当者無し

### 5. PWRI Publication / 土研刊行物（土研資料等）

None / 該当者無し

### 6. Others/ その他

- Gusyev M.A. (2019). Progress Report of the PWRI tritium research in the Chikuma River basin. Chikuma River Office, Nagano, April 12, Japan.

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