

# Newsletter



United Nations  
Educational, Scientific and  
Cultural Organization



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



Public Works Research Institute  
National Research and  
Development Agency, Japan



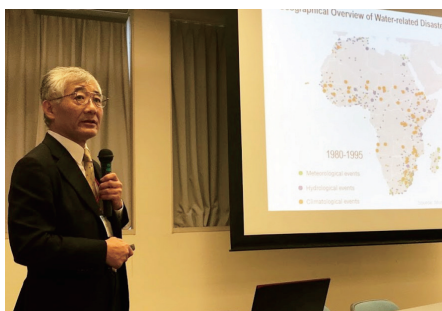
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# ICHARM

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

## Message from Director

### Quick Recovery and Grand Design for Future



Speech at the 7th Tokyo International Conference on African Development (TICAD7) on August 30, 2019  
第7回アフリカ開発会議での講演 (2019年8月30日)

We have had a serious flood disaster again this year. Powerful, massive Typhoon No. 19 (Hagibis), which had a central pressure of 915 hPa, inched towards Japan, while maintaining its super typhoon status, and made landfall in its central part and blew across its eastern part. The maximum rainfall during that period reached more than 1000 mm, and the historical maximum 12-hour rainfall was recorded at 120 stations. Banks breached at 140 locations, and sediment disasters occurred at 667 areas.

In spite of early warnings and preparation by the public and private sectors, severe damage resulted throughout the country, including 99 people either missing or dead, 3,723 houses completely or partially collapsed, and 33,121 houses inundated above the floor level\*.

It is needless to say that Japan should enhance its emergency relief and restoration capabilities quickly. In addition, we should strictly evaluate the effectiveness of non-structural countermeasures defined as mandatory in revised related acts, including the rapid designation of special alert areas, the possible maximum design rainfall for life-saving actions, stakeholders' platforms for reducing the risk of large-scale floods, and evacuation action plans for nursing homes. The results should be used for sorting out problems and improving and further strengthening the countermeasures. Additional measures should be implemented, if necessary.

Responding to a series of devastating flood disasters just after World War II and considering the time-consuming nature of flood control projects, Japan made efforts to establish a long-term infrastructure investment framework for flood risk reduction. After the massive damage by Typhoon Ida in 1958 and Typhoon Vera in 1959, the Erosion and Flood Control Emergency Measures Law was established in 1960. To implement measures required by the law, the Cabinet of the time adopted a 10-year national flood project. These bold decisions under the economic exhaustion after the war considerably contributed to the subsequent rapid economic growth of Japan. Now, evidently, we have come to recognize a new stage induced by changes in climate and society. While carrying out restoration from the recent disasters on the principle of Build Back Better, our untiring efforts are strongly desired to implement innovative, integrated flood countermeasures with a reasonable balance between structural and non-structural approaches by developing a rational, dynamic grand design based on science and technology.

\* The damage statistics cited in this article are quoted from the Disaster Report issued by the Cabinet Office on October 27, 2019.

### 素早い対応と将来へのグランドデザイン

今年もまた激甚洪水災害が発生しました。915hPaにまで発達した台風19号は、強い勢力を保ったまま日本に接近し、日本中部に上陸後、東日本を駆け抜けました。期間最大雨量は1000mmを超え、120箇所の雨量観測所で12時間雨量が過去最大を記録し、140箇所で河川が破堤し、667箇所で土砂災害が発生しました。その結果、事前の官民挙げての注意喚起と準備にも関わらず、死者・行方不明99名、住宅の全・半壊3,723棟、床上浸水33,121棟という大きな被害が報告されています。(※)

緊急の支援を充実させ、素早く復旧に漕ぎつけることは言うまでもありません。加えて、危険地域の指定の迅速化や、命を守る行動のための想定最大雨量、関係者間での対策協議の場、要配慮者施設での避難計画など、法改正で義務化したソフト対策の有効性を厳密に検証しなければなりません。その結果、問題点を洗い出して改善、強化し、必要に応じて追加の対策を進めなければなりません。

戦後打ち続く激甚水害と時間を要する治水事業の性質に鑑み、我が国は長期的な社会資本投資の枠組み作りの努力を重ねました。その結果、昭和33年の狩野川台風、翌34年の伊勢湾台風災害を踏まえ、昭和35年に治山治水緊急措置法が制定され、この一環として治水事業10か年計画が閣議決定されました。戦後経済が疲弊していた中でこの英断は、その後続く日本の高度成長に大きく貢献しました。今、私たちは気候と社会の変化による新たなステージの開始を認識しております。より良い復興を遂げつつ、科学技術に基づく合理的で精緻で大胆なグランドデザインを描くことによって、ソフト、ハードがバランスする革新的で統合的な水害対策実現へのため努力が望まれます。

※被災数値は10月27日付内閣府被災報告より

October 28, 2019  
Toshio Koike  
Director of ICHARM



## **Coming Events**

3. ICHARM will organize a technical session at the World Bosai Forum 2019 / 世界防災フォーラム 2019 テクニカルセッションの開催案内

## **Special Topics**

4. Aga town Risk Information System now open for public use / 阿賀町災害情報共有システム (ARIS) の一般公開はじまる

## **International Flood Initiative (IFI)**

5. The meeting for the Platform on Water Resilience and Disasters in Indonesia / 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に関する会議」の開催
7. Training on climate change prediction model analysis and rainfall-runoff-inundation model in Sri Lanka / スリランカにおける「気候変動予測モデル (CMIP5) 解析・降雨流出氾濫モデル (RRI) に関するトレーニング」の開催

## **Research**

8. Activity report on the World Bank Brazil project / 世界銀行ブラジルプロジェクトにおける活動報告
9. Participation in the 27th IUGG General Assembly / 第 27 回国際測地学・地球物理学連合 (IUGG) 総会への参加
10. Participation in the 16th Annual Meeting of the Asia Oceania Geosciences Society (AOGS) / The 16th Annual Meeting, Asia Oceania Geosciences Society (AOGS) への参加
11. Introduction of ICHARM research projects / 研究紹介
11. Yoshimasa Morooka, Researcher [Investigation of risk communication tools that encourage residents to evacuate at floods] / 諸岡良優 研究員「洪水時の住民の避難行動を促すリスクコミュニケーションツールの検討」

## **Training & Education**

13. Educational Program Updates / 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」活動報告
15. Comments from graduated students of Ph.D. course / 博士課程卒業生からのコメント
16. Action Reports from ICHARM Graduates
16. Samuel Joseph Gama, Principal Mitigation Officer, Office of the Vice President, Department of Disaster Management Affairs - Malawi [From ICHARM with key enablers of professional career progression]

## **Information Networking**

18. Kick-off meeting of the project on water related disaster reduction platform to enhance resilience to climate change in Africa / 西アフリカにおける気候変動を考慮した水災害軽減のためのプラットフォームキックオフ会議
19. Participation in Stockholm World Water Week 2019 / ストックホルム世界水週間 2019 への参加
20. Participation in "Expert Dialogue on Scaling Up Regional Cooperation in Multi-Hazard Early Warning Systems in Asia-Pacific with a focus on flood and drought" by UNESCAP\* / UNESCAP 「Expert dialogue on scaling up regional cooperation in multi-hazard early warning systems in Asia-Pacific with a focus on flood and drought」への参加
21. Participation in the Panel on Tropical Cyclones (PTC) for the Bay of Bengal and the Arabian Sea / ベンガル湾及びアラブ海における Panel on Tropical Cyclones (PTC) への参加

## **Public Relations**

23. Children experience a VR-created flood at Tsukuba Kid Scientists Festival 2019 / つくばちびっ子博士 2019  
～ VR を用いた洪水疑似体験～

## **Others**

24. Comment from internship student / インターン生からのコメント
24. Personnel change announcement / 人事異動のお知らせ
25. Business trips / 海外出張リスト
25. Visitors / 訪問者リスト
26. Publications / 発表論文リスト

# Coming Events

## ICHARM will organize a technical session at the World Bosai Forum 2019

世界防災フォーラム 2019 テクニカルセッションの開催案内

ICHARM will organize a technical session during the World Bosai Forum 2019 to be held at the Sendai International Center on November 9-12, 2019 in collaboration with the relevant organizations. We are looking forward to your active participation.



### Contribution from meteorology, hydrology and DRR for the Platform on Water Resilience and Disasters

Date: 15:30 – 17:00, Monday, 11 November 2019  
 Venue: Main Hall, Conference Bldg. 2F, Sendai International Center  
 Aobayama, Aoba-ku, Sendai, 980-0856, Japan  
 URL: <http://www.worldbosaiforum.com/english/>  
 Note: Prior registration is required for participation in the World Bosai Forum.

#### <Concept>

Water related disasters including floods and typhoon-induced disasters are the key challenges for sustainable development on the society and economy. They will also be aggravated by climate change and the societal change. Enhancing disaster preparedness for effective response has been prioritized in the Sendai Framework for Disaster Risk Reduction (DRR). Such efforts require effective hydro-meteorological monitoring and forecasting, and its utilization to mitigate the damages through early warning, smooth evacuation, and promotion of preparedness and preventive activities.

Consecutive efforts are important for water-related disaster risk reduction. Building the collaborative scheme are essential among these responsible governmental sectors. In collaboration with UN agencies, International Flood Initiative (IFI) is now being promoted. Under the IFI, the efforts are being made to establish the Platform on Water Resilience and Disasters where the departments of meteorology, hydrology and DRR of each country meet together. In this Platform, each department provides data, it is planned to develop more effective flood management through flood forecasting and socio-economic assessment.

With an aim at promoting more effective flood management by utilizing the Platform, this session highlights the key roles of the governmental sectors of meteorology, hydrology and DRR in Japan and the Asian countries, and discuss how to build more effective collaborative scheme among them.

#### <Keynote Speech>

“Lessons learned from the 2011 Tohoku earthquake and tsunami for the mitigation in the future”  
 Prof. Fumihiko Imamura, Director, IRIDeS, Tohoku University

2019年11月9日から12日に仙台国際センターで開催される世界防災フォーラム2019において、関係機関との協働により下記のセッションを開催します。皆様のご参加をお待ちしております。

#### 水のレジリエンスと災害に関するプラットフォームに対する気象・水文・防災からの貢献

日時：11月11日（月） 15:30 – 17:00  
 会場：仙台国際センター会議棟 2階 大ホール  
 〒980-0856  
 仙台市青葉区青葉山無番地  
 URL：<http://www.worldbosaiforum.com/>

\*参加には世界防災フォーラムへの参加登録が必要です。

#### <セッション概要>

洪水や台風などの水関連災害は社会的・経済的に持続可能な発展のための重要な課題となっています。この水災害はまた気候変動や社会的な変化によっても激化することとなります。災害への備えを強化して効果的な対応が図られるようにしておくことは、2015年の仙台防災枠組2015-2030でも優先すべきこととされており、効果的な気象・水文観測と予測、それを活用した早期警報や円滑な避難、備えの向上と予防的行動を通じた被害の軽減が必要とされています。

この観点から災害リスク軽減への備えと予防措置についての一連の流れに沿った対応が重要であり、そうした各担当政府部局間での連携体制の構築が不可欠となっています。現在、国連機関が連携して国際洪水イニシアティブ (IFI) を推進しており、各国の気象部局、水文部局、防災部局が一堂に集う、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が進められています。ここでは各部局がデータの提供を行い、洪水予測や社会経済影響評価などを通じてより効果的な洪水対策を促進させることとしています。

本セッションでは、このプラットフォームを活用したより効果的な洪水対策を進めるべく、日本及びアジア諸国で気象・水文・防災の担当政府部局から、それぞれの役割について明らかにするとともに、より効果的な連携体制の構築について討論を行うこととしています。

#### <基調講演>

「将来的な減災に向けた2011年東北地震及び津波からの教訓」  
 今村文彦  
 東北大学災害科学国際研究所 所長

<発表・パネルディスカッション>

議長:

小池俊雄 (ICHARM センター長)

発表者:

永戸久喜 (気象庁)

村瀬勝彦 (国土交通省)

鈴木弘二 (アジア防災センター)

Mr. Adisorn Champathong (タイ・王立かんがい局)

Dr. Chung Soo Kim (韓国・韓国建設技術研究院)

Mr. Özgür Tuna Özmen (トルコ・内務省災害緊急事態対策庁)

<Presentations & Panel Discussion>

Chair: Prof. Toshio Koike, Director, ICHARM

Speaker: Dr. Hisaki Eito, Japan Meteorological Agency (JMA)

Dr. Masahiko Murase, Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Prof. Koji Suzuki, Asian Disaster Reduction Center (ADRC)

Mr. Adisorn Champathong, RID, Thailand

Dr. Chung Soo Kim, KICT, Republic of Korea

Mr. Özgür Tuna Özmen, AFAD, Turkey

(Written by Tetsuya Ikeda)

## Special Topics

### Aga town Risk Information System now open for public use

#### 阿賀町災害情報共有システム (ARIS) の一般公開はじまる

近年、頻発する水災害の軽減には、行政と住民間の水災害に関する良好なリスクコミュニケーションの必要性が指摘され、行政や住民が、それぞれの立場で的確に行動することが必要です。すなわち、水災害時に生じうる被害に関する情報を住民と行政の間で双方向に共有することが重要と考えられます。

ICHARM は、過去のリスク情報や災害対応に必要なリアルタイム情報を行政の担当者が選択し、一元的にホームページに配置・カスタマイズし、住民と行政の関係者が閲覧できる、「ICHARM 災害情報共有システム (ICHARM Disaster Risk Information System: IDRIS) の研究を進めています。IDRIS を用いて、行政の防災担当者・水防団・コミュニティリーダー・一般住民などが、浸水想定区域や過去の浸水域などのリスク情報、気象情報や水位情報、現地状況写真などの水災害に関連するリアルタイム情報を、正確かつ迅速に把握し共有でき、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しています。

2019年8月15日、IDRISの実証実験として、ICHARMが研究協力協定を結ぶ新潟県東蒲原郡阿賀町用にカスタマイズした阿賀町災害情報共有システム (Aga town Risk Information System: ARIS) を一般公開しました。ARISは阿賀町における過去・現在の大雨、川の様子、水かさ等が一目でわかる川の氾濫に関する危険情報を提供するホームページです。また、スマートフォンで撮影した映像をアップロードし、ARIS上で共有することができる双方向の通信が特徴です。

従来、さまざまなホームページを閲覧しなければならなかった川の氾濫に関する情報を、ARISという一つのホームページで提供することにより、阿賀町役場や住民の皆様が、

In order to reduce damage by frequent water disasters in recent years, the need for good risk communication regarding water-related disasters between local governments and local communities has been pointed out. In addition, it is critical for local governments and residents to take appropriate actions respectively during floods. In other words, it is important to ensure two way information sharing between them about possible damage that can occur during water disasters.

ICHARM has been conducting research on the ICHARM Disaster Risk Information System (IDRIS), a web system designed to provide users with information on past water-related disasters and real-time information for quick response to emergency situations. The system allows local government staff to select and layout the information they consider useful at the moment on a single website. Using IDRIS, the local government and community leaders and residents can accurately and quickly share risk information such as past and current inundation areas, weather forecasts, river water levels, and photos of different sites in the area. IDRIS is expected to be used by communities in both normal and emergency times.

On August 15, 2019, ICHARM opened the Aga town Risk Information System (ARIS) for public use. ARIS is a version of IDRIS customized for Aga Town in Niigata Prefecture in collaboration between the town and ICHARM. ARIS helps general users to easily collect information such as past and current rainfall and river water levels and conditions. ARIS is also equipped with an interactive function which allows users to contribute information to the system by uploading photos and movie clips of various local sites for other users.

Before ARIS, people had to visit different websites for different data and information they needed to properly respond to the situation. ARIS solved this problem by providing different data and information collected from different websites for users to look at on a single website. ICHARM will continue working with Aga Town and its people for them to take appropriate emergency actions based on the prompt, accurate assessment of river, inundation, and other conditions.

## ARISの主な特徴 (Main characteristics of ARIS)

ARISの主な特徴 (Main characteristics of ARIS)

- ・現地情報 (写真・動画・YouTube映像) が投稿可能で、遠くの状態もよく理解できる。  
・ You can upload field information (picture, movie, YouTube movie) and confirm far river condition.
- ・ 川が氾濫したらどこが水につかるかわかる。  
・ You can see where it will be inundated in flood.
- ・ 土砂崩れのしそうな場所がわかる。  
・ You can see where landslides will occur.
- ・ 水かさ (水位) ・ ダムの放流量情報をグラフでわかりやすく表示。  
・ Water level and information on discharge flow rate of dam are visualized.

① 現在の川の様子を見れる。  
・ You can see current condition of river.

② 現在の雨の様子を見れる。  
・ You can see current rain condition.

Main characteristics of ARIS  
ARISの主な特徴

(Written by Masatoshi Denda)

川の氾濫状況を瞬時的に正確に把握し、適切な行動を取ることにつながることを期待しています。

# 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 Office for Disaster Risk Reduction (UNDRR). 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 the meeting for the Platform on Water Resilience and Disasters in Indonesia.

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)、国連防災機関 (UNDRR) 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、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に関する会議」の開催について報告します。

## The meeting for the Platform on Water Resilience and Disasters in Indonesia

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に関する会議」の開催

The meeting for the Platform on Water Resilience and Disasters in Indonesia was held on August 5, 2019, at the Ministry of Public Works and Housing (PUPR) in Jakarta, Indonesia. Around 30 experts participated from the flood-related government organizations of Indonesia including the PUPR (Directorate of Water Resources Management (SDA) and Research and Development Center for Water Resources (PUSAIR)), the Meteorological, Climatological, and Geophysical Agency (BMKG), and the Ministry of Environment and Forestry (KLHK). (The National Disaster Management Authority (BNPB) was absent because of a sudden change of the meeting date.)

The meeting started with the opening remarks delivered by Ir. Fauzi Idris, the

2019年8月5日、インドネシア・ジャカルタの公共事業・住宅省 (PUPR) 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会議が開催されました。このプラットフォーム会議にはインドネシアの公共事業・住宅省 (水資源総局 (SDA)、水資源研究所 (PUSAIR))、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30名程度が参加しました。(会議直前の日程変更により都合がつかず、国家防災庁

(BNPB) は不参加。

会議では、PUPR の Fauzi Idris 局長が Hari Suprayogi 総局長の代理として開会の挨拶を行ったのち、ICHARM から小池俊雄センター長から地球規模での気候変動と災害、科学的知見の関連について、また、日本における近年の災害の発生とそれに対応する制度設計の進展、組織横断の取り組みについて発表があったのち、各参加機関代表者との議論がなされました。

議論では、1) PUPR の SDA と PUSAR、BMKG、KLHK からなるコアメンバーで水のレジリエンスと災害に関するプラットフォームを設立すること。BNPB がコアメンバーの一つとなってプラットフォームに参加する可能性について、PUPR と BNPB が議論すること、2) ソロ川をパイロットプロジェクトサイトとして選定すること、3) データ共有ポリシーを決定することの必要性を認識し、継続して議論すること、4) PUPR がプラットフォームの事務局を務めること、が合意されました。

同日夕刻には会議の概要について、PUPR の Basuki Hadimuljono 大臣に報告したところ、大臣からはプラットフォームに利水者として農業省も参画することの必要性や、DIAS を用いた洪水・渇水予測の有用性への期待、迅速に次のステップを進めることの重要性等について発言がありました。

今回の会議での議論を踏まえ、データ収集の枠組みの構築や、水防災・減災の施策決定・展開の根拠となる高度なデータ分析事例の紹介等を通じて、ICHARM はインドネシア国におけるプラットフォーム活動の支援を行ってまいります。

director of SDA on behalf of Dr. Ir. Hari Suprayogi, the director general of Water Resources. Director of ICHARM Toshio Koike gave a presentation on the relationship between global climate change, disasters, and scientific knowledge. He also mentioned recent disasters in Japan and institutional system improvements in response to the disasters, as well as cross-organizational initiatives. Later, discussions were held with representatives from each participating organization.

In the discussion, the participants agreed on the following four items:

- 1) To establish a Platform on Water Resilience and Disasters by the core group consisting of SDA and PUSAIR of PUPR, BMKG, and KLHK. PUPR will discuss with BNPB the possibility of its participation in the platform as one of the core group members.
- 2) To identify the Solo River as the first pilot river basin.
- 3) To recognize and continue discussing the importance of data sharing policy.
- 4) To designate PUPR as the Platform Secretary.

On the evening of the same day, Prof. Koike reported about the Platform meeting to Dr. Ir. Basuki Hadimuljono, the Minister of PUPR. The minister pointed out the necessity of the participation of the Ministry of Agriculture in the platform as a user. He also showed high expectations for flood/drought forecasting using DIAS and stressed the importance of moving on to the next step quickly.

Based on the discussion of the meeting, ICHARM will support Indonesia in carrying out activities related to the Platform on Water Resilience and Disasters, such as constructing a framework for collecting data and information and introducing cases of advanced data analysis for determining and developing measures for water-related disaster prevention and mitigation.



Participants of the meeting for the Platform on Water Resilience and Disasters in Indonesia  
プラットフォーム会議 参加者



Group photo with Dr. Basuki, the Minister of PUPR  
Basuki 大臣との会談

(Written by Yosuke Tomizawa)

## Training on climate change prediction model analysis and rainfall-runoff-inundation model in Sri Lanka

スリランカにおける「気候変動予測モデル (CMIP5) 解析・降雨流出氾濫モデル (RRI) に関するトレーニング」の開催

As the secretariat of the International Flood Initiative (IFI), ICHARM has been supporting the activities of the Platform on Water Resilience and Disasters in Sri Lanka. As part of this effort, training on climate change prediction model (CMIP5) analysis and rainfall-runoff-inundation model (RRI) was conducted on August 21-22, 2019, at the Irrigation Training Institute (ITI) in Galgamuwa, Sri Lanka.

A total of 25 young professionals including engineers, geologists, disaster management specialists and practitioners participated in the training from the Sri Lanka side, those from the Irrigation Department (ID), the Mahaweli Authority of Sri Lanka (MASL), the Disaster Management Centre (DMC), and the National Building Research Organization (NBRO). At the beginning of the training, Mr. Laksiri De Silva, Director of Irrigation, and, Mr. Sugeeshwara Seenipellage, a chief engineer of ID, delivered opening remarks. The first day of the training started with the following sessions: 1) Introduction of IFI in Sri Lanka by Dr. Mohamed Rasmay, a senior researcher of ICHARM; 2) Introduction of Flood Forecasting Early Warning System (FF-EWS) using Data Ingegration and Analysis System (DIAS) by Dr. Masaki Yasukawa, a project assistant professor of the University of Tokyo; 3) Lecture on climate change by Rasmay; and 4) Introduction and hands-on training of methods for CMIP5 model selection and introduction of methods for CMIP5 precipitation bias correction using DIAS by Dr. Katsunori Tamakawa, a research specialist of ICHARM. On Day 2, Rasmay explained how to operate RRI and conducted hands-on training on how to apply RRI to an actual river by taking the Kalu River in Sri Lanka for example.

These lectures and training courses provided an opportunity for the participants to increase the understanding of climate change impact, and the analysis method of CMIP5 using DIAS, and how to apply RRI to actual river. At the end of the training, Mr. Sugeeshwara gave an assignment for young engineers to review the CMIP5 analysis and develop an RRI model by selecting one river basin in Sri Lanka.



Training course  
トレーニングの様子



Rasmay Senior Researcher  
Rasmay 主任研究員



Yasukawa Project Assistant Professor  
安川 特任助教



Tamakawa Research Specialist  
玉川 専門研究員

(Written by Katsunori Tamakawa)

ICHARM は、International Flood Initiative (IFI) 事務局として、スリランカにおける「水のレジリエンスと災害に関するプラットフォーム」の活動を支援しています。その一環として、2019年8月21日、22日とスリランカ国 ガルガムアかんがい局 トレーニングセンター (ITI) において、気候変動予測モデル (CMIP5) 解析・降雨流出氾濫モデル (RRI) に関するトレーニングを実施しました。

スリランカ側からは、プラットフォームのメンバーである、かんがい局 (ID) 17名、マハウエリ開発庁 (MASL) 4名、災害管理センター (DMC) 2名、国家建築研究所 (NBRO) 2名の地質学や災害管理の専門家を含む多くの若手技術者 25名が参加しました。

トレーニングでは、最初に ITI の Laksiri De Silva 所長と ID の Sugeeshwara Seenipellage 主任技師長が挨拶をし、1日目は、1) ICHARM の Mohamed Rasmay 主任研究員による、ICHARM 活動の紹介、2) 東京大学 安川雅紀特任助教によるデータ統合・解析システム (DIAS) を用いたスリランカ国カル川流域における洪水予測・早期警戒システム (FF-EWS) の紹介、3) Rasmay 主任研究員による気候変動に関する講義、4) ICHARM の玉川勝徳専門研究員による DIAS を用いた CMIP5 のモデルの選択方法、また、CMIP5 の降水量の誤差修正方法の紹介・演習を行いました。2日目は、Rasmay 主任研究員による RRI の紹介とスリランカ国カル川を対象とした演習を実施しました。

講義とともに演習も実施したことで、気候変動や DIAS を用いた CMIP5 の解析手法、また、RRI の実河川への適用について理解を深める機会となりました。トレーニングの最後には、Sugeeshwara 主任技師長から参加した若手技術者に、DIAS を用いた CMIP5 の演習を復習すること、また、スリランカ国内において1河川流域を選び RRI を展開することが課題として指定されました。

# Research

## Activity report on the World Bank Brazil project

### 世界銀行ブラジルプロジェクトにおける活動報告

世界銀行ブラジルプロジェクトにおいて、ICHARMは、データ統合・解析システム(DIAS)上で各種データ(GLDAS気象フォーシング全球データ・GCOM-W/AMSR2衛星マイクロ波輝度温度全球データ・Geophysical Fluid Dynamics Laboratory Climate Model version 2.5(GFDL)季節予測降水量全球データ)を収集・統合しました。そして陸面における水循環と植生成長を算出するデータ同化システム(CLVDAS)をリアルタイムに運用するブラジル北東域セアラ州を対象とした25kmグリッドDIAS農業的旱魃モニタリング・季節予測システム(旱魃システム)を開発しました。またセアラ州の中でも、特に農業が盛んに行われ、気象・水文・農業学的に重要度の高いバナブイユ川流域を対象領域として高解像度(1kmグリッド)の分布型水循環モデルWater and energy budget-based distributed hydrological model (WEB-DHM)を開発しました。

2019年3月26日、第2回フェイス-トゥ-フェイスワークショップがフォルタレザで開催され(写真-1)、ICHARMは、セアラ州における旱魃システムとバナブイユ川流域におけるWEB-DHMを紹介すると共に、本プロジェクトにおける開発システムと個人農家を繋ぐScience facilitatorが重要であることを説明しました。その結果、3月27日にNortheast Drought Monitor (NEDM, [monitordeseccas.ana.gov.br](http://monitordeseccas.ana.gov.br))のデモンストレーションをして頂く機会を得ることができました。さらにNEDMのセアラ州穀物データベースをNortheast States Meteorology and Water Resources Foundation (FUNCEME)よりご提供頂くことができました。このデータベースを用いることによりセアラ州における旱魃システムのLAI出力を用いたセアラ州の穀物収穫高・必要灌漑水量推定手法を考案することができました。またバナブイユ川流域における1kmグリッドのLAI成長量の推定に応用することができました。

2019年6月26日、水・災害に関する日本-世界銀行セミナーが、ワシントンD.C.で開催されました(写真-2)。ICHARM小池俊雄センター長は、水と災害リスクマネジメントの展開について基調講演を行いました。またRiver Flood Risk Management・Drought Risk Management・Dam for Disaster ResilienceのDirectorからの講演とパネルディスカッションも実施されました。さらに本プロジェクトの世界銀行担当者であるAndrea Mariel Juarez Lucas氏よりプロジェクトの成果が報告されました。また6月27日には、Japan-World Bank Deep Dive into Agricultural Drought会議

In the World Bank Brazil project, ICHARM developed a 25km-gridded real-time agriculture drought monitoring and seasonal prediction system (drought system) for Ceará State in the Brazilian Northeast using the Coupled Land and Vegetation Data Assimilation System (CLVDAS), which calculates land water cycle and dynamic vegetation growth. This monitoring and seasonal prediction system has been put into real-time operation on the Data Integration and Analysis System (DIAS), which collects and integrates various data, such as NASA Global Land Data Assimilation System (GLDAS) meteorological global forcing data, GCOM-W/AMSR2 microwave brightness temperature global data, and Geophysical Fluid Dynamics Laboratory Climate Model version 2.5 (GFDL) seasonal predictive global precipitation data. The Banabuiú River basin was selected as the target area because agriculture was very active in the basin and also because it is a highly important area in meteorology, hydrology, and agriculture. The high-spatial-resolution (one km grid) water and energy budget-based distributed hydrological model (WEB-DHM) was also developed for this river basin.

The second face-to-face workshop was held in Fortaleza on March 26, 2019 (Photo 1). ICHARM introduced the drought system for Ceará State and the 1 km-WEB-DHM for the Banabuiú River basin. It also explained the significance of the science facilitator in the establishment of a reliable connection between individual farmers and the developed system in this project. Through the workshop, we obtained the opportunity to see the demonstration of the Northeast Drought Monitor (NEDM, [monitordeseccas.ana.gov.br](http://monitordeseccas.ana.gov.br)) on March 27, and later we were provided with its crop database of Ceará State by the Northeast States Meteorology and Water Resources Foundation (FUNCEME). Using this database and the LAI output from the drought system for Ceará State, ICHARM was able to devise an estimation method of crop yield and required irrigation water in Ceará State, and apply the method to estimate the 1km gridded LAI growth for the Banabuiú River basin.



Photo 1. The second face-to-face workshop of the World Bank Brazil project  
写真-1 世界銀行ブラジルプロジェクト第2回フェイス-トゥ-フェイスワークショップ

In addition, the Japan-World Bank seminar on water and disasters was held in Washington, D.C. on June 26, 2019 (Photo 2). ICHARM Director Toshio Koike gave a keynote speech on the development of water and disaster risk management. Directors of river flood risk management, drought risk management, and dams for disaster resilience also gave a keynote speech. A panel discussion was also carried out. Dr. Andrea Mariel Juarez Lucas, who oversees this project funded by the World Bank, reported the achievements of the project.

The Japan-World Bank deep dive into agricultural drought meeting was held on June 27. Director Koike delivered a presentation on the achievements of this project and the past achievements and latest information on Africa. He also explained about the scale-up strategy to Latin America by applying the drought system. ICHARM also delivered a presentation on the estimation method of crop yield and



required irrigation water volume based on the LAI output from the drought system, and scientifically proved the high performance of CLVDAS. As a result, ICHARM was able to share the usefulness of the achievements of this project with the participants of the World Bank.



Photo 2. Japan-World Bank Seminar on water and disasters  
写真-2 水・災害に関する日本-世界銀行セミナー

(Written by Hiroyuki Tsutsui)

が開催されました。ICARM は、本プロジェクトの成果のみならず、アフリカに関する過去の実績や最新の情報を紹介し、さらに早魘システムのラテンアメリカへの展開戦略についても報告しました。また早魘システムから出力される LAI に基づく穀物収穫量と必要灌漑水量の推定手法と、CLVDAS の高い性能が明瞭に示された科学的事例について報告しました。これにより ICHARM は世界銀行出席者と本プロジェクトにおける成果の有用性を共有することができました。

## Participation in the 27th IUGG General Assembly 第 27 回国際測地学・地球物理学連合 (IUGG) 総会への参加

The 27th General Assembly of the International Union of Geodesy and Geophysics (IUGG) was held on July 8-18, 2019, in Montreal, Canada, and ICHARM Director Toshio Koike and Researcher Mamoru Miyamoto participated in the conference. Since the IUGG General Assembly is a joint union composed of eight academic associations, including the International Association of Hydrological Sciences (IAHS), the International Association of Meteorology and Atmospheric Sciences (IAMAS), and the International Association for the Physical Sciences of the Oceans (IAPSO), the conference provides valuable opportunities for cross-cutting discussions.

In the symposium organized by IAHS, Koike served as co-chair of Session H16, "FLOODS: Processes, Forecasts, Probabilities, Impact Assessments and Management." Miyamoto delivered a presentation on the transdisciplinary approach for the risk reduction of flood disasters through the Platform on Water Resilience and Disasters, which is promoted under the International Flood Initiative (IFI). The presentation included results mainly in the Philippines on the formulating process of the Platform's institutional structure, data integration, flood forecasting and early warning, climate change impact assessment, economic assessment, and contingency planning, with actual cases using the Data Integration and Analysis System (DIAS). The presentation was followed by questions from the floor about the framework of data integration and the dissemination of flood information.

Koike also provided an invited presentation on the evolution of flood management policy against recent large-scale floods in Japan in the session of "Georisk Reduction: Science, Resources, and Governmental Action (U02)." The presentation attracted the interest of the audience and received questions about how to fill the gaps between science and technology and society. Responding to the questions, Koike stressed the necessity and importance of facilitators bridging science and technology and society, adding that ICHARM itself will make efforts to play the role of facilitators.

Since the IUGG General Assembly gathers various participants from universities and international organizations, IFI had an ad-hoc meeting during the conference. In addition to the two from ICHARM, Dr. Johannes Cullmann of WMO, Dr. Anil Mishra of UNESCO-IHP, Prof. Slobodan Simonovic of University of Western Ontario, Prof. Marian Muste of University of Iowa participated in the meeting and

2019年7月8日から18日にカナダのモントリオールにて国際測地学・地球物理学連合 (IUGG) 第27回総会が開催され、小池俊雄センター長と宮本守研究員が参加しました。IUGG は国際水文学科学協会 (IAHS) や国際気象学・大気科学協会 (IAMAS)、国際海洋物理科学協会 (IAPSO) など8つの学術団体が参画する連合体であり、その総会は各協会主催のセッションに加え連合としてのセッションが開催されるため、分野横断的な議論が可能となる貴重な機会となりました。

IAHS によるシンポジウムでは、小池センター長がセッション H16 「洪水：プロセス、予測、発生確率、影響評価とマネジメント」の共同議長を務めました。また、宮本研究員が国際洪水イニシアティブ (IFI) の「水のレジリエンスと災害に関するプラットフォーム」の活動に基づく洪水リスク軽減のための分野横断的な取り組みについて口頭発表を行いました。発表では主にフィリピンにおけるプラットフォームの形成とデータ統合、洪水予警報、気候変動影響評価、経済評価、危機管理計画等の活動についてデータ統合・解析システム (DIAS) の活用事例を含めて紹介し、会場から DIAS によるデータ統合の構造や創出された洪水に関する情報の伝達方法などについて質問が挙がりました。

小池センター長は「ジオリスク軽減：科学、資源と政府行動 (U02)」においても招待講演を行い、日本における最近の大規模洪水に対する治水政策の進化を紹介しました。近年の日本の水災害被害とレジリエンス向上のための政策立案は多くの参加者の関心を集め、会場から科学技術と社会の間のギャップを如何に埋め

るのか、といった質問が挙がりました。これに対し、それらを繋ぐファシリテーターの必要性と重要性が説明され、そのための活動に ICHARM は今後尽力する予定であると回答されました。

なお、IUGG 総会には大学や国際機関等から幅広く参加者が集まるため、期間中に IFI の臨時会議が開催されました。会議には WMO の Johannes Cullmann 部長、UNESCO-IHP の Anil Mishra 氏、ウェスタン・オンタリオ大学の Slobodan Simonovic 教授（リモートアクセス）、アイオワ大学の Marian Muste 教授（リモートアクセス）、小池センター長、宮本研究員が参加し、国連水と災害に関する特別会合や水に関するハイレベルパネル（HLPW）など最近の国際的な動向を共有した後、第 8 回洪水管理に関する国際会議（ICFM8）における特別セッションの開催や IFI 諮問委員会の設立、IFI の活動の実施について議論しました。

discussed the special sessions scheduled in the 8th International Conference on Flood Management (ICFM8), the launch of the IFI Advisory Board, and the implementation of IFI actions, after sharing recent international developments such as the UN special thematic session on water and disasters, the High Level Panel on Water (HLPW), and others.



Invited presentation in "Georisk Reduction: Science, Resources, and Governmental Action" session (U02) 「ジオリスク軽減：科学、資源と政府行動（U02）」セッションにおける小池センター長の招待講演

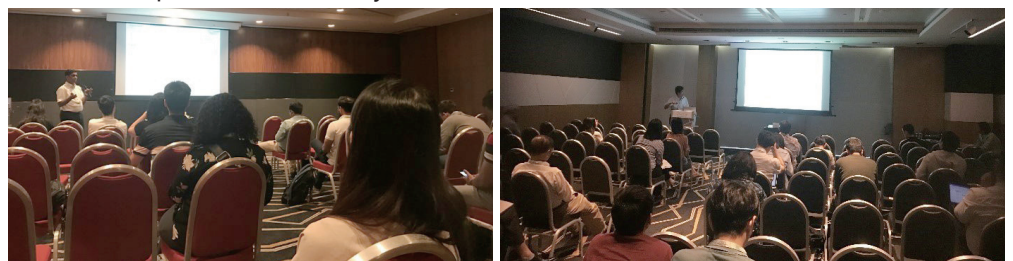
(Written by Mamoru Miyamoto)

## Participation in the 16th Annual Meeting of the Asia Oceania Geosciences Society (AOGS) The 16th Annual Meeting, Asia Oceania Geosciences Society (AOGS) への参加

7月29日から8月2日にかけてシンガポールで行われたアジア域を中心とした地球科学の全てを網羅する国際会議 the 16th Annual Meeting, Asia Oceania Geosciences Society (AOGS) に、ICHARM から、Mohamed Rasmy 主任研究員と牛山朋来専門研究員が参加し、研究発表を行いました。Rasmy 主任研究員は "HS10; Hydrologic Extremes in a Changing Climate" セッションで "Climate Change Impacts on Water Resources of the Andong Watershed in South Korea under CMIP-5 Scenarios" と題して発表を行いました。牛山専門研究員は、"AS08; The science and prediction of heavy rainfall and floods" セッションで "Ensemble Flood Forecasting of a Disastrous Flood Event in 2018 Japan" と題して発表を行いました。

両研究員ともに、参加研究者から好意的な反応が得られました。特に、日本で開発された洪水予測手法の進展、ICHARM で開発された RRI モデルの適用可能性、気候変動予測実験の力学的ダウンスケーリングに統計的アプローチを組み合わせた精度向上手法、ICHARM と DIAS のビッグデータ処理の役割等について、好意的なコメントをいただきました。さらに、両発表者は、世界中から集まった次のような研究者と様々な議論の機会を持つことができました。インド科学教育研究所の Sanjeev Kumar Jha 助教、農研機構の西森基貴ユニットリーダー、北海道大学の久保田尚之准教授、マレーシア国立大学の Fredolin Tangang 教授、マニラ気象台の Cathrene

The 16th Annual Meeting of the Asia Oceania Geosciences Society (AOGS) was held from July 29 to August 2, 2019, in Singapore. It is an international annual science meeting covering all the areas of geoscience especially for Asia. Mohamad Rasmy, a senior researcher, and Tomoki Ushiyama, a research specialist, participated in the meeting from ICHARM and made oral presentations. Rasmy delivered a presentation on "Climate Change Impacts on Water Resources of the Andong Watershed in South Korea under CMIP-5 Scenarios" in the session of "HS10; Hydrologic Extremes in a Changing Climate." Ushiyama delivered a presentation on "Ensemble Flood Forecasting of a Disastrous Flood Event in 2018 Japan" in the session of "AS08; The science and prediction of heavy rainfall and floods."



Senior Researcher Rasmy (left) and Research Specialist Ushiyama (right) deliver a presentation on their research activities to international researchers and scientists at the AOGS Annual Meeting  
AOGS 会議において国際的な研究者に対して研究発表を行う Rasmy 主任研究員（左）と牛山専門研究員（右）

They both received very good feedback from other scientists particularly on: the progress of the flood forecasting technique developed in Japan; the applicability of the RRI model developed in ICHARM; ways to improve dynamical downscaling of climate change projections by introducing a statistical approach; and the roles of ICHARM and DIAS in handling big data. In addition, the conference was a precious opportunity to meet prominent scientists around the world (for example, Dr. Sanjeev Kumar Jha, an assistant professor of the Indian Institute of Science Education and Research, Dr. Motoki Nishimori, the unit leader of the National Agriculture and Food Research Organization, Dr. Hisayuki Kubota, an associate professor of Hokkaido University, Dr. Fredolin Tangang, a professor of the National University of Malaysia, Dr. Cathrene Lagare Rochelle Coronel, a researcher of

Manila Observation, Prof. Jagath Jagath Kaluarachchi, the dean of the College of Engineering at Utah State University, Dr. Wang Lei and Dr. Ma Weigiang, researchers of the Chinese Academy of Science, Dr. Yasutaka Wakazuki, an associate professor of Ibaraki University, Dr. Amithirigala Widhanelage Jayawardena, a professor of the University of Hong Kong, Dr. Qingyun Duan, a professor of Beijing Normal University). The two researchers of ICHARM discussed their research works and also explained ICHARM activities on research, education and capacity building, and networking activities, including the International Flood Initiative and its recent effort to establish Platforms on Water Resilience and Disasters in Sri Lanka, the Philippines, Myanmar, and Indonesia.

(Written by Mohamed Rasmy Abdul Wahid and Tomoki Ushiyama)

Lagare Rochelle Coronel 博士、ユタ州立大学工学部長の Jagath Jagath Kaluarachchi 教授、中国科学院の Wang Lei 博士、Ma Weigiang 博士、茨城大学の若月泰孝准教授、香港大学の Amithirigala Widhanelage Jayawardena 教授、北京師範大学の Qingyun Duan 教授、これらの研究者と研究成果の議論を行うとともに、ICHARM の研究内容や教育、能力開発事業、国際洪水イニシアチブ (IFI) や Platform on Water Resilience and Disasters を通じたスリランカ、フィリピン、ミャンマー、インドネシアにおけるネットワーク形成についての紹介を行いました。

## 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 a researcher as listed below:

**Yoshimasa Morooka**, Researcher

Investigation of risk communication tools that encourage residents to evacuate at floods



### Investigation of risk communication tools that encourage residents to evacuate at floods

洪水時の住民の避難行動を促すリスクコミュニケーションツールの検討

**Yoshimasa Morooka**, Researcher

In recent years, large-scale floods and sediment disasters have occurred every year in different parts of Japan, causing significant damage. In general, flood disasters cause damage in the following order: rainfall, runoff to rivers, flow downstream in rivers, and flooding. Though both cause disasters, floods are quite different in how they occur from earthquakes, which can occur without any signs. In addition, flood damage can be managed in some ways. For example, flood hazard maps are now available for many towns and cities around Japan, showing inundation risk areas. If people evacuate properly, based on such maps and other disaster prevention information such as rainfall and river water levels, which are often provided in advance, damage should be reduced, and at least human lives can be protected. In reality, however, it is hard to say that people have been making the most of the information provided to improve their evacuation behavior.

To address this issue, I designed my doctoral research to clarify the effect of

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、諸岡良優研究員の行っている「洪水時の住民の避難行動を促すリスクコミュニケーションツールの検討」を紹介します。

近年、日本の各地で毎年のように大規模な洪水・土砂災害が発生し、甚大な被害をもたらされています。突発的に発生する地震と異なり、洪水による災害は降雨、河川への流出・流下、氾濫、浸水というように順を追って被害が発生する災害であり、また、想定氾濫区域に基づいたハザードマップも公開されていることから、降雨量や河川水位のような事前に発信される防災情報等を基に適切に避難行動ができれば、その被害を軽減し、少なくとも人命は守ることができるはずですが、近年の水災害でも依然として犠牲者が発生している状況に鑑みると、このような災害発生前の防災・気象情報

や避難勧告等が必ずしも一人一人の避難行動へ活かされていない現状があると考えられます。

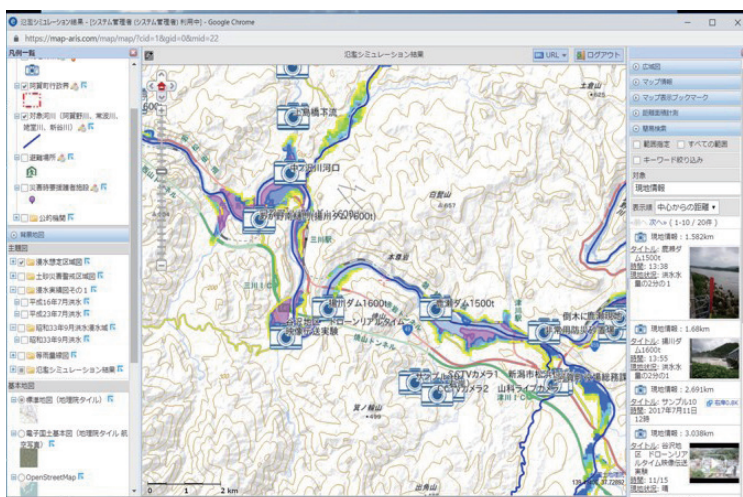
私の学生時代の研究では、洪水時の災害情報が住民の避難行動に及ぼす影響について、近年、洪水・土砂災害による被害が生じた洪水常襲地域・平地・中山間地の3つの地域において洪水時の避難状況及び浸水状況に関するアンケート調査を実施し、各地域の住民の避難行動の実態と避難のきっかけについて分析しました。例えば、①洪水常襲地域では、周囲が浸水する前の早いタイミングで「自宅が浸水しそうだから」という自発的な判断で避難した住民が多いこと、②平地では、「避難勧告や避難指示を聞いたから」や「家族、近所の人、市の職員等に避難を勧められたから」という避難情報や他者からの勧めで避難した住民が多いこと、③中山間地では、「いた場所が被災する危険を感じたから」といった、情報ではなく周囲の状況の変化で避難した住民が多いという結果が得られました。

ICHARMでは、市町村の防災担当者から一般住民の方までが一元的に災害情報を閲覧することが可能なシステムであるIDRIS (ICHARM Disaster Risk Information System)を開発し、8月15日から新潟県阿賀町において阿賀町版IDRISであるARIS (Aga town Risk Information System)の一般実証実験をしています。IDRIS (ARIS)には降雨量や水位、現地状況の写真・動画等のリアルタイム情報に加えて、過去の洪水による浸水実績範囲図や浸水想定区域図といった平常時の防災意識向上に関するコンテンツを含んでおり、平時から出水時までの各コンテンツへのアクセス状況等より、どのような情報を防災担当者や住民の方が必要としているのか分析し、効果的な防災・減災活動に活用できるよう研究を進めていく予定です。また、前述のように、地域ごとに災害時に有用な情報は異なることが想定されるため、他市町村における防災担当者との意見交換をしながらIDRISの展開・普及可能性について検討していくことを予定しています。これにより、住民一人一人が洪水を「我がこと」と認識し、洪水時に住民自らの行動に結びつく災害情報の提供を可能とするリスクコミュニケーションツールとなるよう研究を実施していきます。

flood-related information on the evacuation behavior of residents and conducted questionnaire surveys with my fellow students to collect data and information on the evacuation situation and the inundation situation during floods from residents living in three types of areas: flood-prone areas, flat areas and mountainous areas. The collected data and information were then used to analyze the actual evacuation behavior of residents in each type of areas and to find out what made them decide to evacuate.

Some of the findings are as follows: (1) In flood-prone areas, many residents evacuated on their own judgment at an early timing before the surrounding area was inundated; (2) In flat areas, many residents evacuated according to evacuation information such as evacuation advisories, evacuation orders and advice from others; and (3) In mountainous areas, many residents evacuated not because of information they received but because of changes they noticed in the surrounding environment.

After I started working at ICHARM, I have joined the team developing the ICHARM Disaster Risk Information System (IDRIS), a system that allows municipal disaster prevention officers and residents to access the same disaster information. I have been involved in an experiment using



Local information uploaded to ARIS  
ARISにアップロードされた現地情報の一例

IDRIS, which has been underway in Aga Town of Niigata Prefecture, Japan, since August 15 this year. In this experiment, ICHARM demonstrates the operation of the Aga town Risk Information System (ARIS), which is a version of IDRIS specifically customized for the town. ARIS offers real-time information such as rainfall, water levels, photos and movie clips showing the situations of different local sites, as well as contents for raising public awareness of disaster prevention in normal times, such as past and expected inundated areas. We are planning to analyze the access status to each content in normal and flood times and identify what kind of information is needed by what category of people ranging from municipal disaster prevention officers to residents.



Workshop of ARIS for local fire brigade members  
消防団員を対象としたARIS講習会

As mentioned above, since information people find useful at the time of a disaster varies, depending on where they live and other conditions, ICHARM will carefully examine how IDRIS should be introduced and disseminated while exchanging opinions with disaster prevention officers in other municipalities.

I will continue improving IDRIS with my fellow researchers to make it an effective risk communication tool, hoping that it will be useful for people to remind themselves of flood risk to which they are exposed in normal times and to take appropriate actions based on their voluntary decisions in case of a flood.

(Written by Yoshimasa Morooka)

# Training & Education

## Educational Program Updates

### 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」活動報告

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).

On September 10, 2019, the closing ceremony of this 12-year-old master's program was held at the JICA Tsukuba office, where ICHARM Director Toshio Koike, JICA Tsukuba Director Takeshi Watanabe, and GRIPS Professor Masaru Sugahara made a congratulatory speech. Mr. A. F. M. Tauhid Jaman of Bangladesh spoke in return on behalf of the students.

In the ceremony, the Best Research Award was presented to Mr. Mohamed Thajudeen Mohamed Zuhail of Sri Lanka and Mr. Valencia Christian Darwin of the Philippines this year. The award was given those two by ICHARM and GRIPS to laud them for excellent work based on their master's theses and final presentations they delivered on August 8. The Sontoku Award, also given every year by ICHARM to the student who made the outstanding contribution to the class throughout the program, was presented to Ms. Shwe Pyi Tan of Myanmar.



Closing Ceremony for the Knowledge Co-Creation Program on "Flood Disaster Risk Reduction" in JICA TSUKUBA  
JICA 筑波での「防災政策プログラム水災害リスクマネジメントコース」閉講式

On the following day, the graduation ceremony was held at GRIPS. The eight students were finally awarded a hard-earned master's degree. In this ceremony, Mr. Ahmad Ali Gul and Mr. Md. Khairul Islam were also awarded a doctoral degree in disaster management



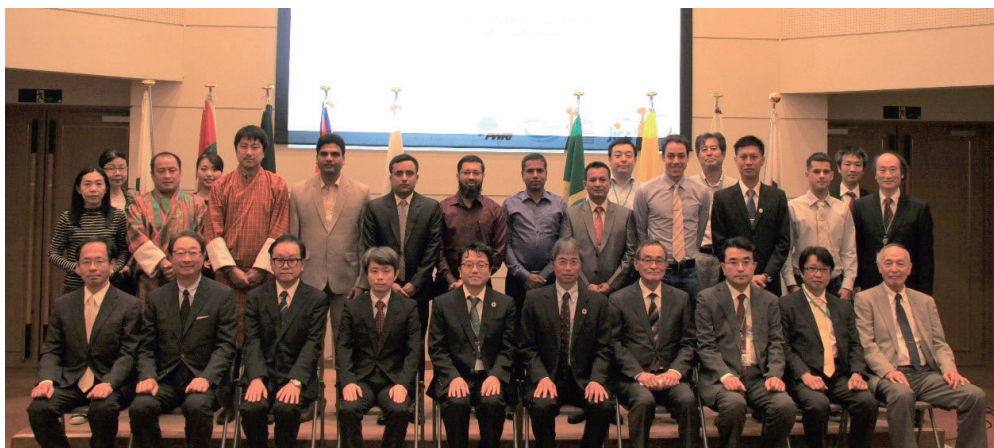
Graduation Ceremony in GRIPS  
GRIPS での卒業式

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、本年度で 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。

2019 年 9 月 10 日には JICA 筑波にて今 12 期目研修の閉講式が行われました。ICHARM の小池俊雄センター長、JICA 筑波の渡邊健所長、GRIPS の菅原賢教授による祝辞が贈られ、研修員からは代表として A. F. M. Tauhid Jaman 氏 (バングラデシュ) が答辞を行いました。8 月 8 日に実施された最終のプレゼンテーションの結果と論文を総合的に判断し、優れた研究成果を残した学生に贈られる Best research award が Mohamed Thajudeen Mohamed Zuhail 氏 (スリランカ)、Valencia Christian Darwin 氏 (フィリピン) の 2 名に、研修中に最も参加者全体のために貢献した研修員に対して ICHARM から授与される「Sontoku Award」が Shwe Pyi Tan 氏 (ミャンマー) に、それぞれ贈られました。翌日は GRIPS にて博士課程及び修士課程の学位記授与式が行われ、修士課程の研修員 8 名に「修士 (防災政策)」の学位が、博士課程の Ahmad Ali Gul 氏、Md. Khairul Islam 氏に「博士 (防災学)」の学位が授与されました。

10 月からは、13 期目の修士課程が開始され、1 日に ICHARM にて開講式を行いました。JICA 筑波からは渡邊所長及び事務担当者、GRIPS からは菅原教授、土木研究所から西川和廣理事長及び幹部職員が参加しました。本年度は 11 名が 1 年間の研修を受けます。

Meanwhile, a new set of 11 students have started the thirteenth year of the master’s program. On October 1, the opening ceremony was held at ICHARM in the presence of the JICA Tsukuba director Watanabe, GRIPS Professor Sugahara and PWRI President Nishikawa along with other JICA officials and PWRI executives.



Opening Ceremony in ICHARM  
ICHARM での開講式

### 2018–2019 List of M.Sc. Theses

Country	Name	Title
Bangladesh	A. F. M. Tauhid Jaman	STUDY ON CHANNEL CHANGES AND BED DEFORMATION IN CONFLUENCE REGION OF GANGES AND JAMUNA RIVERS UNDER DIFFERENT INFLOW CONDITIONS
India	Kale Ravindra Vitthal	DEVELOPMENT OF INTEGRATED HYDROLOGICAL MODELLING FRAMEWORK FOR FLOOD INUNDATION MAPPING IN BRAHMANIBAITARANI RIVER BASIN, INDIA
Liberia	Davis Cynthia Wantee	ANALYSIS OF CLIMATE CHANGE IMPACT USING BIAS-CORRECTED PRECIPITATION IN ST. PAUL RIVER BASIN, LIBERIA
Myanmar	Shwe Pyi Tan	DEVELOPMENT OF INTEGRATED WATER RESOURCES MANAGEMENT PLANS OF SITTAUNG RIVER BASIN UNDER CHANGING CLIMATE
Nepal	Dhaka Ram Acharya	INFLUENCE OF SAND BAR BEHAVIOUR ON CHANNEL CHANGES ALONG KALIGANDAKI RIVER, NEPAL
Pakistan	Ali Imran	Assessment of the Climate Change Impact on the Flood Risk Change in Chenab River Basin
Philippines	Christian Darwin Jacob Valencia	RRI MODEL-BASED FLOOD EVACUATION TIMELINE OF CITY AND MUNICIPALITY LGUs IN PAMPANGA RIVER BASIN, PHILIPPINES
Sri Lanka	Mohamed Thajudeen Mohamed Zuhail	DEVELOPMENT OF INTEGRATED WATER RESOURCES MANAGEMENT PLAN FOR EASTERN DRY ZONE IN SRI LANKA: THE CASE OF GAL OYA RIVER BASIN

### 2016–2019 List of Ph.D. Theses

Country	Name	Title
Pakistan	Ahmad Ali Gul	Fundamental Study for 2-D Numerical Simulation of Channel Changes in Large Rivers Dominated by Fine Sediment
Bangladesh	Md. Khairul Islam	Developing a Methodology for Integrated Flood Risk Assessment in a Transboundary River Basin Using Multi-Platform Data Under Global Change- the Case of the Meghna River Basin

(Written by Tomoki Nakamura)

## Comments from graduated students of Ph.D. course / 博士課程卒業生からのコメント

Two Ph.D. students of the Disaster Management Program, Dr. Gul Ahmad Ali and Dr. Islam Md. Khairul, successfully completed all requirements and received a Doctoral Degree in Disaster Management at the graduation ceremony held at GRIPS on September 11, 2019.

They contributed brief comments as below while looking back on last 3 years at ICHARM.

### Gul Ahmad Ali

(from Pakistan)

Being an ICHARM masters program alumni, I was greatly impressed by the novel disaster management practices in Japan and the unique learning experience at ICHARM. Once I went back to my country, Pakistan, I was able fully utilize what I had learnt at ICHARM to help solve flood management challenges in the country.

It was an honor and a privilege to have been selected for the GRIPS and ICHARM Disaster Management PhD program, and work with some of the best researchers and professors in the world in the field of water-related disaster management. I am deeply grateful and indebted to my supervisors Associate Professor Atsuhiro Yorozuya, and Professor Shinji Egashira for their guidance, consistent support, and encouragement throughout the period of my research. I will always be deeply indebted to them for sharing their extensive knowledge and invaluable experience with me. I would like to thank all colleagues and staff at ICHARM for their immeasurable help and encouragement throughout this research. I would also like to thank ICHARM and PWRI for the financial and institutional support, and for the opportunity to carry out this research.

During my PhD I had the opportunity to utilize state-of-the-art measurement techniques in various rivers in Japan and Bangladesh. Based on these measurements I could discuss the hydraulics of fine sediment transport under different flow conditions, which are an important focus of my research. I really hope to continue research in this field and focus on addressing challenges of river and flood management in Pakistan.

博士課程「防災学プログラム」の2名の研修員、Gul Ahmad Ali氏とIslam Md. Khairul氏は無事に審査に合格して2019年9月11日にGRIPS（政策研究大学院大学）で行われた卒業式で博士（防災学）の学位を取得しました。彼らからのICHARMで過ごした3年を振り返ったコメントを紹介します。



Dr. Gul Ahmad Ali (left) with Professor Egashira (right)

### Islam Md. Khairul

(from Bangladesh)

It was October 4th of 2016 when I came to ICHARM and started my job as a research assistant to pursue my doctoral degree in disaster management at GRIPS. Time indeed does fly. Now, three years have been passed and my dream of becoming a Ph.D. has come true. I am grateful to ICHARM for fully supporting me to smoothly carry out my doctoral study in Japan. During my ICHARM tenure, I developed a methodology for an integrated flood risk assessment in transboundary river basins utilizing the present state-of-art observations and numerical modeling. The Meghna river basin was chosen as a case study. Based on the study findings, policy measures are recommended to reduce increasing flood risk in the downstream region of the basin (i.e., Bangladesh) for achieving the globally supported sustainable development goals and for building back better. It is now time to go back to my country and work with my organization (BWDB) to implement the recommended measures for reducing flood disaster risk in the future.

I would like to take the opportunity to thank all ICHARM individuals who contributed to making my study complete. Particularly, my heartiest thanks to my supervisor (Dr. Mohamed RASMY) and advisors (Prof. Toshio KOIKE and Prof. Kuniyoshi TAKEUCHI) for always being with me as mentors and for providing all academic help. Without their generous support and kind guidance, my study wouldn't have seen the light. I would also like to thank Dr. Miho Ohara, Nikolaos Mastrantonas for their scholarly support. Here, I also thank OKAWA san and ASAMI san for their constant care in different stages of my personal and family life. Finally, I hope to have another opportunity to work with ICHARM again. All the best to ICHARM.



Dr. Islam Md. Khairul (left) with Supervisor Mohamed Rasmay Abdul Wahid (right)

# Action Reports from ICHARM Graduates

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2016年度 (10期) 修士課程卒業のSamuel Joseph Gama氏 (マラウイ) から寄稿いただきましたので、ご紹介します。

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. Samuel Joseph Gama, who graduated from the master's program in 2017, has kindly contributed the following article to this issue.

**Samuel Joseph Gama** from Malawi

**Principal Mitigation Officer, Office of the Vice President, Department of Disaster Management Affairs - Malawi**

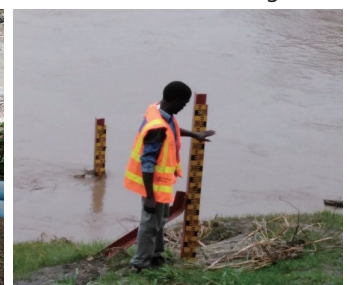
## From ICHARM with key enablers of professional career progression



My period of study of Master's Degree in Disaster Management at ICHARM (2016 to 2017) was full of enablers that are critical for professional progression and career growth. The institution provided me with a platform to exchange ideas, compare proven and promising practices, discover cutting-edge research and contribute to a new ecosystem of learning through the interactions I had with Japanese great scholars (Sensei), policy makers, academic experts, networking and social partners. Particularly, two factors contributed to successful completion of my graduate studies, the first was a personalized learning environment that supported and

motivated each student to nurture his or her passions, make connections between different learning experiences and opportunities, and design their own learning projects and processes through research with assistance of the experienced Professors and Doctors. I was equipped with agency and a sense of purpose, and the competencies I needed to shape and contribute to the lives of others through professional leadership, humanitarian work as well as the passion for designing resilience and risk reduction interventions.

In terms of career development, after graduating from ICHARM, I was promoted to the position of the Principal Mitigation officer. In my present position with the Department of Disaster Management Affairs, I am responsible for coordinating a number of disaster risk management (DRM) projects which aim at increasing resilience of households, communities and a nation at large to disaster risks. For instance, I am coordinating a six-year project (December, 2017 to December, 2022) Green Climate Funded project "Scaling up modernized climate information and Early Warning Systems (M-CLIMES)". The project is being implemented in 21 districts by the Department of Disaster Management Affairs, in collaboration with the Department of Climate Change and Meteorological Services, Department of Water Resources, Department of Agricultural Extension Services, Department of Fisheries, and the National Smallholder Farmers Association of Malawi. The project aims to scale up the use of modernized early warning systems (EWS) and climate information in the country. I am directly coordinating the Department of Agriculture and Extension Services to work with communities in disaster prone and food-insecure districts to co-develop tailored weather- and climate-based agricultural advisories to be disseminated through ICT/mobile, print and radio channels. The other component of the project which I am leading is the scaling-up of the community based early warning systems (CBEWS) in flood-disaster prone areas through awareness raising on flood hazards and vulnerabilities, installation of automated rainfall and hydrological monitoring and telemetry system in the upper and middle streams of problematic Rivers in 33 Villages prone to floods and implementation of flood risk reduction and management measures that includes community level vulnerability and risk assessments, development and



Current CBEWS in most problematic Rivers in Malawi: The Project is replacing these with Automated CBEWS as indicated in the figure below:



Some of the constructed Data Collection Platform (DCP) Houses along the problematic Rivers



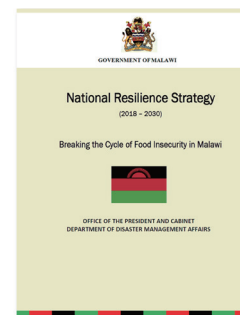
Data logger inside the DCP House- Monitoring of water levels



implementation of local level flood risk management measures. It is expected that most of the downstream communities in all the targeted areas will be supported to better prepare and respond to floods through awareness raising campaigns on flood hazards and vulnerabilities and development of flood evacuation plans and implementation of risk reduction measures.

The other project which I am co-managing (second in command) is the Disaster Risk Management for Resilience (DRM4R-2019-2023). This is a successor of the Disaster Risk Management Programme Support to Malawi that was implemented 2012-2017 by my department with funding from the UNDP. The DRM4R has been designed by my department to strengthen the planning, monitoring and evaluation functions of the DRM sector and to support the coordination of the sector working group and implementation of the DRM-related pillar of the National Resilience Strategy (NRS), including through the joint UN programme on resilience co-financed by Department for International Development (DFID) under the "Building Resilience and Adapting to Climate Change" initiative.

In one of his lectures, Professor Toshio Koike sensei pointed out that "Resilience is fundamentally an interdisciplinary concept that requires both the natural and social sciences, thus building resilience is complementary to reducing disaster risks. During one of our class field visit to Shinanogawa River Office as well as Sagurigawa Dam and Reservoir Management Office in Niigata city, that was organized by ICHARM in order for the students to appreciate resilient recovery and reconstruction as well as some of the river engineering flood counter measures that combined structural (hard-engineered structures such as flood defenses and canal) and non-structural and the role of Dams in flood disaster control, Dr. Yorozuya, course Instructor pointed out that "resilience is pivotal to increase disaster preparedness for effective response and to build back better in the phases of disaster preparedness, recovery, rehabilitation and reconstruction. Learning from the philosophy of Professor Koike as well from Yorozuya sensei, coupled with Japanese knowledge and techniques on recovering from the past disasters, the two Sensei gave me ideas on how my country Malawi can be resilient to water related disasters. When I had returned from my studies in Japan, I proposed to the Malawi government a need for the development of a country level National Resilience Strategy that have elements of science (risk reduction interventions) and social aspects (software DRM aspects) in order to address the problems of floods and drought that usually affects majority of Malawi communities on annual basis. The proposal was accepted by the Malawi Government and as such, I coordinated the development of a 13-year National Resilience Strategy (NRS) in 2018. I visualized the NRS as an agenda aimed at putting vulnerable households on a more sustainable path by strengthening their resilience to seasonal predictable shocks, and extreme shocks such as drought, dry spells and floods which are expected to increase owing to climate change. Through the NRS, it is expected that the Malawi government will bring a multi-dimensional approach to food and nutrition insecurity, diversified and climate-smart agricultural growth, disaster risk reduction, flood control through construction of dykes, establishment and strengthening of early warning systems, environmental management, social protection, and nutrition, managed under a single common programme framework and monitoring and evaluation systems, and through enhanced coordination, pooling of resources and prioritization.



In 2018/2019 rainfall season Malawi was hit by a Tropical Cyclone IDAI which formed in the Mozambique Channel and drifted to Malawi on 5th March, 2019 causing heavy rains accompanied by strong winds. The heavy and persistent rain led to severe flooding in fifteen (15) districts and two (2) cities in southern Malawi. Over 975,000 people were affected, with over 86,976 people displaced, with 60 deaths and 672 injuries recorded. The displaced people sought refuge in 173 displacement sites/camps across the affected districts. Around 80% of the displaced people sought refuge in schools, preventing delivery of education services as students were not able to attend lessons as their schools were damaged or being used by the displaced households as temporary shelter. The Government of Malawi through my department, with support from UNDP, the World Bank and the European Union, commissioned a Post-Disaster Needs Assessment (PDNA) to assess the impact of the floods on different sectors and determine the recovery and reconstruction needs across the affected districts.

To operationalize the key finding of the PDNA, the GoM initiated processes to develop a National Disaster Recovery Framework (NDRF). I am pleased to indicate that I am coordinating the development of the disaster framework which is expected to be finalised by September, 2019. The NDRF is an extension of the PDNA, which translates recovery and reconstruction needs into prioritised recovery interventions across sectors and districts. The NDRF defines mechanisms for monitoring and management, clarifies institutional roles and responsibilities, and optimises recovery investments across short-term humanitarian needs and medium to long-term reconstruction, taking into account the principles of building-back-better and resilience.

In summary, my participation to the Master course in Disaster Management at ICHARM was more valuable than obtaining the Master paper. ICHARM has shaped my career progression and my professional growth.



Coordinated the 2019 Cyclone Idai search and rescue and impact assessments in all the 17 affected districts to inform recovery and reconstruction

# Information Networking

## Kick-off meeting of the project on water related disaster reduction platform to enhance resilience to climate change in Africa

西アフリカにおける気候変動を考慮した水災害軽減のためのプラットフォームキックオフ会議

ICHARM 小池俊雄 センター長、Mohamed Rasmy 主任研究員、玉川勝徳 専門研究員、Maksym Gusyev 専門研究員は、2019年6月17日、18日とトーゴ国のロメで開催された、ユネスコからの受託研究プロジェクト「西アフリカにおける気候変動を考慮した水災害軽減のためのプラットフォーム (WADiRe-Africa)」のキックオフ会合に参加しました。会議は西アフリカの気象水文センター (AGRHYMET) の Abdou Ali 博士、UNESCO の Abou Amani 博士、CONACILSS の Otchotcho Kokou 氏、ICHARM の小池俊雄 センター長の共同議長の下で進められました (写真1)。

西アフリカではニジェール川やボルタ川の洪水氾濫により死者を含む甚大な被害が度々発生し国の発展が大きく妨げられています。このため、UNESCO では速やかに着手できる対策として、ニジェールの周辺地域を含む洪水の監視・予測システムの構築と洪水情報による避難等による人的被害の軽減等を図ろうとしています。本会議では、ニジェール川流域機構 (NBA)、ボルタ川流域機構 (VBA) の11の加盟国 (ベナン、ブルキナファソ、カメルーン、コートジボワール、ガーナ、ギニア、マリ、ニジェール、ナイジェリア、チャド、トーゴ) の代表者、及び UNESCO アフリカの3つの現地事務所からの参加者と ICHARM からの参加者の間で、ボルタ川とニジェール川流域において、水災害軽減のためのプラットフォームを構築するために必要なデータや洪水予測技術のギャップについて情報交換することを目的としました (写真2)。

1日目のオープニングセレモニーでは小池俊雄 センター長が参加者に対し水災害軽減のための科学技術の利用と能力開発の重要性を強調しました (写真3)。また、本プロジェクトに関する地元メディアからインタビューを受けました (写真4)。オープニングに続き、AGRHYMET、VBA および NBA の11か国の各代表者から、ボルタ川、ニジェール川流域の概要について発表があり、その後、観測データの状況、過去の洪水災害、実施中のプロジェクト等について活発な質疑がなされました。

2日目には、ICHARM の参加者からプロジェクトの実施戦略、洪水早期警報システムに使う水文モデルの概要、データ統合・解析システム (DIAS) を用いた降雨のリアルタイムデータアーカイブと衛星観測データのバイアス補正、緊急時対応計画の能力開発、およびプロジェクトの活動スケジュールに関する発表がありました。その後の議論で、各国の代表者がプロジェクトの洪水緊急時対応計画のための代表的な地点 "Hot

ICHARM Director Toshio Koike, Senior Researcher Mohamed Rasmy, and Research Specialists Katsunori Tamakawa and Maksym Gusyev participated in the kick-off meeting of a UNESCO project, "Water related disaster reduction platform to enhance resilience to climate change in West Africa (WADiRe-Africa)," on June 17-18, 2019, in Lome, Togo. The meeting was jointly chaired by Prof.

Koike, Dr. Abdou (AGRHYMET\*), Dr. Abou (UNESCO), and Mr. Otchotcho (Togo CONACILSS\*\*) (Photo 1). In the West Africa region, the flooding of the Niger and Volta rivers has caused extensive damage, including deaths, and greatly hampered the country's development. UNESCO is planning to quickly start the development of a flood early warning system to help the people evacuate by delivering flood information. The meeting aimed to share information on existing gaps of data and flood forecasting technology in the Volta and Niger River basins among the high-level officers of 11 member countries (Benin, Burkina Faso, Cameroun, Cote d'Ivoire, Ghana, Guinea, Mali, Niger, Nigeria, Chad, and Togo), the Niger Basin Authority (NBA), the Volta Basin Authority (VBA), and the representatives of three UNESCO Regional Offices in Africa (Photo 2).



Photo 1. Members of the kick-off meeting panel  
写真1. キックオフ会議進行メンバー



Photo 2. Participants of the kick-off meeting  
写真2. 集合写真

In the keynote address of the opening ceremony on June 17, Prof. Koike emphasized the importance of the technology utilization and capacity building for the disaster risk reduction to participants (Photo 3) and was interviewed about the project by local media reporters afterwards (Photo 4). The officers of AGRHYMET, VBA, and NBA provided a regional overview of the Volta and Niger River basins, and each representative of the 11 countries gave a 10-minute presentation to answer questions on national observation gauges, past flood disasters, and implemented projects in their part of the Volta and Niger River basins.

On June 18, the four ICHARM members presented information regarding the implementation strategies of the project, the modeling aspects of the flood early warning system, real-time data archiving and bias-correction on the Data Integration and Analysis System (DIAS), capacity building for establishing contingency plans, and the timeline of the project activities. Each country representative

identified one municipality as a potential flood “hot spot” for contingency planning in the project during the meeting discussion.

In the closing remarks, Prof. Koike stressed the four key points for regional and national flood governance such as data availability, capacity building, modeling technology, and platform structure and presented key points of the Lome statement, which was agreed by the participants without any objections. After the meeting, the key points of Lome statement was shared at the Fourth UN Special Thematic Session on Water and Disasters held in the ECOSOC\*\*\* Chamber of the UN Headquarters on June 24, 2019, the Japan-World Bank Seminar on Water and Disasters on June 26, and the TICAD7\*\*\*\* side events on August 28 and 30, 2019.

AGRHYMET\*: AGRrometeorology, HYdrology, METeorology

CONACILSS\*\*: Comité national du Comité permanent Inter Etats de Lutte contre la Sècheresse dans le Sahel

ECOSOC\*\*\*: United Nations Economic and Social Council

TICAD7\*\*\*\*: 7th Tokyo International Conference on African Development

Spot”を特定することがアクションとして挙げられました。会議閉会時には小池センター長が、国や地域レベルでの洪水管理のためのデータ利用、能力開発、水文モデル技術開発、プラットフォーム構築で重要な事項を「ロメ宣言の要点」としてまとめ、参加者一同で合意を得ました。この「ロメ宣言の要点」は、2019年6月24日に国連本部で開催された国際連合経済社会理事会 (ECOSOC) における「水と災害に関する第4回国連特別テーマセッション」、6月26日に開催された「日本 - 世界銀行における水と災害のセミナー」、また、8月28日に開催された「第7回アフリカ開発会議 (TICAD7) のサイドイベント」でも共有されました。



Photo 3. Keynote address by Director Koike  
写真3. 小池センター長による基調講演



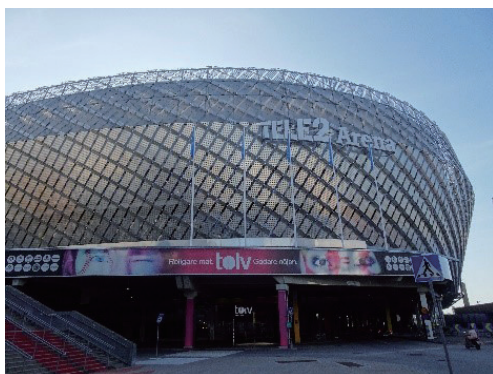
Photo 4. Local media reporters interview Director Koike  
写真4. 地元メディアによる小池センター長へのインタビュー

(Written by Maksym Gusyev and Katsunori Tamakawa)

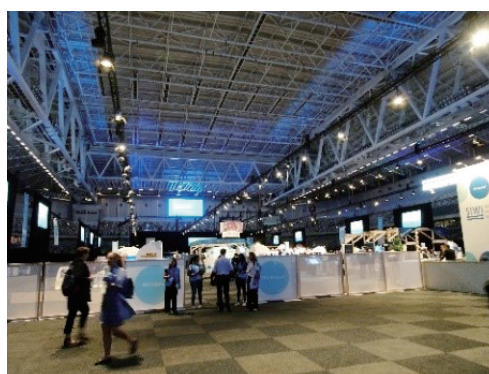
## Participation in Stockholm World Water Week 2019

### ストックホルム世界水週間 2019 への参加

The Stockholm World Water Week 2019 (SWWW2019) was held with a theme of “Water for Society: Including all” on August 25-30, 2019, in Stockholm, Sweden. This 29th conference marked a turning point this year in its long history. The venue moved from the Stockholm City Conference Center, which held the meeting until last year, to the Tele2 Arena, located in the southern part of the city, to accommodate more participants and exhibition booths. At the center of the main hall were exhibition booths surrounded by session rooms.



Tele2 Arena as a conference venue  
会場となった Tele2 Arena



Main hall with exhibition booths  
出展ブースが設置された大ホール

2019年8月25～30日、スウェーデン・ストックホルムにおいて、“Water for Society: Including all” とのテーマによりストックホルム世界水週間 2019 (SWWW2019) が開催されました。今回は 29 回目の開催であり、1 つの転換点となりました。つまり、初回以降、会議の開催場所とされていたストックホルム市会議センターから開催場所が市南部の Tele2 Arena へと移動され、より多くの参加者や展示ブースが受け入れられるものとなりました。大ホールの中央部には展示ブースがセットされ、それを取り巻くようにセッション会場が配置されていました。

開会式では会議主催者であるストックホルム国際水研究所 (SIWI) 所長である Torgny Holmgren 氏より歓迎の挨拶が行われ、スウェーデン国際開発協力大臣である Mr. Peter Eriksson の開会挨拶ではより良い水のガバナンスが提唱されました。またストックホルム市長である Ms. Anna König Jerlmyr からは、水問題への協働を進めるため、政治的

リーダーや学界、その他あらゆるステークホルダーを巻き込んだプラットフォームの重要性が訴えられ、このことは ICHARM が進め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設立支援を後押ししているものと見受けられました。そして今年のストックホルム水大賞は主にアフリカの河川を対象に、世界の河川管理への貢献という点で Dr. Jackie King に授与されました。

SWWW2019 では、8月27～28日に Asia Focus として、アジア太平洋水フォーラム (APWF) 事務局や、UNESCAP、UN-Habitat、ADB、GWP など APWF のパートナー機関により4つのセッションが開催されました。ICARM からは “Strengthening Governance to Address Asia’s Water Challenges” (アジアの水課題に対処するためのガバナンスの強化) のセッションにおいて、池田鉄哉 上席研究員が “Creating partnerships at all levels for water-related disaster risk reduction by involving all” (水関連災害リスク軽減に向けたあらゆるレベルでのパートナーシップ構築) と題して発表を行いました。発表では、国際洪水イニシアティブ (IFI) の下で進められる水のレジリエンスと災害に関するプラットフォームや、WMO と UNESCAP との合同政府間組織である台風委員会への貢献など、コミュニティやローカル、国内、地域、国際的なレベルでのパートナーシップ構築に関する ICHARM の取り組みを紹介しました。そして全ての主催機関により、水管理に関するガバナンスをいかに向上させるかについて活発な議論が行われました。Asia Focus の他のセッションでは、水循環管理、地方の水と衛生、そしてファイナンシングをテーマとしており、2020年10月19～20日に熊本で開催される第4回アジア太平洋水サミット (APWS4) は、これらのテーマを対象としています。このため、今回、これらのテーマを取り上げ、APWS4 に向けてどのように取り組んでいくべきか、参加者と議論できたことは、大変有意義な機会となりました。

In the opening ceremony, Mr. Torgny Holmgren, the executive director of the Stockholm International Water Institute (SIWI), gave a welcoming address as a conference organizer. Mr. Peter Eriksson, the Swedish minister for international development cooperation, delivered an opening address, expressing his advocacy for better water governance. Ms. Anna König Jerlmyr, the mayor of Stockholm, highlighted the importance of creating a platform involving political leaders, academia, and all other stakeholders to collaborate on water issues. Her words sounded like a strong endorsement for ICHARM’s efforts to support countries in establishing Platforms on Water Resilience and Disasters. This year, the 2019 Stockholm Water Prize was awarded to Dr. Jackie King for her contributions to global river management, especially focusing on the African rivers.

During the SWWW2019, four sessions were held as the Asia Focus on August 27-28 by the Asia Pacific Water Forum (APWF) secretariat together with the APWF partner organizations such as UNESCAP, UN-Habitat, ADB, and GWP. Chief Researcher Tetsuya Ikeda of ICHARM provided a presentation entitled “Creating partnerships at all levels for water-related disaster risk reduction by involving all” at the session of “Strengthening Governance to Address Asia’s Water Challenges”. He introduced world-wide efforts of ICHARM, such as establishing the partnerships at the community, local, national, regional and global levels, including the Platforms on Water Resilience and Disasters under the International Flood Initiative (IFI), and contributing to the Typhoon Committee, which is a joint intergovernmental organization of WMO and UNESCAP. All the convening organizations actively discussed ways to improve the governance of water management. The other sessions of the Asia Focus addressed issues on water cycle management, rural water and sanitation, and financing. Since the 4th Asia Pacific Water Summit (APWS4), scheduled on October 19-20, 2020, in Kumamoto, Japan, will focus on these themes, it was a great opportunity to draw attention to them and discuss the pathway toward the APWS4 among the participants.



Opening Ceremony  
開会式



Presentation at the session on governance  
ガバナンスに関するセッションでの発表

(Written by Tetsuya Ikeda)

## Participation in “Expert Dialogue on Scaling Up Regional Cooperation in Multi-Hazard Early Warning Systems in Asia-Pacific with a focus on flood and drought” by UNESCAP\* UNESCAP 「Expert dialogue on scaling up regional cooperation in multi-hazard early warning systems in Asia-Pacific with a focus on flood and drought」への参加

8月26～30日に、タイ・バンコクのUNESCAP Disaster Resilience Weekにおいて、「Expert Dialogue on Scaling Up Regional Cooperation in Multi-Hazard Early Warning Systems in Asia-Pacific with a focus on flood and drought」が開催され、「早期災害予測システムの構築と活用」、「災害情報・知見の共有管理」、「宇宙技術・衛星データの活用」、「ICTによるリスクマネジ

UNESCAP held an international event, “Expert Dialogue on Scaling Up Regional Cooperation in Multi-Hazard Early Warning Systems in Asia-Pacific with a focus on flood and drought,” during the Disaster Resilience Week on August 26-30, 2019, in Bangkok, Thailand. The expert meeting focused on the following issues: “Establishing and using early disaster prediction systems,” “Shared management of disaster information and knowledge,” “Utilization of space technology and satellite data,” and “ICT risk management.” Each issue was discussed by experts from Asian-Pacific countries.

Chief Researcher Hiroyuki Ito of ICHARM participated in the session on "Establishing and using early disaster prediction systems." As one of the important issues concerning the promotion of early flood warning systems, he spoke about difficulties in introducing such systems, especially to areas where rainfall data and rain gauges were insufficient. In his presentation, he also suggested solutions using scale-up technologies developed by ICHARM, such as "satellite rainfall data (GSMaP\*) corrected by ground rain-gauge data," "run-off analysis using the WEB-RRI model," and "the flood forecasting system on DIAS\*", a system capable of performing data and calculation processing in real time. He also explained the Platform on Water Resilience and Disasters, which is a flood risk reduction framework to apply the flood forecasting system involving various organizations of a country responsible for water-related disaster risk reduction. He added ICHARM's IFI\* activities that support countries in promoting the Platform activities.

After all the experts delivered presentations on their topics (which were called ignite talks), the participants were divided into groups by region for discussions. The results of the discussions were integrated into the key recommendations and reported at the sixth session of the Committee on Disaster Risk Reduction held on August 28.

The key recommendations are as follows:

1. Collecting and sharing data such as meteorology
2. Platform for sharing big data and securing analysis capabilities
3. Cross-border information exchange in international rivers
4. Capacity building for disaster management officers and local residents
5. Leave no one behind by providing information to the end

UNESCAP: United Nations Economic and Social Commission for Asia and the Pacific

GSMaP: Global Satellite Mapping of Precipitation

DIAS: Data Integration and Analysis System



Expert dialogue  
専門家会議



Opening of Committee on Disaster Risk Reduction,  
Sixth Session  
第6次災害リスク軽減委員会

(Written by Hiroyuki Ito)

メント」の課題別セッションにおいて、アジア・太平洋地域各国の専門家による議論が行われました。

ICHARM伊藤弘之上席研究員は「早期災害予測システムの構築と活用」のセッションに参加し、洪水早期警戒システムの重要な課題の一つとして、雨量計の整備等が乏しく雨量データの入手が困難な地域への洪水予測システムを適用する場合の課題を取り上げました。そこで、課題解決のためのscale up技術として、ICHARMが開発した「衛星降雨データ (GSMaP) を地上雨量計データで補正して使用する技術や、WEB-RRIモデルによる流出解析、それらのデータ・演算処理をリアルタイムで行うDIASによる洪水予測システムを紹介しました。また、構築した洪水予測システムを実装するための枠組みとして、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」とそれらを支援するIFI活動について紹介しました。

各専門家による話題提供 (ignite talk) の後、地域毎に参加者が分かれて議論が行われ、その結果を統合する形で、以下のように主要な提言 (キー・レコメンデーション) がまとめられ、28日の「Committee on Disaster Risk Reduction, Sixth Session」で報告されました。

1. 気象等データの収集・共有
2. プラットフォームの構築によるビッグデータの共有、解析能力の確保
3. 国際河川における国境を越えた情報交換
4. 防災担当者、地域住民の能力開発
5. 社会の隅々までの情報提供による leave no one behind

## Participation in the Panel on Tropical Cyclones (PTC) for the Bay of Bengal and the Arabian Sea

### ベンガル湾及びアラブ海における Panel on Tropical Cyclones (PTC) への参加

ICHARM has long contributed to the activities of the Typhoon Committee (TC), which is a joint intergovernmental body of WMO and UNESCAP. Chief Researcher Tetsuya Ikeda has been the chairperson of the Working Group on Hydrology (WGH) since the 51st annual session this February. ICHARM has recently been working on "Platform on Water Resilience and Disasters under the International Flood Initiative (IFI)" as one of the Annual Operating Plans (AOPs) of WGH. ICHARM supports the establishment of the IFI Platform in the Philippines, which is a member of TC-WGH.

As TC targets the typhoon-affected region, the Panel on Tropical Cyclones (PTC) for

ICHARMは長年にわたってWMOとUNESCAPとの合同政府間組織である台風委員会 (TC) の活動に貢献してきており、今年2月の第51回総会において、池田鉄哉上席研究員が水文部会 (WGH) の議長に任命されました。同時に ICHARM では、「国際洪水イニシアティブ (IFI) の下での水のレジリエンスと災害に関するプラットフォーム」について、WGHの年次活動計画 (AOPs)

の一つとして取り組んでいます。ICHARMは、TC WGHのメンバー国であるフィリピンでIFIのプラットフォーム設立支援を行っています。

TCは台風の影響を受ける地域を対象としているのに対し、熱帯サイクロンの影響を受ける地域では、同じくWMOとUNESCAPとの合同政府間組織として、ベンガル湾及びアラブ海におけるPanel on Tropical Cyclones (PTC) が設立されています。このPTCについては、激甚な熱帯サイクロンがもたらす深刻な人的被害やますます増加しつつある経済的被害に対し、どのように対応すべきか検討することを目的として1973年に設立されて以降、年次会合を開催しています。設立当初のメンバーはインドやバングラデシュ、タイ、そして、ICHARMがIFIのプラットフォーム設立支援を行っているミャンマー、スリランカ、パキスタンの6か国であったのに対し、2018年までには13か国に拡大し、高山地域や多雨地域、乾燥砂漠地域といった地理的にも広範な地域をカバーするようになりました。

2019年9月9～13日、第46回PTC会合がミャンマー・ネピドーで開催されました。ミャンマー国の交通通信大臣Thant Sin Maung氏より歓迎の挨拶が述べられ、その後、インド気象局、UNESCAP、WMOの代表からそれぞれ開会の挨拶が述べられました。PTCメンバー国からは、熱帯サイクロンによる自国の被害の状況やそれに対処するための対策について発表が行われました。池田上席研究員からは、IFIやコミュニティ・ローカル・国内・地域・世界レベルでのパートナー構築に関するICHARMの活動について発表を行い、参加者からは非常に有用な情報であり、参考になったとの称賛が寄せられました。会合では、今後、どのように地域的な協働活動を展開していくべきかについて議論がなされ、ICHARMに対してはIFIの活動を通じてPTCとTCとの橋渡しを行うことが期待されました。

#### 【リンク・Link】

<https://www.globalnewlightofmyanmar.com/myanmar-hosts-46th-session-of-panel-on-tropical-cyclones/>  
<https://www.wmo.int/pages/prog/www/tcp/ESCAP-Trop-cyc-panel.html>  
<http://www.wmoescap-ptc.org/>

the Bay of Bengal and the Arabian Sea similarly targets the region prone to tropical cyclones as an intergovernmental body of WMO and UNESCAP. Since established in 1973 for the purpose of discussing how to tackle heavy losses of lives and increasing economic damage brought by devastating tropical cyclones, the PTC has been convening an annual session. The PTC originally started with six countries: India, Bangladesh, Thailand, Myanmar, Sri Lanka and Pakistan, for the last three of which ICHARM is supporting the establishment of the IFI Platforms. Until 2018, the PTC was joined by seven more countries, and now the 13-member organization covers a wide geographical region such as the highest mountains, the rainiest areas, and the driest deserts.

On September 9-13, 2019, the 46th session of the PTC was held in Nay Pyi Taw, Myanmar. Union Minister for Transport and Communications of Myanmar Thant Sin Maung extended a welcoming address followed by opening remarks by India Meteorological Department, UNESCAP, and WMO. The PTC member countries gave presentations on damage due to the tropical cyclones in their countries and measures taken to manage them. Chief Researcher Ikeda provided a presentation on ICHARM's activities on IFI and the creation of partnerships at community, local, national, regional and global levels, and it was praised as very informative and relevant to the participants. During the session, the participants discussed how to develop regional collaborative activities and expressed their expectations for ICHARM to build a bridge between the PTC and TC through IFI activities.



Group photo of the participants for the 46th session of the PTC  
第46回PTC会合参加者



Presentation by Chief Researcher Ikeda  
池田上席研究員による発表

(Written by Tetsuya Ikeda)

# Public Relations

## Children experience a VR-created flood at Tsukuba Kid Scientists Festival 2019

### つくばちびっ子博士2019～VRを用いた洪水疑似体験～

Virtual reality (VR) technology has been used in various fields such as movie and medical industries. In the field of disaster prevention, too, many studies have been conducted using VR technology. For example, ICHARM has been working on the development of a simulated flood experience tool driven by this advanced technology.

As it was often pointed out, for example, regarding the Western Japan Heavy Rain Disaster 2018, people often fail to take appropriate evacuation actions even though various types of flood-related information are provided for them in advance. ICHARM is hoping to help this situation by developing a VR-driven tool with which people can experience a flood virtually.

On August 1, 2019, ICHARM participated in Tsukuba Kid Scientists Festival 2019, an annual outreach activity for children, and offered them an opportunity to try out the high-tech tool. A total of 115 children visited ICHARM's booth and experienced a virtual flood by wearing a goggle-type device. After that, they were asked to fill in a questionnaire sheet with eight questions aimed at clarifying whether the virtual flood experience contributes to raising their awareness of floods.



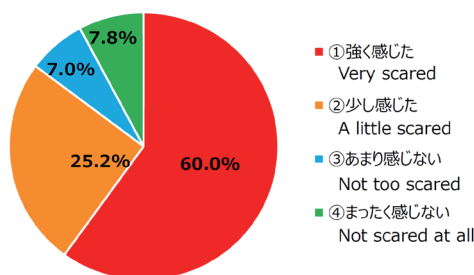
Children experienced a virtual flood by wearing a goggle-type device  
洪水疑似体験ツールを体験している様子

When asked, "When experience a virtual flood, were you scared of the flood?" (Question 1), about 60% of the children answered "Very scared," and 25% answered "A little scared." This result shows that almost all the children felt scared of the flood in the flood simulation.

They were also asked a question to find out whether or not they had ever been worried about floods before (Question 6). The results found that about 19% of the children were very worried and 29% were somewhat worried. In sum, about half of the children have been worried about floods before the virtual flood experience.

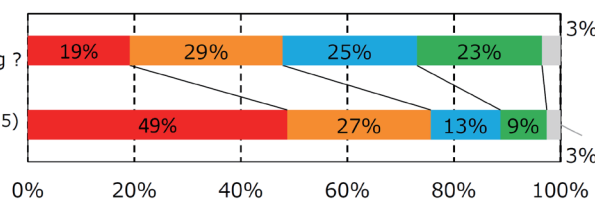
Another question, "Are you worried about a flood disaster in the future?" (Question 7), was asked to see if the virtual experience had any effect on the children's awareness of floods. About 49% answered "Very worried," and 27% "Somewhat worried." The results of Questions 6 and 7 suggest that the virtual flood experience contributed to raising children's awareness of flood disasters.

Q1. VRによる洪水疑似体験をして「洪水は怖い」と感じましたか？  
When experience a virtual flood, were you scared of the flood ?



Q6. 今まで洪水を心配していましたか？ (N=115)  
Have you ever been worried about flooding ?

Q7. これからの洪水災害が心配になりましたか？ (N=115)  
Are you worried about a future flood disaster ?



■ ① かなり心配である (Very worried) ■ ② 多少心配である (Somewhat worried) ■ ③ あまり心配でない (Not worried too much) ■ ④ ほとんど心配でない (Not worried) ■ 未回答 (Not answered)

※問2～5, 8については省略 (※Question 2～5, 8 are omitted.)

仮想現実 (Virtual Reality: VR) は現在、映画や医療を始めとした様々な分野で活用されており、防災分野でも VR を用いた多くの研究が行われています。平成30年の西日本豪雨等、事前に洪水に関する各種の防災情報が提供されているにも関わらず、適切な避難行動が行われず大きな被害が頻発していることに鑑み、ICHARM では洪水を『我がこと』と捉えて行動意図を醸成するための研究の一環として VR による洪水疑似体験ツールの開発を進めています。8月1日に実施された「つくばちびっ子博士2019」において、土木研究所内で本ツールを用いた洪水疑似体験会を実施しました。体験会では、来ていただいた小学生115名に、本ツールによる体験が洪水に対する意識向上に寄与するかどうかを明らかにすることを目的とした全8問のアンケート調査を行いました。アンケートの回答結果を簡単にご紹介します。

問1「VRによる洪水疑似体験をして『洪水は怖い』と感じましたか？」については、60%の方が「強く感じた」、25%の方が「少し感じた」と回答しました。つまり、本ツールによる洪水疑似体験によって、大多数の体験者(全体の85%)が『洪水は怖い』と感じたということが明らかになりました。

また、洪水疑似体験を行う前の気持ちについての問6「あなたは今まで、洪水災害を心配していましたか？」については、19%の方が「かなり心配していた」、29%の方が「多少心配していた」と回答しました。つまり、計48%の方が「洪水災害を心配していた」ことが明らかになりました。一方、洪水疑似体験を行った後の気持ちについての問7「これからの洪水災害が心配になりましたか？」について、49%の方が「かなり心配になった」、27%の方が「多少心配になった」と回答しました。つまり、計76%の方が「洪水災害が心配になった」ことが明らかになりました。これより、本ツールによる洪水疑似体験によって、体験者の洪水に対する心配の度合いが向上したことが明らかになりました。

ICHARM では、本年4月に行われた「国総研・土研一般公開」においても同様のアンケート調査を実施しており、2つの調査結果を比較することにより大人と子ども或いは年代による洪水に対する意識向上の差を明らかにし、今後の防災・減災対策に役立つ研究に繋げていきたいと考えています。詳細な結果については論文にまとめて公表する予定です。

ICHARM conducted a similar questionnaire survey for adults last April. The two surveys have clarified differences and similarities in flood awareness between adults and children and among different age groups. The findings are expected to be used to improve disaster prevention and mitigation measures in the future. The detailed results will be published in a journal paper.

(Written by Yoshimasa Morooka)

## Others

### Comment from internship student

#### インターン生からのコメント

ICHARM accepted an internship student Mr. Jiyong Bae from Korea Meteorological Administration from June to August.

He contributed a short message as below while looking back at his studying at ICHARM.

ICHARMでは、韓国気象庁からのインターン生、Jiyong Bae氏を受け入れました。

Jiyong Bae氏からの、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。

**Mr. Jiyong Bae** (from Korea) Korea Meteorological Administration

Stay period: June 3 - August 30, 2019

I was a visiting foreign researcher of ICHARM funded by Korea Meteorological Institute. Thanks to the help from Ms. Asuka Sato, I could find and access my room in Tsukuba for three months without any trouble. My supervisor, Prof. Mohamed Rasmy, kindly introduced the new world of hydrology to me. I learned how Rainfall Runoff Inundation model works. Then I tried to improve the original work from a past intern by finding the rainfall gauge data in Andong Dam river basin to calibrate RRI model more accurately.

My study area was Davao river basin of the Philippines. Although extreme rainfall events in the region are predicted to increase according to global climate models in RCP 8.5 scenario, there were rare ground rainfall gauges in the study area, leading to high vulnerability to flood. Therefore, I tried to supplement the rainfall data with satellite rainfall products through conducting bias correction and merging various types of products. I could use the skills with regard to dealing with satellite products thanks to the help from the researcher Khairul Islam. Through the advice from Professor Rasmy, I could significantly improve my final presentation by making a storyline.

Finally, I had a happy experience in ICHARM; not only playing crickets and South Asian traditional game, but also getting help and listening to various stories from master's and doctor's course students in the organization. I will try to work for the sake of public interest based on this valuable time in ICHARM.



Training Advisor Shinji Egashira (from left), Supervisor, Senior Researcher Rasmy Abdul Wahid and Mr. Jiyong Bae

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

### New ICHARM Members .....

One new member joined ICHARM.  
He would like to say brief hello to the readers around the world.



**Tomoyuki Okada / 岡田 智幸**  
Chief Researcher / 上席研究員

Japan

It is my pleasure to have become a member of ICHARM. In addition to my previous research post in PWRI, I worked for the International Affairs Office of River Planning Division in MLIT, the World Meteorological Organization in Geneva, and the Embassy of Japan in Vietnam. With work and travel experiences over 60 countries, I hope to contribute to advancing ICHARM activities.



## Business trips / 海外出張リスト

\* July - September 2019

- July 2 - 5, Chengdu, China, Toshio Koike, to attend HELP "Alliance of Alliances for Research and Education on Water and Disasters"
- July 7 - 12, Yangon and Naypyidaw in Myanmar, Hirosato Yoshino, Meetings with high officials of major related organization, Embassy of Japan and JICA in Myanmar
- July 8 - 16, Montreal, Canada, Toshio Koike and Mamoru Miyamoto, Attending "the 27th IUGG General Assembly"
- July 29 - Aug. 2, Thailand, Mamoru Miyamoto and Yousuke Nakamura, to conduct field surveys of topography in Rojana Industrial Park and surrounding area in Thailand
- July 28 - Aug. 3, Singapore, Mohamed Rasmy Abdul Wahid and Tomoki Ushiyama, Asia Oceania Geosciences Society (AOGS) 16th Annual Meeting
- August 4 - 8, Jakarta, Indonesia, Toshio Koike (to August 7), Kazuhiko Fukami (to August 7) and Yosuke Tomizawa, to attend the 1st IFI plenary meeting
- August 10 - 27, Sri Lanka, Mohamed Rasmy Abdul Wahid, Maintenance of rain gauge station in Sri Lanka and meeting about IFI activity in Sri Lanka
- August 15 - 23, Sri Lanka, Katsunori Tamakawa, Maintenance of rain gauge station in Sri Lanka and meeting about IFI activity in Sri Lanka
- August 18 - 21, Sri Lanka, Tetsuya Ikeda, Maintenance of rain gauge station in Sri Lanka and meeting about IFI activity in Sri Lanka
- August 22 - 26, Sweden, Mamoru Miyamoto, to attend the meeting of WMO/GWP Associated Programme on Flood Management (APFM) 2019
- August 24 - 1 September, Seattle, USA, Robin Kumar Biswas, to attend a seminar held by SASWE research group in Washington University
- August 25 - 30, Bangkok, Thailand, Hiroyuki Ito, to attend UNESCAP Disaster Resilience Week
- August 25 - 30, Stockholm, Sweden, Tetsuya Ikeda, to participate in Stockholm World Water Week and hold a session
- September 3 - 6, Indonesia, Kazuhiko Fukami, Regional Workshop on Water Education in Asia and the Pacific
- September 3 - 6, Philippines, Toshio Koike, Miho Ohara, Mamoru Miyamoto and Ralph Allen Acierto, to hold meetings on SATREPS activities in the Philippines with related organizations
- September 7 - 9, Beijing, China, Toshio Koike, attending "The Stake Key Laboratory for Remote Sensing Science (SLRSS) Internal Advisory
- September 8 - 10, Nay Pyi Taw, Myanmar, Tetsuya Ikeda, to participate in WMO/UNESCAP Pane on Tropical Cyclones
- September 16 - 20, Indonesia, Kazuhiko Fukami, UNESCO regional strategic coordination meeting "Science to Enable and Empower Asia Pacific for SDGs II"
- September 22 - 28, Mongolia, Maksym Gusev, IAEA/RCA Final Project Assessment Meeting
- September 25 - October 1, Philippines, Tomoyuki Okada / September 24 - October 1, Philippines, Miho Ohara and Ralph Allen acierto / September 25 - 29, Philippines, Mohamed Rasmy Abdul, Atsuhiko Yorozya and Katsunori Tamakawa / September 26 - 29, Mamoru Miyamoto and Tomoki Ushiyama, Philippines, to hold meetings for SATREPS detail survey
- September 28 - October 1, Beijing, China, Toshio Koike, to attend Chinese government Friendship Award ceremony

## Visitors / 訪問者リスト

\* July - September 2019

- Visited by four students from Miyagi Prefecture Sendaidaiichi High School, July 11, 2019  
Purpose: Deepen the understanding of how to evacuate from tsunamis and how to create a city that protects people from flood hazards
- Visited by delegate from Malaysia-Japan International Institute of Technology (MJIT), July 22, 2019  
Purpose: As part of course work "MJIT Master of Disaster Risk Management Japan Attachment", Prof. Shinji Egashira (ICHARM Research and Training Advisor) and Prof. Kuniyoshi Takeuchi (University of Yamanashi, Former ICHARM director) gave lecture
  - Ms. Faizah Che Ros, Senior Lecturer, MJIT
  - Mr. Shuib Rambat, Senior Lecturer, MJIT
  - Mr. Aizul Nahar Harun, Senior Lecturer, MJIT
  - Ms. Nor Eliza Alias, Senior Lecturer, MJIT
  - Total of 17 delegate from MJIT



- Visited by delegate from Mekong River Commission, August 6, 2019  
Purpose: to attend a lecture given by Dr. Harada 'Characteristics of flood hazard in Japan -Development of tools for analysis and warning system-'
  - Nam So (Mekong River Commission)
  - Prayooth Yaowakhan (Mekong River Commission)
  - Chou Beang Ly (Cambodia National Mekong Committee)
  - Phetsamone Khanopphet (Lao National Mekong Committee)
  - Panut Manoonvoravong (Thai National Mekong Committee)
  - Tien Hong Truong (Viet Nam National Mekong Committee)
  - Soe Myint Oo (Forest Department, Ministry of Natural Resources and Environmental Conservation)

● Visited by the Vanuatu Meteorology & Geo-Hazards Department (VMGD), Mr. Iuma Bani, and the Japan Meteorological Agency (JMA), Dr. Hisaki Eito, August 8, 2019

Purpose: Conducting Internship Program on Water Hazard and Risk Management

- Mr. Iuma Bani, Weather forecaster, VMGD
- Dr. Hisaki Eito, Head of Tokyo Typhoon Center, JMA



## Publications / 発表論文リスト

\* July - September 2019

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

- Chatterjee S., Gusyev M.A., Sinha U.K., Mohokar H.V., and A. Dash (2019). Understanding water circulation with tritium tracer in the Tural-Rajwadi geothermal area, India. *Applied Geochemistry* 109: 104373, <https://doi.org/10.1016/j.apgeochem.2019.104373>
- Thapa B.R., Ishidaira H., Gusyev M.A., Pandey V.P., Udmale P., Hayashi M., and N.M. Shakya (2019). Implications of the Melamchi water supply project for the Kathmandu valley groundwater system. *Water Policy*: 1-18.
- Hisaya Sawano, Katsunori Tamakawa, Badri Bhakta Shrestha, Tomoki Ushiyama, Maksym Gusyev and Toshio Koike, Formulation of adaptation measures for flood management under the uncertainty of future projection, *Proceedings of THA2019 International Conference on Water Management and Climate Change towards Asia's Water-Energy-Food Nexus and SDGs* (Bangkok, Thailand, 2019), pp.475-480, [http://aseanacademicnetwork.com/sites/default/files/conference/Proceedings\\_THA2019-010519.pdf](http://aseanacademicnetwork.com/sites/default/files/conference/Proceedings_THA2019-010519.pdf)
- Daisuke Harada, Naoko Nagumo, Yousuke Nakamura and Shinji Egashira, Characteristics of Flood Flow with Active Sediment Transport in the Sozu River Flood Hazards at the Severe Rainfall Event in July 2018, *Journal of Disaster Research (JDR)*, Vol.14, Issue6, pp.886-893, September, 2019

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

- Gusyev M.A. (2019). Water circulation in the Chikuma River basin. *National Research Institute of Fisheries Sciences, Ueda, August 22, Japan.*
- Tomoki Ushiyama and Yosuke Nakamura, Ensemble flood forecasting of a disastrous flood event in 2018 Japan, *AOGS 2019 annual meeting, AOGS, Singapore, July 29- August 2, 2019*

### 3. Poster Presentation / ポスター発表

None / 該当者無し

### 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

None / 該当者無し

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