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## Message from Director

### Make a Preemptive Action

Serious human and economic losses occurred due to the floods and sediment disasters in Sri Lanka in May and in Kyushu, Japan, in July. Both events were caused by long hours of torrential rainfall from cumulonimbus clouds rising one after another as a result of water vapor convergence in interaction with characteristic topography under a typical synoptic atmospheric pattern.

In Sri Lanka, the disaster occurred right at the time when, in response to a proposal by the International Flood Initiative (IFI), the Meteorology Department, the Irrigation Department, and the Ministry of Megapolis & Western Development were cooperatively in preparation for building a national platform, where observed data and model outputs will be shared and concerted actions will be taken for disaster risk reduction. In Japan, a new policy, promoting "reconstruction of a society where water-related disaster risk reduction should be fully recognized," was adopted recently in a nod to the Kinu River Floods in 2015 and the Hokkaido and Iwate Floods and Sediment Disasters in 2016 due to anomalous patterns of typhoons. Successively, the Flood Prevention Act and the Sediment Disaster Prevention Act were revised, and the Urgent Action Plan was just implemented.

For all these efforts, unfortunately, we are always reactive in taking measures. How can we turn the tide so as to take a proactive approach?

We as society need to take actions based on prevision backed by science and technology to build societal resilience, with which we will be able to better manage increasing risk of unexperienced disasters resulting from changes in climate and society. To this end, science and technology should make efforts to achieve accountability and earn the trust of society. Considering the implementation of science and technology in society as an academic frontier, ICHARM will develop its capability for supporting emergency actions step by step and contribute to building a resilient society, which can make preemptive moves smoothly and quickly when facing emergency.

### 先手を打とう

5月末にスリランカで、7月初めには九州にて、洪水土砂災害による甚大な被害が発生しました。いずれも特徴的な総観場で形成された水蒸気の収束が地形との相互作用で次々と積乱雲を発生させ、長時間にわたって豪雨をもたらした結果生じたものです。

スリランカでは、国際洪水イニシアチブ (IFI) の呼びかけに応じて、気象局、灌漑局、首都圏整備省らが中心となって、洪水のプラットフォームを構築し、相互に観測データやモデル出力を共有して、災害リスク軽減のための協調した活動を準備している矢先でした。我が国では、これまで経験したことのない台風によって発生した2015年の鬼怒川、2016年の北海道、岩手の洪水土砂災害に鑑み、水防災意識社会の再構築の政策を掲げ、水防法や土砂災害防止法の改正、緊急行動計画を決定したばかりでした。

しかし、いつも後手後手となっています。どうしたら転換が図れるでしょうか。

気候と社会の変化にともなって生じるこれまで経験したことのないような事象に対応できるレジリエントな社会の構築には、科学技術による確かな予見に基づく行動が不可欠です。そのためには、科学技術に対する社会の信頼を獲得し、説明責任を果たしていかなければなりません。ICHARMは科学技術の社会実装こそがフロンティアと考えております。まずは非常時の行動を支援する体制の段階的な整備に取り組み、そのうえで科学技術の予見に基づいて平常時から非常時へ遅滞なく対応できる社会を構築できるよう貢献したいと考えています。



July 31, 2017  
Toshio Koike  
Director of ICHARM

ICHARM Director Toshio Koike (rightmost) gives a presentation at emergency meeting on flood disasters in Sri Lanka (June 1, 2017)

# Special Topic

## ICHARM Disaster Relief Activities in Sri Lanka

2017年5月24日、スリランカ国南部および西部地域で降り始めた雨は、25日午後9時には激しさを増し、翌26日午前9時までその状態が続きました。結果的に、この12時間で500mmを超える雨が降りました(図1)。

As shown in Fig. 1, on May 24, 2017, a rainfall event started in the southern and western regions of Sri Lanka. The event intensified at 9:00 p.m. on May 25 and continued to maintain its intensity till 9 a.m. on the next day. During this 12-hour period, the total rainfall exceeded 500 mm.

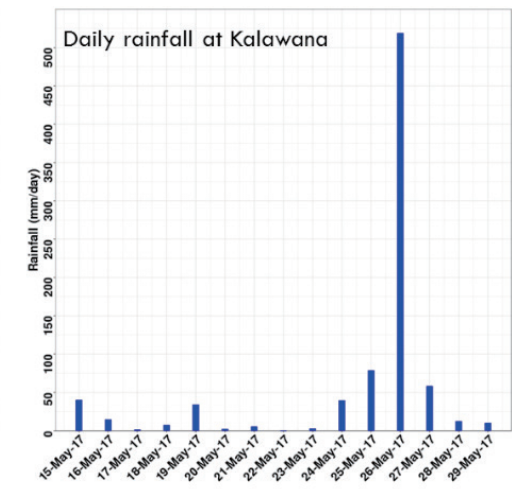
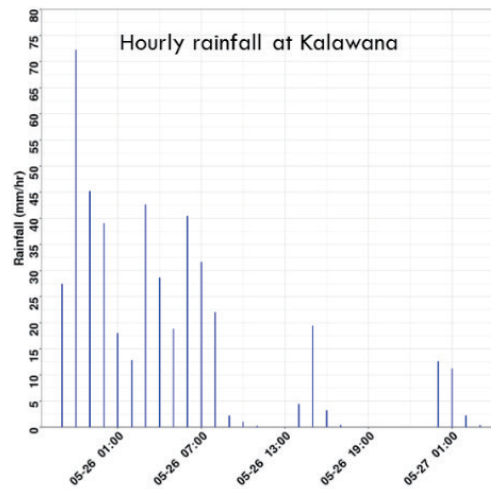
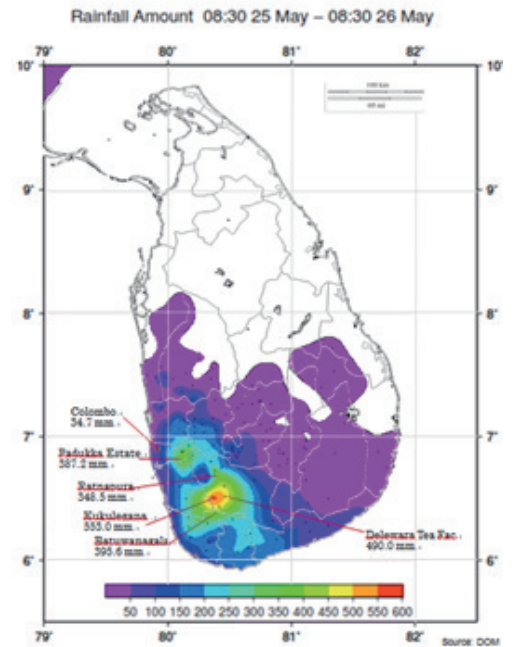


Fig. 1 Daily accumulated rainfall amount (mm) and distribution over the Sri Lanka on the heavy rainfall day, 25th – 26th May 2017 (Left, source: DOM, Sri Lanka); intensity of hourly and daily rainfall at Kalawa (right, source: ICHARM and JAXA)

今回の降雨現象の再現期間は推定約200年、Kukulaダム地点の最大流量はおよそ1400m<sup>3</sup>/sであり、両数値とも2003年降雨の数値を超えています(図2)。これまでに経験したことのない激しい雨によって、南部・西部両地域では大規模な洪水や地すべりが発生し、甚大な人的および物的被害が発生しました。

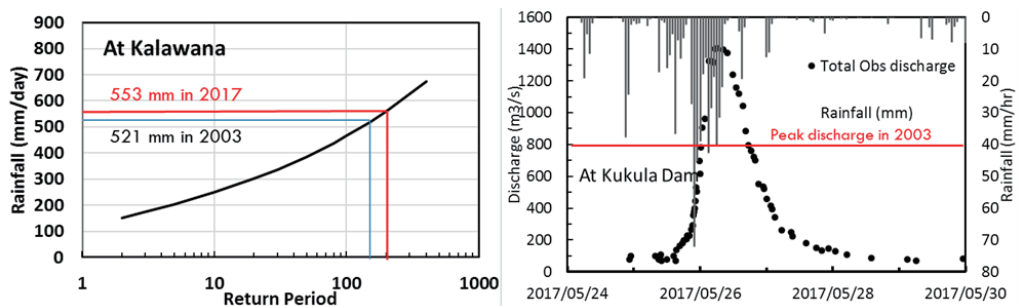


Fig. 2 Estimated return period for 2003 and 2017 heavy rainfall (right, source: ICHARM), observed discharges at Kukula dam during May, 2017 flooding (left, source: CEB).

The estimated return period of the May 2017 event was about 200 years, and the peak discharge at Kukula dam was about 1400 m<sup>3</sup>/s; both figures are larger than those of the previous historical event in 2003 (Fig. 2). This unprecedented heavy



rainfall caused severe floods and landslides over these regions, which resulted in devastating damage to lives and properties.

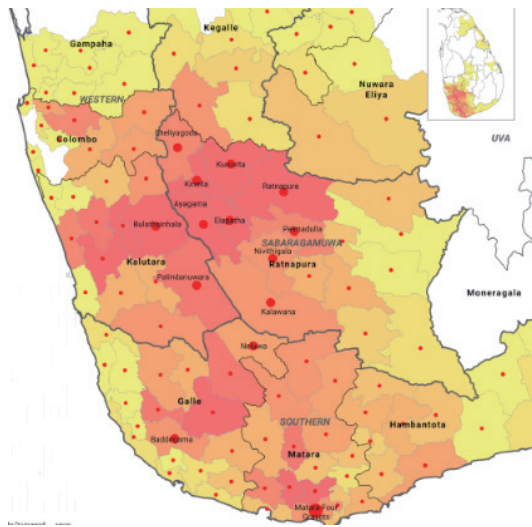


Fig. 3 Map of Disaster Affected Areas

(courtesy: [http://reliefweb.int/sites/reliefweb.int/files/resources/20170605\\_IOM\\_Displacement\\_Map.pdf](http://reliefweb.int/sites/reliefweb.int/files/resources/20170605_IOM_Displacement_Map.pdf))

According to the Government of Sri Lanka (GOSL), as of June 3, 2017, 211 people had lost their lives, 96 people had gone missing, and about 704,000 people had been affected (Fig. 3). As per the request from GOSL, on June 3, the Government of Japan (GOJ) dispatched the Japan Disaster Relief Expert Team (the JDR Team) consisting of 10 technical experts in the fields of flood control, erosion and sediment control, water resources, flood forecasting, and remote sensing to provide technical advice on effective measures at short-, mid-, and long-term flood and landslide control. PWRI also assisted the JDR mission by sending an expert, Senior Researcher Mohamed Rasmy, to Sri Lanka.

The purposes of the JDR Team were: a) to assess affected sites, b) to provide technical advice for the emergency response to damage caused by the heavy rainfall, c) to monitor the efforts to prevent secondary disasters from landslides and give ad-

スリランカ国政府の発表では、6月3日時点で、死亡者は211名、行方不明者は96名に上り、災害により何らかの影響を受けた者はおよそ704,000名を数えました(図3)。同3日には、スリランカ国政府の要請に応え、日本政府は、短期および中長期の視点における効果的な洪水対策および地滑り対策のための技術的な助言を行うことを目的に、洪水管理、土砂災害管理、水資源、洪水予測、リモートセンシングなど各分野の専門家10名から構成された災害救援専門家チーム(救援隊)を派遣しました。土木研究所もこの活動に協力すべく、Mohamed Rasmy 主任研究員を救援隊の一員として派遣しました。

救援隊の主な目的は、a) 被災地の調査、b) 豪雨被害に対する緊急対応に関する技術的な助言、c) 地滑りの2次被害防止活動の監視および避難に関する助言、そして、d) 洪水防止基本計画作成など、今後の両国政府間協力の検討でした。救援隊は被災地の調査を実施し、スリランカ国政府の関係省庁、機関、その他利害関係者と会議を行い、最終的に今回の災害に関する調査結果と両国政府の今後の協力についてまとめた報告書を作成し、関係省庁および政府関係者に提出しました。



Fig. 4 Field survey of flood levels in the affected areas with guidance of Irrigation department (Chief Eng. SPC Sugeeshwara).



Fig. 5 Field survey of flood levels in the affected areas with guidance of Irrigation department and the embassy of Japan in Sri Lanka

Special Topic

vice for evacuation, and d) to consider possibilities for future cooperation between GOJ and GOSL such as developing a flood mitigation master plan. The JDR Team visited and surveyed affected areas, held meetings with relevant ministries, organizations, and stakeholders of GOSL, and finally submitted a report on the findings and future collaborations between GOJ and GOSL to the relevant ministries and government officials of Sri Lanka.



Fig. 6: Meetings, discussions of finding and future collaborations, and handing over of the final report to relevant Ministers (Disaster management-Hon. Anura Priyadarshana Yapa and Irrigation and water resources- Hon. Gamini Vijith Vijithamuni Soysa) and government officials (President Secretary-P.B. Abeyakoon and Director, Foreign Affairs- Krisanti Weerakoon) of Sri Lanka.

(Written by Mohamed Rasmy Abdul Wahid)

## PWRI and the University of Tokyo jointly issued the press release

2017年7月6日、ICHARMの今後の活動として、土木研究所及び東京大学が共同で記者発表を行いました。その概要は以下の通りです。

・2017年5月下旬にスリランカ国で発生した洪水被害（死者・行方不明者300名超）を受けて、スリランカ国政府からの要請に基づき、日本国政府から国際緊急援助隊が派遣され、国立研究開発法人土木研究所も研究員の派遣により協力を行った。

・更なる洪水被害の発生が懸念されるスリランカ国では、今後、日本の高度な科学技術を活かした防災情報が有効と考えられることから、データ統合・解析システム（DIAS）を研究開発してきた東京大学地球観測データ統合連携研究機構（EDITORIA）と、洪水観測、予測研究を推進している国立研究開発法人土木研究所の水災害・リスクマネジメント国際センター（ICHARM）が協力して、同国におけるリアルタイム洪水予測等の情報提供を試行的に実施するとともに、その活用のための研修や人材育成等を行う。

記者発表の全文については、以下のサイトをご参照願います。

[http://www.icharm.pwri.go.jp/special\\_topic/pdf/20170706.pdf](http://www.icharm.pwri.go.jp/special_topic/pdf/20170706.pdf)

On July 6, 2017, PWRI and the University of Tokyo jointly issued a press release on the future activity of ICHARM in response to a severe flood disaster in Sri Lanka. The outline is as follows:

- A devastating flood disaster occurred in Sri Lanka in late May 2017, leaving over 300 people dead and missing. Upon the request of the government of the Democratic Socialist Republic of Sri Lanka, the government of Japan dispatched the Japan Disaster Relief (JDR) Expert Team to Sri Lanka to assist flood recovery efforts. The Public Works Research Institute (PWRI) assisted by sending a senior researcher as its expert.
- Since further flood damage is anticipated in Sri Lanka, disaster-related information provided by using Japan's advanced science and technology will be crucial for effective flood management. Under such circumstance, EDITORIA, which has developed DIAS, and ICHARM, which specializes in research on flood observation and forecasting, have decided to provide real-time flood forecasts and other information experimentally and to offer training and capacity development programs for proper utilization of these information.

The full text of the press release is available online at:

[http://www.icharm.pwri.go.jp/special\\_topic/pdf/20170706\\_english.pdf](http://www.icharm.pwri.go.jp/special_topic/pdf/20170706_english.pdf)

(Written by Tetsuya Ikeda)



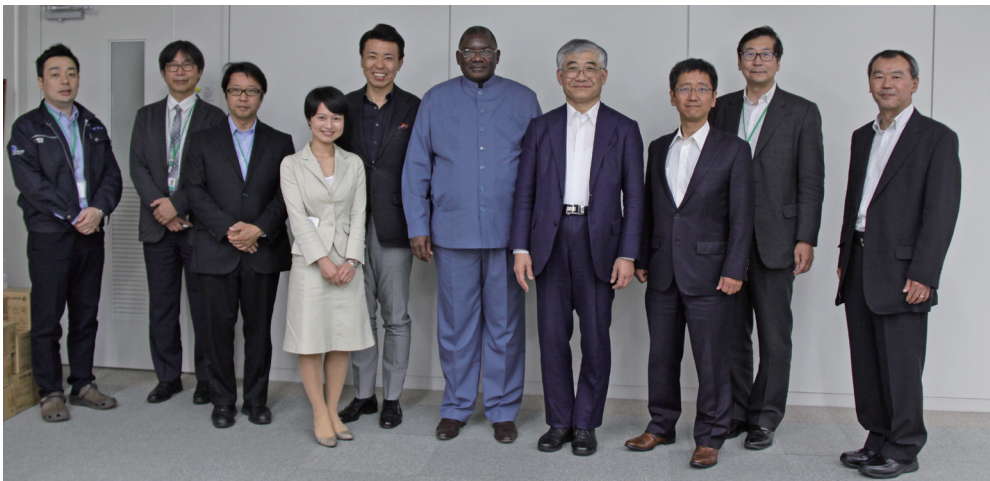
## President of the 38<sup>th</sup> UNESCO General Conference visited ICHARM

Mr. Stanley Mutumba Simataa, the president of the 38th session of the General Conference, UNESCO, visited ICHARM on May 15, 2017. President Simataa is also the Deputy Minister of Information and Communication Technology, the Republic of Namibia.

After attending the 201st Session of the Executive Board held from late April to early May at the UNESCO Headquarters in Paris, France, President Simataa visited Japan on May 10-16 as a working visit upon the invitation by the Minister for Foreign Affairs.

During his stay, he had a courtesy call on the Ministry of Foreign Affairs and the Saitama Prefectural Government, and visited ICHARM, a category 2 centre under the auspices of UNESCO.

After a courtesy call on PWRI President Kazuhiro Nishikawa on the afternoon of May 15, President Simataa received presentations on ICHARM's activities by ICHARM Director Toshio Koike and representatives of its research teams.



President Simataa (in a blue suit) with ICHARM staff and Director Takahashi, Multilateral Cultural Cooperation Div., MoFA

He also listened to brief explanations by doctoral and master's students of ICHARM on their research, and exchanged views and comments with them.

Then President Simataa made a speech at the ICHARM auditorium. In his speech, he mentioned that water-related disasters such as floods and the impact of climate change have become global concerns, and he stressed the importance of countermeasures. In this respect, he highly evaluated projects implemented by ICHARM in cooperation with UNESCO, including those for flood forecasting and early warning in the Indus River basin of Pakistan and those conducted under the framework of the International Flood Initiative (IFI).



President Simataa delivers a speech

After that, the president took a short institutional tour to the hydraulic laboratory of PWRI, and received explanations about experiments on spillways and other discharge facilities of dams constructed in Japan. He left ICHARM for Tokyo on the same day, and went back to his home country, Namibia, on May 16.

It was his first time to visit a UNESCO category 2 centre in Japan, and we hope that it was an enjoyable stay at ICHARM.

2017年5月15日、ユネスコ第38回総会議長を務められているスタンレー・ムツンバ・シマター氏が ICHARM を訪問されました。シマター議長は、ナミビア情報・通信技術副大臣でもあります。

フランス・パリのユネスコ本部では4月下旬から5月上旬まで、第201回執行理事会が開催され、シマター議長は本理事会終了後、外務省の閣僚級招へいによって、5月10日から5月16日まで日本を訪問しました。滞在中、外務省や埼玉県への表敬訪問を行うとともに、ユネスコの支援を受けるカテゴリー2センターである ICHARM を訪問しました。

5月15日の午後、土木研究所の西川和廣理事長への表敬訪問を行い、その後、ICHARM 内で小池俊雄センター長及び各研究チームの代表者から ICHARM の活動内容について発表を受けました。

また、ICHARM に在籍する博士課程・修士課程の研究者から、それぞれの研究内容について報告を受け、意見交換を行いました。

その後、シマター議長には、ICHARM の講堂にてスピーチを行っていただきました。スピーチでは、洪水などの水関連災害や気候変動による影響が世界的な関心事となっていることから、その対策の重要性を述べられました。その観点から、ICHARM がユネスコと連携して実施しているパキスタン・インダス川流域での洪水予警報に関するプロジェクトや、国際洪水イニシアチブ (IFI) に関する取り組みを高く評価していただきました。

スピーチの後、土木研究所内の水理実験施設を見学され、日本で建設されるダムの洪水吐けや放流設備に関する水理実験の様子について説明を受けられました。

ICHARM 訪問を終えて、東京に戻られたシマター議長は、翌5月16日、母国ナミビアへの帰路に就きました。

シマター議長にとって、日本のユネスコ・カテゴリー2センターを訪問するのは初めての機会でしたので、ICHARM での滞在を喜んでもらえたものと思っております。

(Written by Tetsuya Ikeda)

# International Flood Initiative (IFI)

国際洪水イニシアチブ (International Flood Initiative: IFI) はユネスコ、世界気象機関、国連大学、国連国際防災戦略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月には、IFIの関係機関により、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「ジャカルタ宣言」が採択されました。これにより、各国および関係機関と協働しながら、フェーズ1の「デモンストレーション」からフェーズ2の「プロトタイプング」、フェーズ3の「オペレーション」へと展開し、統合洪水マネジメントに貢献する活動を進める予定です。

特に、フィリピン・スリランカ・パキスタン・ミャンマー・インドネシアにおいては、各国の関係機関により「国家防災プラットフォーム」を設立することになり、ICHARM は設立のためのファシリテーターとして、各国で意見交換を行っています。

以下、パキスタン・ミャンマー・フィリピンでの取り組みを紹介します。なお、「Special topic」に掲載のスリランカ洪水緊急対応も IFI 活動の一環として行われています。



The International Flood Initiative (IFI) is a framework to improve flood management on a global scale in collaboration with such international organizations as UNESCO, the World Meteorological Organization, the United Nations University, and the International Strategy for Disaster Reduction. ICHARM has been the secretariat for IFI since the establishment of the initiative.

In October 2016, the Jakarta Statement was adopted by the organizations participating in IFI to establish interdisciplinary cooperation for further promoting flood risk reduction and sustainable development. Based on this agreement, IFI, while keeping close ties with countries and other organizations, will proceed with activities to implement integrated flood management by incrementally moving from "Phase 1: Demonstration," to "Phase 2: Prototyping," and finally to "Phase 3: Operation."

As part of this effort, the Philippines, Sri Lanka, Pakistan, Myanmar, and Indonesia have already decided to establish a national platform for disaster risk reduction involving various government agencies, and ICHARM has been actively supporting their decision by facilitating close communication between relevant organizations, both domestically and internationally.

The following introduces the cases of Pakistan, Myanmar, and the Philippines. For further information, IFI is also involved in the emergency response effort for the recent flood disaster in Sri Lanka (see "Special Topic").

## Workshop on "Platform on Water-related Disaster" in Pakistan

2017年4月12日に、パキスタン・イスラマバードにおいて、パキスタン国内における IFI (国際洪水イニシアチブ) のプラットフォーム設立に関するワークショップが開催され、小池センター長のほか ICHARM の研究者4名が参加しました。本ワークショップはユネスコパキスタンプロジェクトのワークショップ、ステアリングコミティとあわせて開催されました。パキスタンにおける IHP (The International Hydrological Programme) ナショナルコミティ議長で PCRWR (Pakistan Council of Research in Water Resources) 議長の Ashraf 氏のほか、Federal Flood Commission (FFC)、Planning Commission 等のパキスタンにおける水防災に関する関係省庁、大学研究者ら多数が参加しました。また、ユネスコジャカルタ事務所の Shahbaz Khan 所長のほか、JICA から参加がありました。

これまでユネスコパキスタンプロジェクトの活動により培われてきたネットワークのもと、パキスタン国内における活動のための目標設定、実施体制等が議論されました。今後、ワークプラン策定のための調整が進められる予定です。

The International Flood Initiative (IFI) is promoting a worldwide effort to establish a national platform in each country to implement more effective disaster management. As part of this effort, a workshop was held on April 12, 2017, in Islamabad, Pakistan, to support the country for the establishment of a platform. It took place with another workshop and the steering committee of the UNESCO Pakistan project. ICHARM Director Toshio Koike and four other researchers participated along with Dr. Muhammad Ashraf, who chairs the Pakistan national committee of the International Hydrological Programme (IHP) and the Pakistan Council of Research in Water Resources (PCRWR), other experts and officials of government agencies in flood disaster management such as Planning Commission, and researchers from local universities. Dr. Shahbaz Khan, the director of UNESCO Jakarta Office, and JICA experts were also among the participants.

With an excellent network among the participants created through the UNESCO Pakistan project, they had very positive discussions on the goals and structure of



Participants in the workshop



the platform and other related issues that should be addressed by the Pakistani government. Further meetings are scheduled to develop a work plan.

(Written by Morimasa Tsuda)

## High Level Consultation Meeting on IFI Coordination held in Myanmar

The High Level Consultation Meeting on IFI<sup>\*1</sup> Coordination in Myanmar was held on May 9 in Nay Pyi Taw, Myanmar. The meeting was planned as collaboration between ICHARM and the SATREPS<sup>\*2</sup> program. The program is led by the University of Tokyo as the principal research organization and supports the "Development of a Comprehensive Disaster Resilience System and Collaboration Platform in Myanmar." ICHARM Director Toshio Koike and Chief Researcher Hisaya Sawano attended the meeting along with the director generals of DWIR<sup>\*3</sup>, DMH<sup>\*4</sup>, RRD<sup>\*5</sup>, and IWUMD<sup>\*6</sup>, the pro-rector of Yangon Technological University, and an adviser of HELP<sup>\*7</sup>. The participants discussed the development of a national platform for water-related disaster risk reduction, in which relevant national organizations collaborate to reduce water-related disaster risks in Myanmar, and agreed on the basic structure and policy of the platform. The meeting also confirmed that DWIR, DMH, RRD, and IWUMD will form the core of the platform with the secretariats of NWRC<sup>\*8</sup> and NDMC<sup>\*9</sup>. Moreover, to demonstrate the functions of the platform, they also decided to start test operations for the Bago River and the Sittang River. The platform will go ahead with preparation for risk assessment including data collection and database development, while discussing issues arising through the process.

\*1 International Flood Initiative

\*2 Science and Technology Research Partnership for Sustainable Development

\*3 Directorate of Water Resources and Improvement of River Systems, Ministry of Transportation and Communication

\*4 Department of Meteorology and Hydrology, Ministry of Transportation and Communication

\*5 Relief and Resettlement Department, Ministry of Social Welfare, Relief and Resettlement

\*6 Irrigation and Water Utilization Management Department, Ministry of Agriculture, Livestock and Irrigation

\*7 High-level Experts and Leaders Panel on Water and Disasters

\*8 National Water Resources Committee

\*9 National Disaster Management Committee

2017年5月9日にミャンマー・ネピトーにおいて、ミャンマーでのIFIに関する協議のための高官等会議 (High Level Consultation Meeting on IFI (International Flood Initiative) Coordination in Myanmar) を開催しました。これは東京大学が研究機関代表となって進めているSATREPS (Science and Technology Research Partnership for Sustainable Development: 地球規模課題対応国際科学技術協力) の「ミャンマーの災害対応力強化システムと産学官連携プラットフォームの構築 (Development of a Comprehensive Disaster Resilience System and Collaboration Platform in Myanmar)」プログラムと ICHARM が連携し、水資源河川系開発局 (DWIR)、気象・水文局 (DMH)、救済・再定住局 (RRD)、灌漑水利用管理局 (IWUMD) の各局長 (Director General)、ヤンゴン工科大学の副学長 (Pro-Rector) 及び HELP (High-level Experts and Leaders Panel on Water and Disasters: 水と災害ハイレベルパネル) のアドバイザーを招いて実施したものです。この会議では、ミャンマーでの水災害リスクの軽減に向け、関係する組織が連携して活動を進める場としての、水と災害に関するプラットフォームの構築に関し議論が行われ、基本的な体制及び活動方針について合意しました。その中で、会議に参加した4政府機関は、国家水資源委員会 (NWRC: National Water Resources Committee) や国家災害管理委員会 (NDMC: National Disaster Management Committee) の事務局とともに、プラットフォームのコアメンバーとなることを確認しました。またプラットフォームの活動を試行 (demonstrate) するために、バゴ川とシタン川での活動を進めることになりました。今後、このプラットフォームで議論を積み重ねながら、リスク評価に向けたデータの収集、データベースの構築等を進めていきます。



From front row left: Director Koike, Prof. Khin Than Yu<sup>\*1</sup>, U Kyaw Myint Hlaing<sup>\*2</sup>, U Htun Lwin Oo<sup>\*3</sup>, Dr. Ko Ko Naing<sup>\*4</sup>, Dr. Hrin Nei Thiam<sup>\*5</sup>, Prof. Khin Ni Ni Thein<sup>\*6</sup>

\*1 pro-rector, Yangon Technological University

\*2 director general, IWUMD, Ministry of Agriculture, Livestock and Irrigation

\*3 director general, DWIR, Ministry of Transportation and Communication

\*4 director general, RRD, Ministry of Social Welfare, Relief and Resettlement

\*5 director general, DMH, Ministry of Transportation and Communication

\*6 advisor, HELP; member, NWRC

International Flood Initiative

また、会議に先立って、DWIR、DMH、RRD、IWUMDと個別に会談しました。DMHとの会議では、Director GeneralのHrin Nei Thiam氏にICHARM 10周年記念誌を贈呈しました。DMHはICHARMがミャンマーで3都市（Yangon, Mandalay, Mawlamyine）を対象に実施した洪水管理のプロジェクト（ADB TA-8456）のカウンターパートであり、Director Generalからは、このプロジェクトを踏まえ10周年記念誌に寄稿いただき、その中で今後も引き続きICHARMとの連携のもとで、ミャンマーでの災害リスク軽減に取り組むことへの期待を示されています。

このほか、澤野 上席研究員は、5月5日にヤンゴン市開発委員会（YCDC）を訪問し、ADB TA-8456の最終報告書を進呈するとともに、福岡市からYCDCに派遣されている野田勝也氏にも面会し、今後のヤンゴンの洪水対策について意見交換しました。

Prior to the meeting, Director Koike had individual meetings with DWIR, DMH, RRD, and IWUMD. In the meeting with Dr. Hrin Nei Thiam, the director general of DMH, he presented her with ICHARM's 10th anniversary publication. DMH was the counterpart organization when ICHARM conducted an Asian Development Bank project (ADB TA-8456) recently to improve flood management in Yangon, Mandalay and Mawlamyine. The director general contributed to the anniversary publication in relation to the project. She expressed hope to continue close cooperation with ICHARM for further improvement in disaster risk reduction in Myanmar.



Director Koike presents Director General Thiam with ICHARM's anniversary publication at DMH

Meanwhile, Chief Researcher Hisaya Sawano visited the Yangon City Development Committee (YCDC) on May 5 to present the final report of the ADB TA-8456 project. At YCDC, he also met with Mr. Katsuya Noda, who is there to assist YCDC on behalf of Fukuoka City of Japan, and discussed issues to be solved for further improvement of flood management in Yangon.



From left: Mr. Katsuya Noda\*1, Mr. Thant Zaw Wai\*2, Chief Researcher Sawano, Mr. Kyaw Min Oo\*3

\*1 advisor on cooperation and support for urban development

\*2 senior assistant engineer, Engineering Department, YCDC

\*3 assistant engineer, Engineering Department, YCDC



From left: Mr. Katsuya Noda, Ms. Tin Tin Kyi\*1, Chief Researcher Sawano, Ms. Saw Sandar Oo\*2

\*1 deputy chief engineer, City Planning and Land Administration Department, YCDC

\*2 division head, City Planning and Land Administration Department, YCDC

小池センター長は5月7日、川崎昭如東京大学特任准教授とともにバゴ川のタワへ赴き、SATREPSプログラムの一環として新たに設置されるフロート式水位計およびテレメトリ・システムについて、灌漑水利用管理局職員の指導にあたりました。

On May 7, Director Koike visited Tawa Village in the upper Bago River with Project Associate Professor Akiyuki Kawasaki of Tokyo University. Director Koike and Associate Professor Kawasaki gave local personnel of IWUMD instructions about float-



Director Koike (front, third from left) with local personnel in front of the water gauge station

type water gauges and a telemetry system that have been installed to collect data for the SATREPS program.

(Written by Hisaya Sawano)

## Meeting for the Platform on Water-related Disasters in the Philippines

International Flood Initiative (IFI) では、活動の一環としてフィリピン共和国の水災害に関するナショナルプラットフォームの構築を支援しています。2017年3月13日に実施した

The International Flood Initiative (IFI) has been supporting the Republic of the Philippines for establishing a national platform related to flood management by organizing a series of meetings. The previous meeting was held on March 13, 2017, and agreed on the framework of the national platform. Another meeting, "Meeting



for the Platform on Water-related Disasters,” was held recently on June 15, 2017, in Pasay City, Metro Manila, to discuss specific activities to be conducted under the platform. A total of 19 participants were at the meeting, including Director Toshio Koike, Chief Researcher Hisaya Sawano, Senior Researcher Miho Ohara, Researcher Mamoru Miyamoto and Research Specialist Naoko Nagumo from ICHARM. Undersecretary Renato U. Solidum Jr. of the Department of Science and Technology (DOST) was also there as a co-chair of the platform among other representatives from governmental organizations and universities.

After Director Koike provided some ideas for future activities at the beginning of the meeting, the participants discussed basic policy for data management to define collecting, arranging and utilizing data on water-related disasters that are needed to conduct risk assessment at the model sites of the Pampanga River basin in the Luzon Island and the Davao River basin in Mindanao Island. As a result, the participants agreed that the participating organizations should cooperate to prepare a list of data related to water-related disasters and upload data by using the Data Integration and Analysis System (DIAS) by the end of this year. All the discussions and information at the meeting will promote archiving and integrating data on water-related disasters and accelerate further involvement of the Philippines in IFI activities.

**Participating organizations in the meeting on 15 June 2017:**

- Department of Science and Technology (DOST, central office and Region XI office)
- Department of Public Works and Highways (DPWH)
- Office of Civil Defense (OCD)
- National Economic and Development Authority (NEDA, central office and Region III office)
- Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA)
- University of the Philippines (Diliman, Los Baños and Mindanao)
- JICA
- ICHARM



Participants in the meeting

(Written by Naoko Nagumo)

会議で合意されたナショナルプラットフォームの枠組みのもと、今後の具体的な活動内容について議論するため、2017年6月15日に「Meeting for the Platform on Water-related Disasters」をマニラ首都圏パサイ市において開催しました。この会議には、ICHARMから出席した小池センター長、澤野上席研究員、大原主任研究員、宮本研究員、南雲専門研究員に加え、ナショナルプラットフォームの共同議長の一人である科学技術省 (DOST) 次官 Renato U. Solidum Jr. 氏のほか、科学技術省リージョン XI (DOST Region XI)、公共事業道路省 (DPWH)、市民防衛局 (OCD)、国家経済開発庁 (NEDA)、国家経済開発庁リージョン III (NEDA Region III)、大気地球物理天文局 (PAGASA)、フィリピン大学 (ディリマン校、ロスバニョス校、ミンダナオ校)、JICA の代表者ら合わせて 19 名が参加しました。

会議では、今後、目指すべき活動について小池センター長が話題提供を行った後、モデルサイトであるルソン島のパンパンガ川流域、及びミンダナオ島のダバオ川流域においてリスクアセスメントを行うために必要な水災害関連データの収集・整理・活用に向け、データ管理の基本方針について議論しました。その結果、各組織が連携しながら水災害関連データのリストを作成し、データ統合・解析システム (DIAS) を用いて今年中にデータをアップロードすることで合意しました。これにより、今後フィリピン国内での水災害関連情報収集・統合化が推進され、IFI の活動がより一層活発に進められることが期待されています。

## Research

### Introduction of ICHARM research projects

ICHARM sets three principal areas of activity: research, capacity building, and information network. ICHARM 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,

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

Research

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、Shrestha 主任研究員の行っている「Flood Disaster Risk Assessment in Asian Developing Countries under Climate Change Scenarios」、Perera 専門研究員の行っている「Climate change impact study for the Lower Mekong Basin」、原田専門研究員の行っている「中山間地の谷底低地河川における流路・河床変動を伴う洪水流の解析」、博士課程学生の Mahtab 氏の行っている「Analysis on the Best Strategy to Attain the Maximum Economic Benefits in Haor Areas in Bangladesh」の4つの研究を紹介します。

social and cultural conditions, being sensitive to local needs, priorities, development stage, etc., within the context of global and regional experiences and trends.

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 four studies as listed below:

- Badri Bhakta Shrestha**, Senior researcher  
Flood Disaster Risk Assessment in Asian Developing Countries under Climate Change Scenarios
- Duminda PERERA**, Research specialist  
Climate change impact study for the Lower Mekong Basin
- Daisuke Harada**, Research specialist  
Characteristics of flood flow with riverbed deformation in mountainous valley-bottom streams
- Mahtab Mohammad Hossain**, Doctoral student  
Analysis on the Best Strategy to Attain the Maximum Economic Benefits in Haor Areas in Bangladesh

## Flood Disaster Risk Assessment in Asian Developing Countries under Climate Change Scenarios



**Badri Bhakta SHRESTHA**, Senior researcher  
バドリ バクタ シレスタ 主任研究員

Flood disasters have been more frequent, particularly in developing countries, due to rapid urbanization and development activities. Floods can cause serious damage such as loss of lives and destruction of infrastructure. Therefore, flood disaster risk mitigation plans should be properly prepared and implemented. To develop such plans, however, requires evidence-based risk assessment strategies to quantify and mitigate flood risk. In this context, ICHARM has been conducting research on flood disaster risk assessment and risk management by using the Rainfall-Runoff-Inundation (RRI) model, developed at ICHARM, and developing methodologies to assess flood damage and risk by future floods under climate change.

As part of the research on flood disaster risk assessment, ICHARM conducted research activities assessing the impact of climate change on Asian river basins in terms of flood risk in the Program for Risk Information on Climate Change (SOUSEI Program) funded by the Ministry of Education, Culture, Sports, Science and Technology of Japan from April 2012 to March 2017. ICHARM selected five flood-vulnerable river basins in the Asian region (the Pam-panga River basin in the Philippines, the Solo River basin in Indonesia, the Chao Phraya River basin in Thailand, the lower Mekong River basin (LMB) in Cambodia, and the Indus River basin in Pakistan), and assessed flood damage to agriculture under climate change using MRI-AGCM3.2S precipitation dataset by analysing the damage of present and future floods to rice crops.

To assess flood disaster risk, the characteristics of flood hazards such as flood depth and flood duration were computed using the RRI model<sup>1,2</sup>. Since rice production is a major source of income in many Asian developing countries,



the study specifically focused on flood damage to rice crops. Flood damage to rice crops was calculated by a function of flood depth, flood duration, and the growth stage of rice plants<sup>3</sup>. The flood damage curves, developed by ICHARM using flood damage matrix data of the Philippines<sup>3,4</sup>, were applied to assess flood damage to rice crops. First, assessment of flood damage to agriculture was conducted for large-scale flood events in the past to verify the methodology<sup>3,4,5</sup>. Then, flood damage assessment was conducted under the conditions of present climate (1979-2003) and future climate (2075-2099), using a MRI-AGCM3.2S precipitation dataset<sup>6,7</sup>. Frequency analysis was also conducted using rainfall to identify the intensities of flood hazards with 50- and 100-year return periods under present and future climate conditions<sup>1,2</sup>, and flood damage was then assessed for both return-period cases with different rainfall patterns chosen from each climate scenario. Fig. 1 shows the comparison of flood damage assessment for a 100-year flood in the case of the worst scenario, which causes the largest flood area for the river basins of Pampanga, Solo, LMB, and Chao Phraya. The results obtained from the damage assessment were compared for the worst case, and found that the agricultural economic loss of rice crops in the case of a 100-year flood can increase in the future by 4%, 25%, 27% and 16% in Pampanga, Solo, LMB, and Chao Phraya, respectively. The results of this study can be useful to implement flood mitigation actions for climate change adaptation. The flood disaster risk assessment methodology developed in the study can also be applied to other river basins for flood risk management.

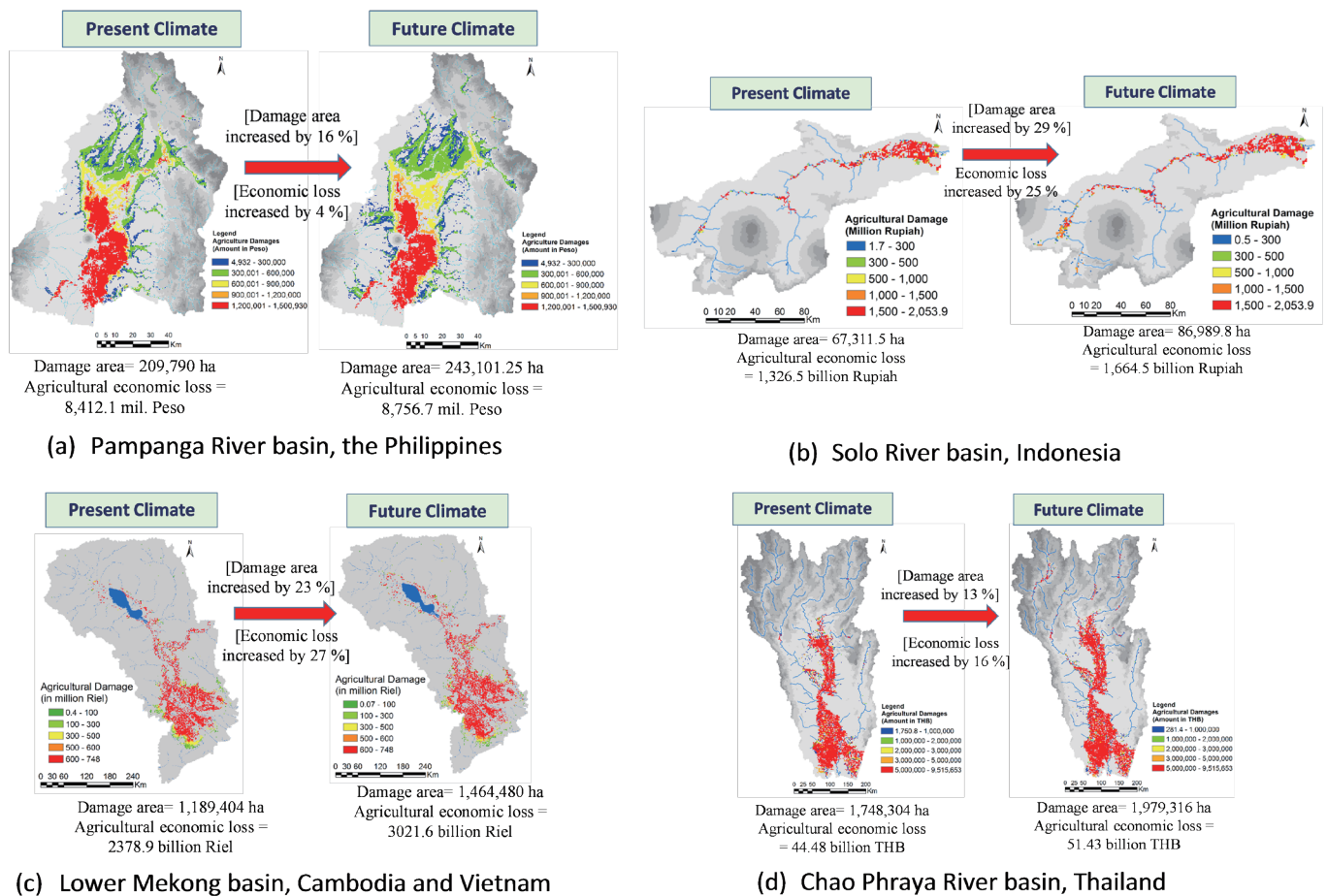


Fig.1 Comparison of flood damage assessment under present and future climate conditions in the case of 100-year flood event

**References:**

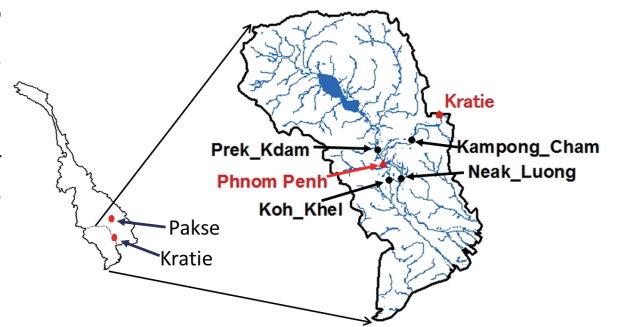
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3. Shrestha B. B., Okazumi T., Miyamoto M., Sawano H. 2016. Flood damage assessment in the Pampanga river basin of the Philippines. Journal of Flood Risk Management 9: 355-369.
4. Shrestha B. B., Sawano H., Ohara M., Nagumo N. 2016. Improvement in flood disaster damage assessment using highly accurate IFSAR DEM. Journal of Disaster Research 11 (6): 1137-1149.
5. Shrestha B. B., Sawano H., Kuribayashi D. 2016. Flood risk assessment in the Solo River basin of Indonesia. Proceedings of the 7th International Conference on Water Resources and Environment Research (ICWRER-2016).
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7. 2016 Annual Research Result Report of SOUSEI Program. 2016. pages 136-142.

## Climate change impact study for the Lower Mekong Basin

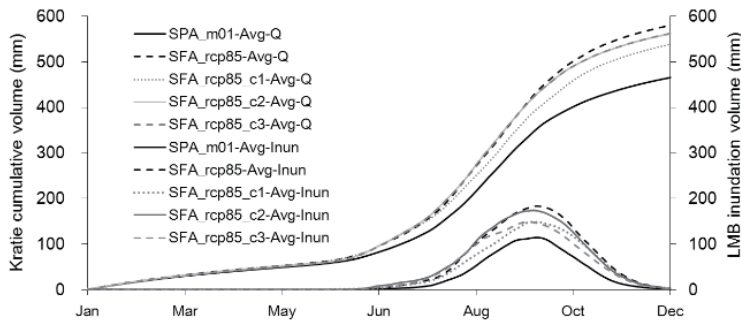


**Duminda PERERA**, Research specialist  
ドゥミンダ ペレラ 専門研究員

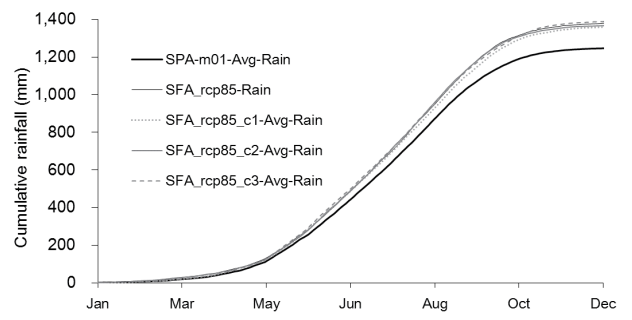
Climatic variations caused by overwhelmed emission of greenhouse gases is likely to alter the hydrology of river basins by changing the patterns of the precipitation, runoff processes and water storages. Even though, various studies have been conducted based on the climatic models under different emission scenarios, there is a limitation in regional and local scale hydrological analyzes with the combined application of high resolution Atmospheric General Circulation Models (AGCM) and Physically Based Hydrological Models (PBHM) for extreme floods. This study has taken an effort to overcome that limitation in previous studies. MRI-AGCM3.2S precipitation based flood analysis was conducted for the Lower Mekong Basin (LMB) in this study. The selected MRI-AGCM3.2S experiments in the study were an AMIP-type experiment as present climate (SPA\_m01: 1979-2003), and four members of RCP8.5 greenhouse gas emission scenario experiments (SFA rcp8.5) with different sea surface temperature (SST) distributions (C1 – C3), as future climate ensembles for 2075-2099. The whole hydrological system of the Mekong basin was modelled by the BTOP hydrological model while the LMB area was modelled by RRI model. The peak inundation area increments for the future climatic conditions compared with the present AMIP-type experiment are 1.34, 1.26, 1.35 and 1.24 respectively for RCP8.5 experiments with four SST distributions. The peak inundation volume extensions in future RCP8.5 experiments compared to the present climatic condition are 1.60, 1.30, 1.52 and 1.29 respectively. In this study, present and future river runoff, flood peaks, inundated area and inundation volume changes were analyzed aiming to provide supportive information for the LMB flood risk assessment and water resources development.



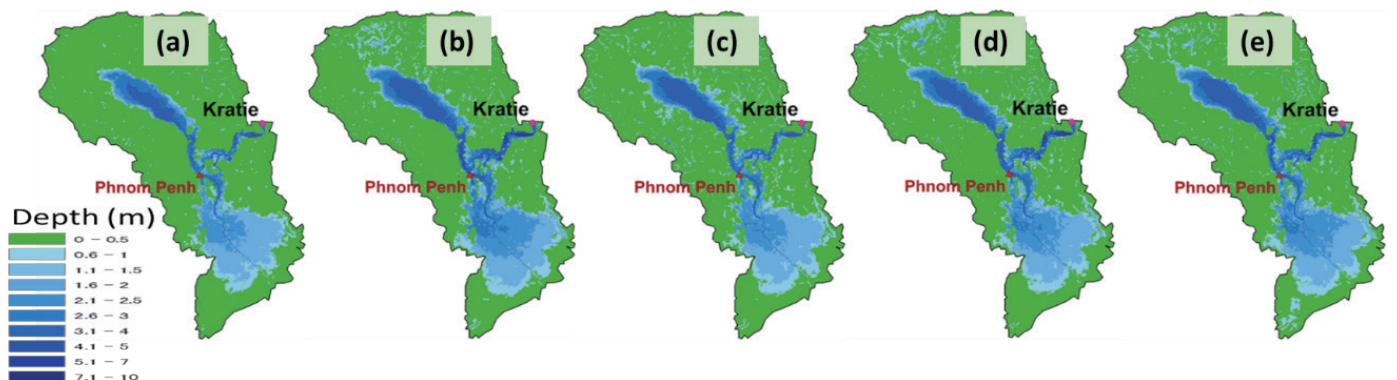
Study area and river gauging stations



25 years averaged cumulative specific river runoff volume at the Kratie station and 25 years averaged cumulative specific inundation volume (above 0.5m) at the LMB



25 years averaged cumulative Mekong basin rainfall



Maximum inundation out of 25 years simulation for LMB: (a) SPA\_m01, (b) SFA rcp8.5, (c) SFA rcp8.5-C1, (d) SFA rcp8.5-C2 and (e) SFA rcp8.5-C3



## Characteristics of flood flow with riverbed deformation in mountainous valley-bottom streams

### 中山間地の谷底低地河川における流路・河床変動を伴う洪水流の解析



**Daisuke Harada**, Research specialist

原田 大輔 専門研究員

In August 2016, heavy rainfall due to Typhoon No.10 caused violent flood damage to areas along the Omoto River, which runs through Iwaizumi Town, Iwate Prefecture. Since the flood discharge was far greater than the flow capacity of the river channel, the flood affected virtually all valley plains. According to our field survey, because the valley-bottom streams are surrounded by mountains, there might be a possibility that the numerous sediment and floating woods supplied from the surrounding mountains compounded the disaster. In this study, flood flow analysis was conducted with various types of sediment and floating woods supply conditions for planning effective river management in mountainous valley streams.

Figure 1 shows the results of 2D numerical flood flow analysis with riverbed deformation in the Otomo area, where severe damage was observed. As shown in Figure 1, the flood flow is concentrated on the bending parts of the valley, and is diverged toward the downstream of the sand bars. Figure 2 shows the results of simulations which assumed the trapping of floating woods on the bridge piers, which reveals that the results of elevation changes are closer to the actual events when the trapping of floating woods are considered. Therefore, it is concluded that countermeasures against sediment and floating woods are quite important in developing a river improvement plan for mountainous valley streams such as the Omoto River.

岩手県岩泉町を流れる小本川では、2016年の台風10号による出水により、洪水流が流路の通水能力を大きく超えて谷底全体を流れ、大きな被害をもたらした。著者らが現地調査を行った結果、小本川のような中山間地河川では土砂と流木の生産源が非常に近く、これらの谷底低地への流入により洪水流が大きく影響を受けたと推察された。そこで、流路・河床変動を伴う洪水流の解析を実施し、また大量の土砂や流木の流入を想定した解析を行い、小本川のような中山間地域河川の河道計画を行う上での留意点を抽出した。

図-1は特に被害の大きかった乙茂地区における平面二次元河床変動解析結果であり、ピーク流量時のものを示している。洪水流は湾曲部で集中し、その下流の砂州部に向かい発散するような状況であることが分かる。次に、橋脚に流木が捕捉されて流れを阻害した場合を想定した解析を行った結果を図-2に示すが、河床変動解析結果は実態とより近くなった。流木や土砂の流入の対策は、中山間地河川の河道計画上の極めて重要な検討課題である。

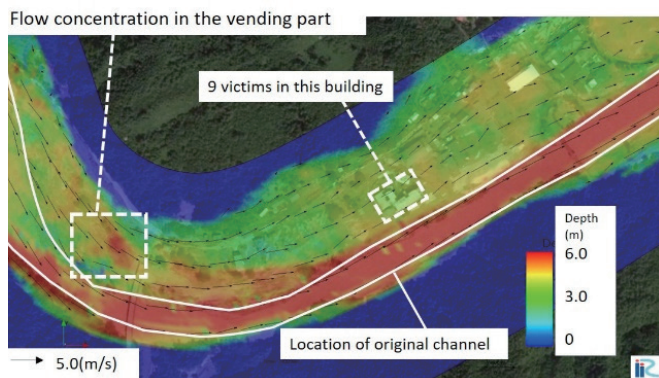


Figure 1 : Results of 2-D numerical flood flow analysis with riverbed deformation

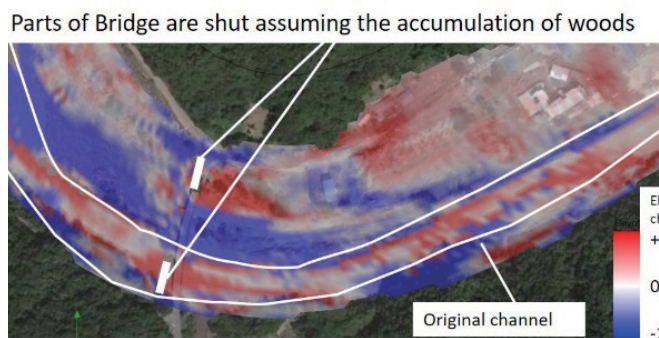


Figure 2 : Results of numerical simulations assuming the accumulation of woods around the bridge

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## Analysis on the Best Strategy to Attain the Maximum Economic Benefits in Haor Areas in Bangladesh



**Mahtab Mohammad Hossain**, Doctoral program student (D2) and Research assistant  
 マフタブ モハマト ホセイン 博士課程 (2 回生) ・リサーチアシスタント

Bangladesh is a low-lying deltaic country where flood is a common natural hazard. The seasonal flood period is June to September. But, north eastern part of Bangladesh is sometimes flooded in April/May (it is the boro rice harvesting time). This flood is locally called flash flood or early flood. A lot of depressed areas (locally called haor area) are situated in this region which is easily inundated by this early flood. Flash floods strike suddenly and inundate boro crops, damage infrastructures by erosion and cause massive loss in haors region. Almost 80% of haor area is covered by boro rice during January to May; as a result about 1/3 of total country rice comes from this region. Farmers in haor area want to harvest the boro crop before striking the flash flood but it is a recurrent phenomenon thus flash flood is identified as the number one ranked hazard in this region. The main objective of this study is to propose the best strategy to attain the maximum economic benefits in haor area, which includes i) agriculture risk assessment due to flash flood in haor areas ii) comparing the effect of different possible strategies with inundation frequency analysis iii) propose the best strategy to maximize the economic benefits in haor area.

A two dimensional Rainfall Runoff Inundation (RRI) model has been considered to attain the objectives. RRI uses 2D diffusive wave equations and simulates inundation area based on water levels. It deals with slopes and river channels separately. A flow chat to attain the objective has been presented in **Figure 1**:

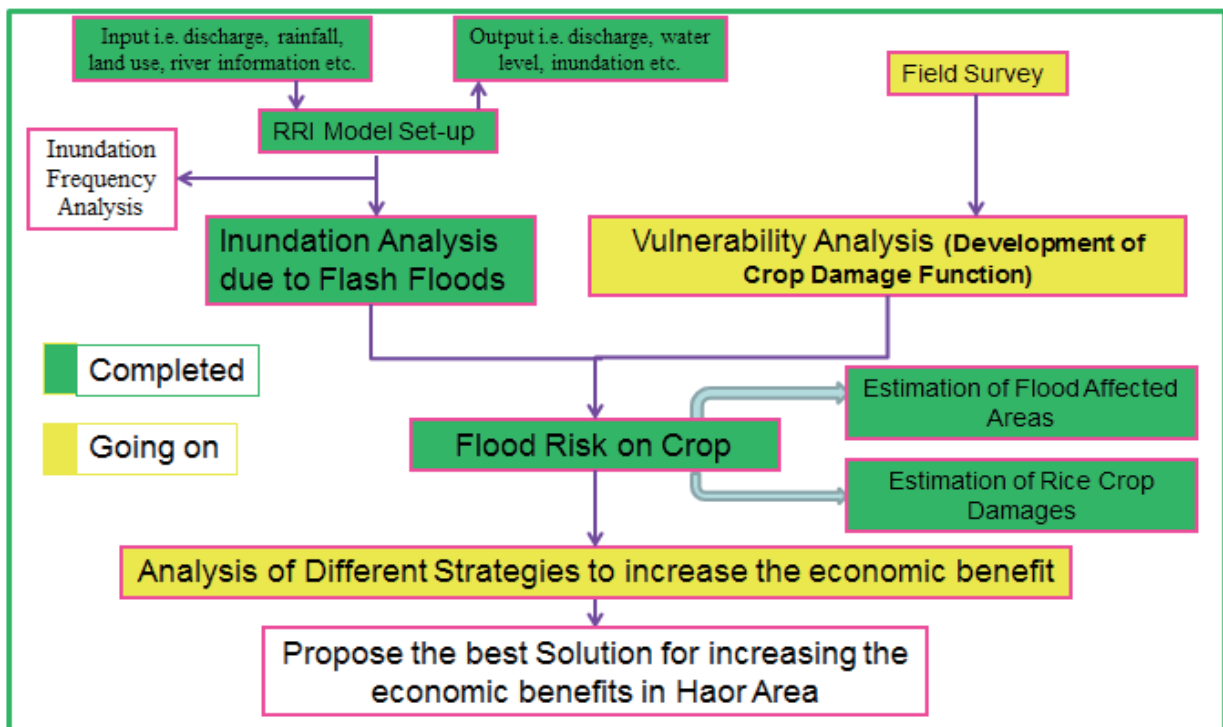


Figure 1: A brief methodology to attain the objectives

Agriculture risk assessment will identify the area which would seriously affect and distribution of the inundation due to flash floods. It will help to find the best way of flood management. Different options (structural and non-structural) have been considered to reduce the impact of flash flood on agriculture in this region. After that, the best strategy will be selected which will lead to reduce the impact of flash flood and inspire more area to be agriculture in future thus the maximum economic benefit will be attained. The RRI model has already been set-up. It was verified that the proposed method is satisfactory for crop damage assessment and therefore can be applicable for future crop damage assessment. Finally, concluding remarks for the policy makers will be presented to implement the research suggestions for solving the flash flood problem and maximizing the economic benefit in haor area.



## ICHARM individual research project: Grants-in-Aid for Scientific Research (B: 15H05136 oversea, KAKENHI)

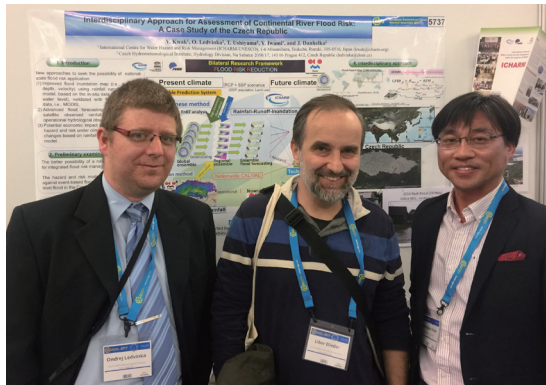
Research Specialist Young-joo Kwak ( he is in charge of the Principal Investigator ) has led a research project (Grants-in-Aid for Scientific Research (B: 15H05136 oversea, KAKENHI)) funded by Grants-in-aid for Scientific Research for three years. He introduces this project's oversea activities as below.

ICHARM の郭 栄珠専門研究員が研究代表を勤める、今年で 3 年目の科研費研究課題（基盤研究 (B15H05136) 海外学術調査：気候変動及び社会経済シナリオを考慮した広域河川氾濫リスク予測モデル開発）の海外研究活動を紹介します。

### Research Specialist Kwak visits CHMI and attends EGU2017

Research Specialist Young-joo Kwak has been working in collaboration with researchers of the Czech Hydrometeorological Institute (CHMI) in order to develop a risk forecasting model for widespread river floods in consideration of climate change and corresponding socio-economic scenarios. As the research has progressed, Kwak visited the Czech research institute on April 20-22, 2017, to discuss with his counterparts how further research should be conducted, as well as the characteristics of recent and historical flood events in the country. After that, they jointly announced the summary of their discussion at the European Geosciences Union General Assembly 2017 (EGU2017). Kwak and the Czech researchers also agreed that a strategic research scheme involving young researchers should be crafted, and that a joint research should be conducted on the development of advanced flood forecasting methods and the improvement of disaster management and measures by using such methods.

EGU2017 was held on April 23-28 at the Austria Center Vienna in Vienna, Austria. Approximately 14,500 participants attended the assembly and delivered about 17,400 paper presentations in 649 sessions. Kwak made a presentation entitled "Rapid Global River Flood Risk Assessment under Climate and Socioeconomic Scenarios: An Extreme Case of Eurasian region" in the session of Hydroclimatic Extremes under Change, and also spoke about the "Interdisciplinary Approach for Assessment of Continental River Flood Risk: A Case Study of the Czech Republic" with Dr. Ondřej Ledvinka of CHMI in the session of Application of Remote Sensing and Earth-Observation Data in Natural Hazard and Risk Studies." Such case studies as this joint project on a Eurasian case is particularly meaningful as they may be able to expand their research covering both Asia and Europe and lay the groundwork for future research.



(from left) Research Specialist Kwak and co-presenters, Dr. Ondřej and Dr. Libor of CHMI

In addition to his presentations, EGU2017 was a great opportunity for the research specialist to collect information on the latest research trend and to make active contributions to other activities during the event such as being an evaluator who evaluated presentations by students.

2017 年 4 月 20 日～ 22 日の三日間、チェコ水文気象研究所と深層的な共同研究の必要性について打ち合わせをし、最近の、及び歴史的なチェコの洪水特徴など実務的レベルの議論を行いました。その要旨を EGU 連合総会 2017 で共同発表後、若手研究者を含む戦略的な研究構成及び先端洪水予測の研究に関する災害管理及び対策をテーマとした共同研究を推進することに合意しました。

本 EGU 連合総会 2017 は、4 月 23 日から 4 月 28 日までオーストリアセンターウィーンにて開催され、約 17,400 論文発表 (649 セッション) と約 14,500 名の参加者 (107 ケ国) がありました。ICHARM の郭専門研究員は Hydroclimatic extremes under change セッションで「Rapid Global River Flood Risk Assessment under Climate and Socioeconomic Scenarios: An Extreme Case of Eurasian region」と Application of remote sensing and Earth-observation data in natural hazard and risk studies セッションにて「Interdisciplinary Approach for Assessment of Continental River Flood Risk: A Case Study of the Czech Republic」の内容について Dr. Ondřej Ledvinka 氏 (CHMI) と共同発表しました。このようなユーラシアにおける事例研究は、アジア域のみならずヨーロッパ域まで研究範囲を広げて 29 年度研究に結びつけるよう展開することが期待されます。

さらに、成果発表・最新研究情報収集だけでなく、審査員 (evaluator) として学生の発表内容も評価し、国際学会の活動にも積極的に参加することができました。

(Written by Young-joo Kwak)

## Research Specialist Kwak visits a hydrology institute of India and conducts a field survey in flood-damaged areas

ICHARM とインド国立水文研究所 (NIH) 間において、国際的な連携のもとで研究を進展させるため、2017年5月31日から6月2日まで Director Er. R.D. Singh 氏と打ち合わせを行い、ICHARM-NIH 間での研究協力が一致しました。

本研究活動は、NIH の洪水管理センター (Centre for Flood Management Studies : CFMS、の洪水担当者 Dr. Sansay Kumar Sharma 氏の全面的な研究支援を受け、事前に提案されたミニワークショップでの招待講演 (Invited lecture, ICHARM と JPL-NASA) を通じてブラマプトラ川の氾濫シミュレーション結果事例とリモートセンシングデータ判読の信頼性を高めるグラウンドトゥースデータ収集の重要性を強調しました。

写真 1 は、JPL-NASA の Dr. Sang-ho Yun 氏と郭専門研究員の共同講演の様子です。講演の前半は、JPL-NASA の Dr. Yun 氏から洪水発生時、現地との両方向対話型調査アプリ (Floodfront.net) の紹介と、後半は、郭専門研究員が最新のドローンを活用した現地調査案と郭専門研究員が開発中の Online-GIS Survey123 (米国 Esri 社) のモバイル「米被害の現地調査用アプリケーション」の紹介もし、約 25 人の NIH 研究者と洪水に関する活発な質疑と討議を行いました。

その後6月3日から6月9日までインド北部のアッサム州に位置する NIH の洪水管理センター (CFMS) を訪問し、インドとバングラデシュを流れる国際河川、ブラマプトラ川の中流の水害及びグラウンドトゥース情報を収集するなど現地調査を行いました。特に、Dr. Bibhash Sarma 氏 (准教授、Assam Engineering 大学) と Dr. Sanjay 氏との打ち合わせにより (写真 2)、2015 年に水害があったブラマプトラ川付近の調査対象域、内容、移動経路などを決め、州政府担当者や現地案内員のアレンジなど安全かつ順調な現地調整を行い、異言語の地域にスムーズに対応することができました。今回の現地調査では、重要なグラウンドトゥース情報をより省力化、効率化、迅速化、正確化することが期待できる最新の調査手法の投入を開始し、新たなモバイルデータ管理システムも試作しました。写真 3 は、ドローン (MAVIC Pro, DJI, China) を用いて空撮した Kulsu 川の河口付近の氾濫状況です。

Research Specialist Young-joo Kwak has been working on the development of a risk forecasting model for widespread river floods by considering factors of climate change and socio-economic scenarios. For further progress in this project, he visited India to meet with Er. R.D. Singh, the director of the National Institute of Hydrology (NIH). The two researchers discussed and agreed on international collaboration between ICHARM and NIH in research.

In fact, the research project has already been provided with full support from Dr. Sansay Kumar Sharma of the Centre for Flood Management Studies, which is part of NIH, and Kwak's visit was to tighten the cooperative relationship between the two institutes. During his visit, Kwak delivered a brief presentation that he had been invited to make in advance. He explained sample results from flood simulation for the Brahmaputra River, and addressed the importance of the collection of ground truth data, which increase the reliability of remote sensing data analysis.

The presentation was actually collaboration between Kwak and Dr. Sang-ho Yun of the Jet Propulsion Laboratory-NASA, California Institute of Technology. In the first half of the invited lecture, Dr. Yun introduced to the audience an application called "Floodfront.net," which is designed to investigate the inundation status of an affected area through interactive communication between the user and those in the affected area. Kwak explained how to investigate flood damage using the latest drone technology and also a mobile application named "Online-GIS Survey123 (manufactured by Environmental Systems Research Institute, Inc. : ESRI)," still under development, to investigate flood damage to rice fields in an affected area. A lively discussion with about 25 researchers of NIH followed with many questions asked about floods and related issues.



Photo 1: Joint lecture by Research Specialist Kwak and Dr. Yun of JPL-NASA (on display)

Dr. Kwak also visited CFMS of NIH in Assam, a northern Indian province, to conduct field investigation with local researchers to collect information on floods and ground truth from the middle reach of the Brahmaputra River, an international river flowing through India and Bangladesh. Dr. Bibhash Sarma, an associate professor of Assam Engineering University and Dr. Sanjay Kumar Sharma Sanjay were particularly helpful to decide the area, content, route of the investigation, coordinate local government personnel and guides for safe and efficient investigation, and complete the investigation with no problem, though the area was diversified linguistically. Throughout the investigation, Kwak tested an advanced investigation method to collect ground truth information with less labor and time and more efficiency and accuracy. He also developed a prototype of a new mobile data management system.



Photo 2: Meeting at NIH-CFMS: (from left) Dr. Sanjay, Research Specialist Kwak, and Dr. Bibhash Sarma



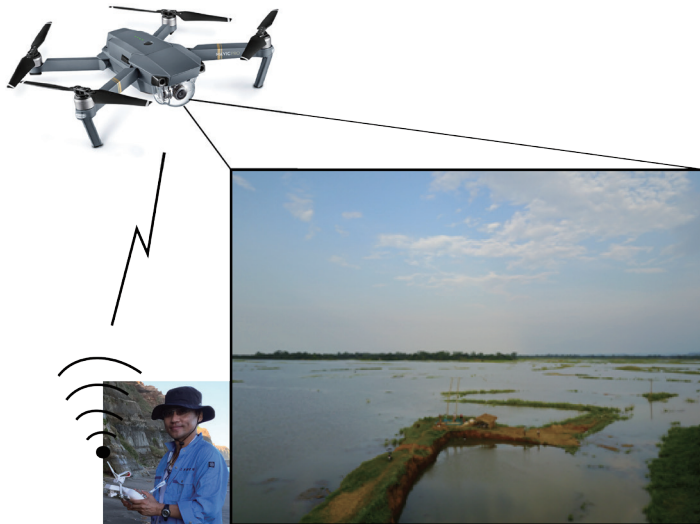


Photo 3: Drone-captured image (MAVIC Pro, DJI, China: altitude 50m) of flooding near the river mouth of the Kulsu River

(Written by Young-joo Kwak)

## Training and Education

### Field trips by M. Sc. students

ICHARM offers a master's degree program, "Water-related Disaster Management Course of Disaster Management Policy Program (JICA Training Program: Flood Disaster Risk Reduction)," in collaboration with JICA and the National Graduate Institute for Policy Studies (GRIPS). Currently, 10 students are enrolled in this 10-year-old program and study various issues in management of water-related disasters. They recently visited the Shinano River basin and the Yodo River basin.

#### Shinano River basin (April 27-29)

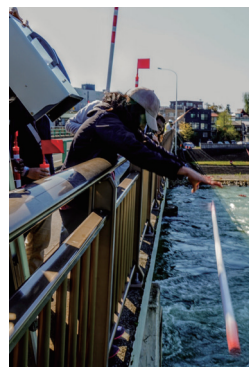
In April, the students visited the Shinano River basin in Niigata Prefecture. The area experienced severe flood events in 2004 and 2011 due to heavy rainfall.

On the first day, they paid a visit to the Lower-Shinano River Office for a lecture on the heavy rain in 2004 and 2011 and the effect of preventive measures they have had since implemented. The lecturer presented the successful implementation of the measures after the 2004 heavy rain, explaining that the structural damage in 2011 reduced by 90% compared with the damage in 2004 despite that the rainfall in 2011 was 1.6 times as large as that in 2004. After that, they took a short tour to the Ohkozu diversion channel, which was built in 1922.

On the morning of the second day, the students visited the first destination, Sagurigawa Dam, where they had a rare opportunity to see the inside of the dam. In the afternoon, the students moved to Ojiya City and participated in a discharge measurement workshop organized by the Japan Society of Civil Engineers. They practiced discharge measurement in an actual river with help from PWRI researchers.



Sagurigawa dam



Discharge measurement workshop on Shinano River

ICHARM 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、2016 年 10 月から 10 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。10 名の研修生は ICHARM 内での講義に加えて、日本の洪水対策についてよりよく理解するために、現地訪問を通して学んでいます。4 月には信濃川流域、5 月には淀川流域を訪問しました。

#### 信濃川流域 (4月27～29日)

信濃川の恵みにより良質な穀倉地帯である越後平野では、古くから水害の被害を受けてきました。直近では 2004 年及び 2011 年に豪雨による被害を受けました。そこで、その被害、対策事業を学ぶために北陸地方を訪問しました。

初日は、信濃川下流河川事務所を訪問し、2004 年及び 2011 年の豪雨とその対策事業の効果について講義を受けました。2004 年豪雨後の対策事業の効果として、2011 年の降水量は 2004 年の 1.6 倍であったにもかかわらず、建物への被害は 2004 年よりも 90% 減らすことができたこと等の説明を受けました。その後、1922 年に完成し、当時東洋一の大工事と言われた、大河津分水路を見学しました。翌日は、午前、まだ残雪が残る三国川ダムを訪問し、堤体内の見学などを行いました。午後には、小千谷市へ移動し、土木学会が開催する流量観測会において、土木研究所の研究員より流量観測の実習を受けました。まだ、肌寒い季節にも関わらず、研修生は屋外実習などに真摯に取り組んでいました。

Training and Education

**淀川流域 (5月27日～30日)**

琵琶湖からもたらされた豊富な水資源をもとに古くから発展してきた淀川流域の治水対策並びに平成25年9月の記録的豪雨をもたらしした台風18号の影響及びそれに対する行政機関の対応などを学ぶために、淀川から宇治川にかけて現地訪問を行いました。

初日は、台風の概要及び管内の被害状況の概要を学ぶために、国土交通省近畿地方整備局を訪問しました。台風18号は記録的な降水量を観測し甚大な被害を各地に及ぼしましたが、そのような中で、2004年の台風被害後の対策工事の効果により今回被害を免れた箇所も少なくないこと、淀川水系のダム群の連携操作及び瀬田川洗堰の操作によって更なる被害拡大を回避できたと思われることなどの説明を受けました。その後、2日間をかけて淀川河川事務所、淀川ダム統合管理事務所、天ヶ瀬ダムや、台風での被害箇所へ赴き、具体的な説明を受けました。最終日は、淀川流域の豊かな文化を学ぶために琵琶湖疏水記念館を見学しました。

現地見学については、日本の治水対策の実例を研修員に直接示すことができる良い機会となっています。

最後に、お忙しい中、現地訪問のご対応していただきました国土交通省北陸地方整備局信濃川下流河川事務所、信濃川河川事務所、国土交通省近畿地方整備局河川部河川計画課、淀川河川事務所、淀川ダム統合管理事務所の皆様には大変お世話になりました。ここにお礼申し上げます。

**Yodo River basin (May 27-30)**

They traveled along the Yodo and Uji rivers to learn about flood management over the Yodo River basin, damage caused by a devastating typhoon No.18, and administrative responses to that damage.

On the first day, the students visited the Kinki Regional Development Bureau of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) to understand the outline of Typhoon No.18 and damage it caused. They learned that the collaborative operation of dams in the Yodo River system and the timely operation of the Seta River overflow weir may have been very effective in avoiding further flood damage.

On the following two days, the students visited several places related to the flood disaster for more information, including the Yodo River Office, the Yodo River Dam Integrated Management Office, Amagase Dam and typhoon-affected sites.

On the final day, they went to the Lake Biwa Canal Memorial Museum to learn about the diverse culture in the Yodo River basin. They became very interested in the exhibitions and asked so many questions that they needed extra time to finish them.



Amagase dam

Study tours are an important part of ICHARM's educational programs, which offer students great opportunities to take a close look at Japan's flood control measures in operation.

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

*(Written by Takashi Shirai)*

**UNESCO Pakistan project: training for Pakistani and Afghan experts**

2017年5月17日から26日までの10日間、ICHARMが事務局となり、パキスタン国及びアフガニスタン国の高級行政官4名を対象としたワークショップ「パキスタンの統合的な洪水リスク管理能力向上」を実施しました。このワークショップは2010年にパキスタンで発生した大洪水を契機にJICAファンドによりUNESCOが実施しているプロジェクトの一環として行っているものです。

ワークショップには、パキスタン水資源電力開発公社主任技師をはじめとする4名が参加し、ICHARM職員による日本の水災害管理の概説、ICHARMの役割と国際的な取組み、水文、水理モデルとその活用、災害管理におけるドローンの活用の講義、国土交通省職員による洪水予警報、ダム及び河川管理施設に関する講義、気象庁職員による業務概要説明が行われました。また、現地見学として利根川流域の加須市で行われた水防訓練、常総市の2015年鬼怒川洪水発生箇所の見学、近畿地方整

A two-week workshop to enhance the capacity for comprehensive flood risk management was held on May 17-26, 2017, for senior administrative officers from Pakistan and Afghanistan. The workshop was part of the project, organized by UNESCO and funded by JICA, which started after a large-scale flood that caused tremendous damage to different parts of Pakistan in 2010. ICHARM served as the secretariat for this event.



At the opening ceremony



Four participants, including the chief engineer of the Pakistan Bureau of Water Resources and Power Development, attended the workshop, which covers a variety of subjects for more effective flood management. ICHARM researchers gave lectures on Japan's water-related disaster management, international projects and the role of ICHARM, the mechanism and use of hydrological and hydraulic models, the use of drones for disaster management. The experts of the Ministry of Land, Infrastructure, Transport and Tourism explained flood forecasting and warning and structures for dam and river management. The experts of the Japan Meteorological Agency outlined the roles of the agency in disaster management. The participants also took study tours to Kasu City along the Tone River to watch a flood-fighting drill and Joso City to study locations severely affected by the 2015 Kinu River flood, as well as to the Kinki Regional Development Bureau and the Yodo River Management Office. Additionally, they visited the JICA headquarters in Tokyo, where they exchanged opinions with JICA staff in charge of projects in Pakistan and Afghanistan. After that, they also made a courtesy visit to the Embassy of Afghanistan in Japan.



A lecture at MLIT

Overall, the participants made positive comments on the workshop, saying that it touched many important aspects of flood management and that it was a precious opportunity to take a close look at Japan's advanced flood countermeasures. They also mentioned that the workshop was very helpful for them to have a concrete image of how flood forecasting using the Integrated Flood Analysis System (IFAS) works and how Pakistan and Japan should cooperate for more effective use of the system. The Afghan participants suggested that considering many issues they face on water-related disasters, more Afghan personnel should be encouraged to attend this and other training programs. The participants also pointed out a few problems for improvement. The workshop contained so much for only nine days, and it was physically exhausting to move between destinations by public transportation because the participants were not used to it.

ICHARM hopes that the participants will contribute to the reduction of future water-related disaster damage by proposing new ideas based on knowledge and experience learned from the workshop.

*(Written by Yoshio Tokunaga)*

備局及び淀川事務所訪問を行ないました。この他、JICA 本部においてパキスタン及びアフガニスタンを担当する職員との意見交換ならびに駐日アフガニスタン国大使館への表権訪問を実施しました。

参加者からは、「このワークショップの内容は大変充実しており、日本の先進的な洪水対策を見ることができた。」「特に IFAS（総合洪水解析システム）などを活用してパキスタンで行う洪水予測について、概要及び今後の両国の協力方法について具体的に理解することができた」とのコメントがありました。アフガニスタンの研修員からは、「自国の水災害の課題が多くあることから、本研修だけでなく、他の研修プログラムについても、自国職員が参加するべき」と感想がありました。他方では、10 日間という短期間の中にあまりに多くの内容が詰め込まれていたこと、公共交通機関の移動になれていないことから、体力的にハードな研修となりました。

研修員が帰国後、今回のワークショップで得られた経験を元に、パキスタン・アフガニスタン両国で考えられる将来の水災害軽減に新しいアイデアを提案してもらうことを期待しています。

## Research and Training Advisor Egashira lectures at MJIT in Malaysia

The Malaysia-Japan International Institute of Technology (MJIT), an academic entity to provide Japanese-style engineering education in Malaysia, was officially launched in September 2011 as part of Universiti Teknologi Malaysia (UTM). Japanese universities and research institutes cooperate closely with MJIT by forming a consortium to provide assistance in education, research, management and other areas. MJIT has recently created the "Master of Disaster Risk Management" course as the fifth master-level course after the four preceding courses of electronic systems engineering, mechanical precision engineering, sustainable systems, and technology & innovation management. This newly created course is designed to allow students to earn a master's degree after one year, just like the Water-related Disaster Management Course of the Disaster Management Policy Program, which ICHARM manages in collaboration with the National Graduate Institute for Policy Studies (GRIPS) of Japan.

The following lists five core subjects and eight elective subjects:

\* **Core Course:** Integrated Disaster Management, Disaster Data Management and Forecasting, Control Measures and Mitigation Planning, Emergency Response

MJIT（マレーシア日本国際工科院）は、マレーシアにおいて日本型工学教育を行う高等教育機関として、マレーシア工科大学（UTM）のもとに 2011 年 9 月に開校した。これに対して、日本国内の大学・研究所はコンソーシアムを形成し、教学・研究・経営等について支援を行っている。Master of Disaster Risk Management コースは、既設の電子システム、機械精密工学、環境グリーン技術、技術経営学コースに次いで、2016 年 9 月に 5 番目に開設された。このコースは、GRIPS において ICHARM が関わっている Disaster Management Policy Program の Water-related Disaster Management Course の修士課程と同様、一年で修士を取得できるように工夫されている。本コースの講義科目は、コア 5 科目および選択 8 科

Training and Education / Information Networking

目からなっている。（\* 参照）

これらの科目に加えて、本コースには、災害のリスク管理等に関する問題を抽出し考察を深めるためのプロジェクト研究や日本における2週間の研修が用意されている。

このプログラムに対して ICHARM は、コンソーシアムの一員として協力するとともに、コア科目の講義（前センター長、前顧問 竹内邦良）および選択科目の講義（研究・研修指導監 江頭進治）を担当している。教学の対象となる学生は、マレーシア政府内の防災関係部局の中間管理職を主なターゲットとしており、その方向で学生募集が行われ、現在5人の学生が在籍している。

江頭研究・研修指導監は、Flood Hydraulics and Mechanics of Sediment Transportation の講義のため、この4月、MJIT に一週間滞在した。本コースの教育理念や講義科目の配置等については理解し、その方向で講義ノートを準備したつもりであったが、学生全員が水理学や水文学に触れたことのない学生であった。そのため、講義を開始して十数分後には、講義法の方針を転換し、河道における流れの水面形、洪水流、波動、流砂や河川変動等についての基本的な講義を行った。学生からは常時熱心な質問もあった。

Planning and Communication, and Recovery and Reconstruction Management

**Elective Course:** Control Measures for Landslides and Debris Flow, Flood Forecasting and Hazard Mapping, River Channel and Irrigation Design, Geo Information in Disaster Risk Assessment, Flood Hydraulics and Mechanics of Sediment Transportation, Disaster Education and Preparedness, Community and Social Resilience, Public Health Policy and Management, Healthcare in Emergencies and Rehabilitation, and Disaster Psychology

In addition to the subjects listed above, the students are required to participate in a project study to learn how to identify issues in disaster risk management and study them in depth. Two-week training in Japan is also a part of the requirements.

ICHARM has been closely cooperating with this program as a member of the consortium and sent its staff to deliver lectures; for instance, Former Director and Advisor Kuniyoshi Takeuchi for a core subject and Training and Research Advisor Shinji Egashira for an elective subject. This master course aims mainly at middle-ranking governmental officers involved in disaster management at different sections and departments. At present, five students are enrolled.

In April 2017, Egashira visited MJIT for a week to give a series of lectures on flood hydraulics and mechanics of sediment transportation. Having studied the goals and subjects of this course, he prepared lectures, but he found that all five students had not studied any of hydraulics and hydrology. Only about ten minutes or so after he started the first lecture did he decide to give up what he had prepared and began teaching the basics of hydraulics and hydrology such as the water surface profile of stream flow in open channels, flood flow, wave motion, sediment transportation, and river deformation. Though the topics were new to them, the students were eager to learn as much as possible, asking many questions.

(Written by Shinji Egashira)

## Information Networking

### Training workshops held in Pakistan

2017年4月6日から8日の日程で、パキスタン国ラホールにあるパキスタン気象局（PMD）で、洪水予測モデルに関するトレーニングワークショップ（正式名称は英文参照）が開催されました。このワークショップは、気象局や現地大学の専門家を対象に、現地の諸条件を考慮した IFAS（総合洪水解析システム）および RRI モデル（降雨流出氾濫モデル）を開発するための研修として企画されました。ICHARM からは、講師として津田主任研究員と山崎、LIU の両専門研究員が派遣され、河川管理、水関連災害、洪水予測に関わる政府機関や大学に所属する技術者や研究者に、IFAS および RRI モデルの開発・運用について講義しました。

4月10・11日には、同国イスラマバードで、ユネスコ・プロジェクト「パキスタンにおける洪水警報および管理能力の戦略的強化フェーズ2」の一環として、もうひとつのワークショップ（正式名称は英文参照）が開催され、ICHARM も招待さ

On April 6-8, 2017, an international training workshop, "Intermediate rainfall-runoff modelling and Hands on training on IFAS and RRI models part 3," was held at the Pakistan Meteorological Department (PMD) in Islamabad, Pakistan. The workshop aimed to strengthen the capacity for hydrological model development and operation of Pakistani engineers and researchers in governmental organizations responsible for river management, water-related disasters or flood forecasting. ICHARM sent three researchers as lecturers for this workshop, including Senior Researcher Morimasa Tsuda, Research Specialist Yusuke Yamazaki, and Research Specialist LIU Tong. ICHARM researchers specifically provided detailed instructions for officers and experts of PMD and local universities to be able to develop locally-customized hydrological models, i.e., the Integrated Flood Analysis System (IFAS) and the Rainfall-Runoff-Inundation (RRI) model, both of which are essential tools for the ongoing UNESCO projects.



ICHARM researchers give training lectures



On April 10-11, 2017, ICHARM was invited to another workshop, "Strategic Data for Reliable Models and Timely Flood Forecasts," at Serena Hotel in Islamabad, which was held as part of a UNESCO-led project, "Strategic Strengthening of Flood Warning and Management Capacity of Pakistan Phase 2". It was organized by the Pakistan Council for Water Resources Research (PCRWR) in collaboration with UNESCO and attended by officers and experts from the Pakistan Meteorological Department, governmental agencies in the agricultural sector, local universities, UNESCO, and the Japan International Cooperation Agency (JICA). The workshop aimed to gather scientists, hydrological modelers, meteorologists and decision makers at a common platform to share experiences, expertise, and success stories in other regions to develop an early warning system for the implementation of the project in the Indus River System. Dr. Tsuda, Senior Researcher Atsuhiko Yorozyua, Dr. Yamazaki, and Dr. LIU joined the workshop from ICHARM. They presented the challenges and case studies of the specific fields for the Phase 2 project, including IFAS model upgrade, ADCP based measurement of flow regimes, implementation of RRI to estimate extreme events in the lower Indus River and the Eastern Rivers, and glacier/snow melt analysis, all of which attracted extensive attentions and aroused great interest for discussion.



Participants in the workshop

On April 12, 2017, the team of ICHARM researchers led by Director Toshio Koike visited the Embassy of Japan in Pakistan together with Dr. Shahbaz Khan, the director of the UNESCO Regional Bureau for Science in Asia and the Pacific, and Ms. Vibeke Jensen, the director of UNESCO Islamabad and a representative to Pakistan. Mr. Junya Matsuura, Minister/Deputy Chief of Mission at Embassy of Japan, and Mr. Teruaki Nagasawa, the first secretary of the Economic & Development, the Embassy of Japan, joined the meeting at the embassy. Director Koike reported ICHARM's activities and achievements during two phases of the UNESCO project in Pakistan, which has improved the flood risk management capacity of Pakistan agencies and facilitated the development and installation of flood early warning systems (Indus-IFAS). Dr. Shahbaz acknowledged support and cooperation from the Japanese government and ICHARM's achievements. The officers assured the government of Pakistan of full cooperation of the Japanese government for disaster management programs.

(Written by LIU Tong)

れました。ユネスコの共催により、パキスタン水資源調査委員会が主催したこのワークショップには、パキスタン気象局、農業関連政府機関、現地大学、ユネスコ、JICAから職員、専門家が参加しました。このワークショップは、科学者、水文モデル開発者、気象学者、意思決定者が一堂に会し、インダス川流域を対象としたユネスコ・プロジェクトにおける早期警報システムの開発に関連して、異なる分野の経験、専門知識、成功例の共有を目的として開催されました。ICHARMからは津田主任研究員、萬矢主任研究員、山崎専門研究員、LIU 専門研究員が参加し、IFAS モデルの改良点、ADCP を利用した流況観測、インダス川下流域およびインダス川東部支川における極端現象の予測のための RRI モデルの実装、融氷雪解析について説明しました。どの発表も参加者の関心を広く集め、活発な議論が行われました。

4月12日、小池センター長および ICHARM の研究者一行は現地日本大使館を訪れ、松浦純也公使、長澤輝明一等書記官に面会しました。この訪問には、ユネスコ・アジア太平洋地域科学局長 Shahbaz Khan 氏、ユネスコ・イスラマバード事務所長でパキスタン代表 Vibeke Jensen 氏も同行されました。小池センター長からは、ICHARM の活動および、パキスタン政府機関の洪水リスク管理対応能力の強化や早期洪水警報システム (Indus-IFAS) の開発・実装など ICHARM のユネスコ・プロジェクトへの貢献について説明しました。Shahbaz 氏は、日本政府の支援・協力および ICHARM の貢献について感謝の意を表されました。出席した日本政府関係者からは、パキスタン政府が取り組む災害管理施策に日本政府として協力していく旨の発言がありました。

## Visited by Vice chancellor of Bangladesh Agricultural University (BAU)

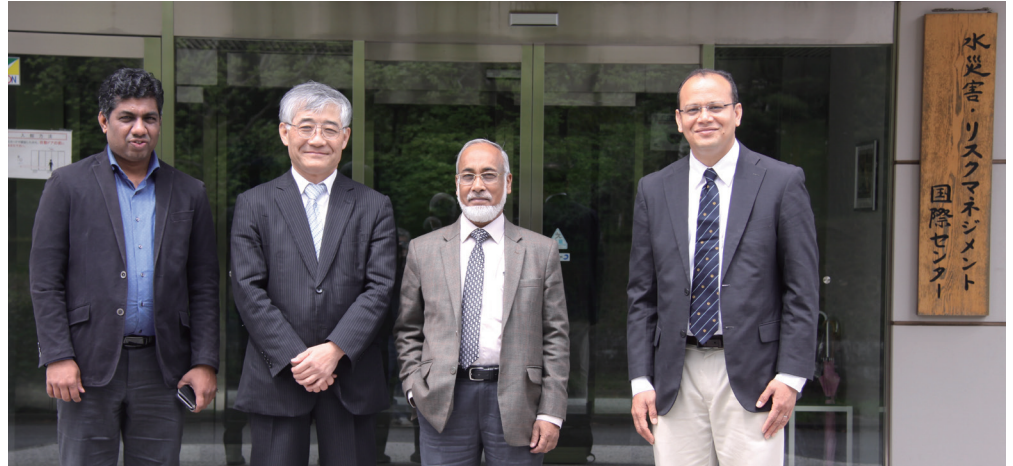
On April 22, 2017, Professor Ali Akbar, the vice chancellor of Bangladesh Agricultural University, paid a visit to ICHARM with Associate Professor Tofael Ahamed of Tsukuba University. ICHARM Director Toshio Koike and Senior Researcher Moham-

2017年4月22日、バンングラデシュ農業大学副学長 Ali Akbar 教授が、Tofael Ahamed 筑波大学准教授とともに、ICHARM を訪れ、小池

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センター長、Rasmy 主任研究員と意見交換を行いました。まず、小池センター長が ICHARM の活動、特に研究、情報ネットワーク、国際洪水イニシアチブ (IFI) が推進する災害管理プラットフォーム構想について紹介しました。災害管理プラットフォーム構想については、数か国の実施例も紹介し、説明しました。Akbar 教授からは、バングラデシュ農業大学の活動の他、同国 Haor 地方に設置された研究・教育機関の進展について説明がありました。その後、ICHARM と新しく設置された研究機関との協力関係構築の可能性について議論しました。

ed Rasmy welcomed the two visitors. The director introduced ICHARM's activities; particularly, research, information networking, and the International Flood Initiative Framework and its implementations in several countries. Professor Akbar briefed on the activities of Bangladesh Agricultural University and the recent development of a research center by the university in Haor region of Bangladesh for promoting research and education. They also explored possible collaborations between this new research center and ICHARM.



(from right) Associate Professor Ahamed, Professor Akbar, Director Koike, and Senior Researcher Rasmy

(Written by Mohamed Rasmy Abdul Wahid)

## Workshop on "Risk-Based Hydrologic Engineering Standards" in Koblenz, Germany

ダムや堤防は、現在及び将来気候の下で起こりえる水災害の経済的、社会的悪影響を軽減することを目的とした社会基盤です。

洪水・渇水ハザードの規模に関する将来気候下での不確かさは、これまでも国際的な科学コミュニティが定量化していますが、いまだに多くの国で、社会基盤を設計するにあたって、気候変動という重要な問題が既存の工学基準で考慮されていないのが実情です。

この問題に対処するため、2017年4月24・25日、ドイツ国コブレンツで、「リスクを考慮した水文的技術基準」をテーマにワークショップが開催され、各国から専門家が参加しました。これは、ドイツ連邦水文研究所 (BfG) の下に設立されたユネスコ協力組織・水資源地球環境変動国際センター (ICWRGC) が主催して、技術基準でどのように気候変動に対処するかについて知識と経験を共有する機会を提供する目的で開かれました。

本ワークショップは、Eugene Stakhiv 博士の司会で進められ、参加者による発表の後、議論が交わされました。

ICHARM からは小池センター長が、気候変動下の洪水リスクにどう適応するかについて、2015年河川審議会で採択された最大雨量予測の段階的アプローチについて説明し、また、2015年鬼怒川洪水及び2016

On April 24-25, the "Risk-Based Hydrologic Engineering Standards" workshop gathered experts from various countries (see photo below) to share their knowledge and experiences of engineering standards in view of climate change at the International Centre for Water Resources and Global Change (ICWRGC) under the auspices of UNESCO in Koblenz, Germany. Recent unprecedented precipitation events triggered extreme flooding in many river basins around the globe and resulted in major water-related disasters with lost lives and damaged properties. Having dam and levee infrastructure may reduce these adverse economic and social impacts of extreme floods, but it requires the understanding of potential flood magnitudes for a robust infrastructure design against future flood events. Despite extensive quantification of precipitation and flood magnitudes under climate change uncertainties by an international scientific community, incorporating these uncertainties in the existing engineering standards is a challenge tackled at the workshop.

The kick-off presentation of the workshop was given by Dr. Eugene Stakhiv summarizing the current US engineering practice and its shortcomings and was followed by each participant's presentation providing a wealth of useful and practical information. From ICHARM, Dr. Toshio Koike presented a Japanese incremental approach of estimating maximum possible rainfall adopted by the River Council in 2015 for flood risk adaptation under climate change. He also shared Japanese experiences of flood risk management and communication during the 2015 Kinu River and 2016 Ishikari River floods. Research Specialist Maksym Gusev gave an overview of existing flood engineering standards in Russia, New Zealand and Australia with examples of recent major flood disasters, and introduced ICHARM's novel approach to investigate drought and flood impacts on the dam infrastructure under climate change applied in the river basins of Pampanga (the Philippines), Solo (Indonesia) and Chao Phraya (Thailand). After presentations finished on the second day of the workshop, the group discussion moderated by Dr. Stakhiv allowed par-



ticipants to express their views on the existing approaches for considering climate change impacts across different countries. As a result, participants achieved a common understanding and planned for a publication of workshop outcomes as the way forward. In the afternoon session (April 24), Dr. Johannes Cullmann gave an invited presentation about current World Meteorological Organization (WMO) programs focused on flood forecasting, and ICHARM Director Toshio Koike presented a new International Flood Initiative (IFI) strategy and its implementation in several selected countries of the Asia-Pacific region by ICHARM. The workshop was considered a great success and concluded with a group photo of the participants.



Participants of the "Risk-Based Hydrologic Engineering Standards" workshop held at the International Centre for Water Resources and Global Change (ICWRGC) under the auspices of UNESCO, Federal Institute of Hydrology (BfG), on April 24-25, in Koblenz, Germany: (front row left to right) E. Stakhiv (USA), J. England (USA), S. Demuth (Germany), T. Matiash (Ukraine), and T. Koike (Japan); (back row left to right) N. Reynard (UK), G. Johann (Germany), W. Grabs (Germany), N. Zlatanovic (Serbia), H. van der Most (the Netherlands), M. Gusyev (Japan), Z. Kundzewicz (Poland), J. Cullmann (Switzerland), U. Schröder (Germany), D. Loucks (USA), R. Vogel (USA), S. Michas (Greece), R. Wilby (UK), and I. Papadakis (Greece).

(Written by Maksym Gusyev)

年石狩川洪水を事例に、洪水リスクマネジメント及びリスクコミュニケーションに関する経験を紹介しました。

ICHARMのGusyev 専門研究員は、異常湿潤気候下で近年発生した主な洪水被害について発表し、さらに、ロシア、ニュージーランド、オーストラリアにおける現行の洪水に対する工学基準の概要を説明しました。また、パンパンガ（フィリピン）、ソロ（インドネシア）及びチャオプラヤ（タイ）のダム施設を対象として ICHARM が新たに開発した、気候変動下の濁水及び洪水の影響を分析するアプローチについても紹介しました。

ワークショップの発表を通じて多くの有益な情報を共有し、ワークショップ2日目の午前中に行われたグループ討議を通して、参加者間でテーマに関する共通理解を得ることができました。本ワークショップの成果は、なんらかの形で出版する方向で計画が進んでいます。

4月24日午後の部では、Johannes Cullmann 博士が洪水予測を中心とした世界気象機関の現行プログラムについて発表を行いました。小池センター長は、新しいIFI(国際洪水イニシアチブ)戦略、さらにアジア太平洋地域で選定された国でのIFI戦略の実施に関する ICHARM の活動について紹介しました。本ワークショップは成功に終わり、最後に集合写真を撮って締め括られました。

## APRSAF/SAFE-ESCAP Meeting, Training in Bangkok, Thailand

The APRSAF/SAFE-ESCAP meeting\*<sup>1</sup> was held at the United Nations Economic and Social Commission for Asia and the Pacific (UN-ESCAP) in Bangkok, Thailand, on May 15, 2017. It was co-organized by UN-ESCAP and the Japan Aerospace Exploration Agency (JAXA) at the occasion of the seventy-third session of the Commission of ESCAP. Around 45 people from 7 countries (Indonesia, Japan, Cambodia, Malaysia, Myanmar, Sri Lanka, and Thailand) participated in this meeting. Senior Researchers Mohamed Rasmy and Morimasa Tsuda participated in the event as the technical experts for two ongoing SAFE projects, led by JAXA and implemented by ICHARM, on satellite rainfall applications to water resources management and disaster early warning in collaboration with the Mekong River Commission (MRC) and the Department of Irrigation, Sri Lanka.



Senior Researcher Rasmy responds to questions on SAFE-SRI LANKA activities

A joint luncheon session on SAFE and Sustainable Development Goals (SDGs) was held on May 15, 2017, as a collaboration event between APRSAF/SAFE and UN-ESCAP. Senior Researcher Rasmy was invited to the meeting as one of the panelists. He introduced ICHARM activities on flood forecasting for disaster risk reduction and their linkages to SDGs, including its three main areas of activity, technical sup-

2017年5月15日、タイ国バンコクのUN-ESCAPでAPRSAF/SAFE-ESCAP会議が開催されました。この会議はUN-ESCAPとJAXAが第73回ESCAP委員会にあわせて共同で開催したものです。インドネシア、日本、カンボジア、マレーシア、ミャンマー、スリランカ、タイの7カ国からおおよそ45人が参加しました。ICHARMからはRasmyおよび津田両主任研究員が参加しました。現在 ICHARM は JAXA が主導する2つのSAFEプロジェクトに対する技術支援を行っており、メコン川委員会およびスリランカ灌漑局と協力して、水資源管理や早期災害警報における衛星観測雨量の適用を推進しています。

また、同日、APRSAF/SAFEとUN-ESCAPの共同で、SAFEとSDGsに関する昼食会議が開かれました。Rasmy主任研究員は、パネリストの一人としてこの会議に招待されました。Rasmy主任研究員は、災害リスク軽減のための洪水予測に関する ICHARM の活動とSDGsと

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の関連について説明しました。この他、ICHARMの活動の3本柱や、JAXAが提供する衛星観測雨量データ(GSMaP)の適用を促進するためのメコン川委員会やスリランカを対象とした技術支援や能力開発、さらに、IFI(国際洪水イニシアチブ)の戦略および実装枠組みの推進についても説明しました。JAXAからはSAFE関連のプロジェクトについて、ESCAPからはSDGs達成を支援するための衛星情報の利用や、アジア・太平洋地域を対象とした宇宙利用拡大のための新たな行動計画(2018-2030)が説明されました。この会議は、政策立案者や一般利用者に対して、宇宙利用の有益性を具体的に示す絶好の機会にもなりました。

port and capacity building for the application of JAXA's rainfall products (GSMaP) to projects in the Mekong River Commission (MRC) and Sri Lanka, and the IFI strategic structure and its implementation framework. JAXA presented SAFE-related projects, and ESCAP presented space applications which have the potential to support SDGs and mentioned the New Asia-Pacific Plan of Action for Space Applications (2018-2030). This session provided an excellent opportunity to showcase the benefits of space applications to policymakers and end users.

\*1 A joint meeting involving three organizations of the Asia-Pacific Regional Space Agency Forum (APRSAF), the Space Applications For Environment (SAFE), and the Economic and Social Commission for Asia and the Pacific (ESCAP)



Senior Researcher Rasmy (first from right) at the luncheon session held in collaboration between ESCAP and APRSAF/SAFE

(Written by Mohamed Rasmy Abdul Wahid)

## CommonMP 10<sup>th</sup> Anniversary Workshop held in Tokyo

CommonMP (Common Modeling Platform for water-material circulation analysis)とは、河川流域内の様々な水・物質移動の過程を再現するモジュール(要素モデル)を組み合わせて河川流域全体の水・物質循環をシミュレーションすることができる要素モデルのためのプラットフォームです。このソフトウェアは、水・物質循環に関する様々な分野の研究者や専門家がそれぞれの得意分野の要素モデルを提供することにより、互いに協力して流域の水・物質循環を解析できる環境を整備することを開発目的の一つとしています。

このほど、開発プロジェクト開始から10年を迎えることとなりましたので、それを記念してワークショップが下記の通り実施されました。ワークショップの中で行われたパネルディスカッションにICHARMの菊森佳幹主任研究員がパネリストとして参加しました。

パネルディスカッションでは、国土交通省水管理・国土保全局の國友優河川情報企画室長から、「現在国土交通省が推進しているi-Constructionの一環として、水管理・国土保全局はi-Waterという施策を推進していくこととしている。CommonMPもその中に位置づけ

The Common Modeling Platform for water-material circulation analysis (CommonMP) is software that provides a platform to simulate water-material circulation in a river basin using multiple modules, or element models, capable of reproducing various water-material transport processes in a river basin. One of the goals for the development of this software is to create an environment in which water-material circulation can be analyzed in collaboration with researchers and experts of different areas, each of whom provides an element model of their specialty.

This year marked the 10th anniversary of the CommonMP development project. To celebrate this milestone, a commemorative workshop was held on May 17, 2017, and Senior Researcher Yoshito Kikumori participated in the panel discussion as one of the panelists during the workshop.

Among the panelists was Mr. Masaru Kunitomo\*, who shared great news with the audience. He told that the Water and Disaster Management Bureau is planning to promote the "i-Water" project as part of the "i-Construction" policy, which has already started to be implemented in other areas. He also mentioned that CommonMP is expected to play a role in this project.

Kikumori spoke at the workshop about his ideas to further promote the use of CommonMP. Taking advantage of ICHARM's specialty in river and basin simulation, he is planning to install such simulation functions in CommonMP and make them available for public use. He also explained that the development of CommonMP has been led by the National Institute for Land and Infrastructure Management and mainly based on advice from a consortium consisting of related organizations, and pointed out that the development has not always satisfied the users' needs. To address this issue, he suggested that CommonMP should be offered as open-source



software for general users to upgrade the program according to their needs, now that CommonMP has been developed adequately and that the users' needs have become more diversified.

I hope that the next 10 years will be another decade for CommonMP to demonstrate its full capacity that is designed to achieve the original purposes and help boost research and development in the field of hydraulic, hydrological, and water-material circulation analysis.

\* Head of River Information Office, Water and Disaster Management Bureau, Ministry of Land, Infrastructure, Transport, and Tourism



Senior Researcher Kikumori speaks at the anniversary workshop

(Written by Yoshito Kikumori)

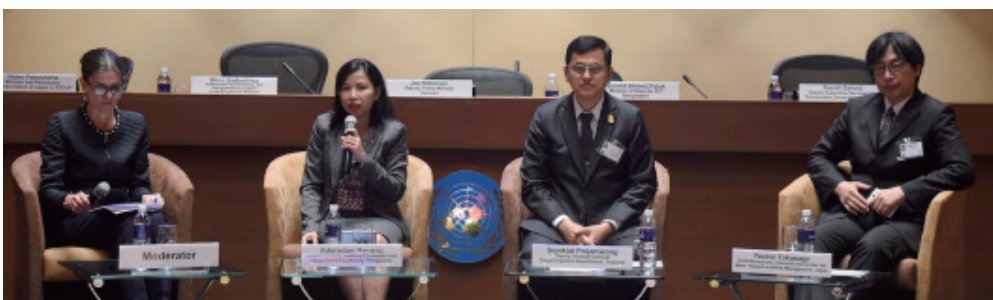
いく。」との、特筆すべき発言がありました。

菊森主任研究員からは、「ICHARMで研究・研修の対象としている河川・流域のシミュレーション・プロジェクトを CommonMP 上で実装・整備し、共有する取り組みを行っていくこと、また、CommonMP のプラットフォームは国土交通省国土技術政策総合研究所が主体となり、関連機関からなるコンソーシアムの意見を聞きながら開発を進めてきたが、必ずしもユーザの改良要望を満たしてきたわけではない。CommonMP の開発が一段落したことと、ユーザのニーズが多様になってきたことから、今後はユーザが自ら改良を加えられるようにオープンソースライセンスにすべきである」との意見が述べられました。

次の 10 年間、CommonMP がその開発目的としての機能を発揮して、水理・水文・水物質循環解析における研究開発活動を活性化させることを期待します。

## Side event of the 73rd ESCAP general meeting in Thailand

On May 18, 2017, the 73rd ESCAP general meeting was held in Bangkok, Thailand. On this occasion, Japan hosted a side event on the enhancement of disaster resilience to water-related disaster risks through regional cooperation. Chief Researcher Yoshio Tokunaga attended this event as a panelist along with the deputy director of the National Economic Development Authority of the Philippines, and the deputy director of the Royal Irrigation Department of Thailand. The participants mainly spoke about various efforts by different countries and the importance of regional cooperation to reduce water-related disaster risks.



A side event at UNCC, Bangkok

2017年5月18日、タイ国バンコク市において第73回国連アジア太平洋経済社会委員会（ESCAP）総会が行われ、日本主催による標題のサイドイベントが開催されました。ICHARMからは、徳永上席研究員が、フィリピン国国家経済開発庁ナバロ次官、タイ王立灌漑局ブラジャムウォン次官とともにパネリストとして参加して、水災害における各国の取組みや地域協力の枠組みの貢献について発表を行いました。

徳永上席研究員からは、ICHARM及び土木研究所の活動など日本の取組を説明するとともに、地域協力のひとつである、ESCAPが支援する台風委員会の活動を通じて、メンバー国間で水災害管理の経験共有が図れるメリットを強調しました。

Tokunaga explained activities of ICHARM and the Public Works Research Institute as part of Japan's efforts in disaster risk reduction. He also stressed that the Typhoon Committee under the auspices of ESCAP is an excellent framework to share knowledge and experience in water-related disaster management among member countries.

*(Written by Yoshio Tokunaga)*

## Global Platform for Disaster Risk Reduction held in Cancun, Mexico

2017年5月22日～26日にかけてメキシコのカンクンで災害リスク軽減のグローバルプラットフォーム(The Global Platform for Disaster Risk Reduction)が開催され、ICHARMからは小池俊雄センター長、大原美保主任研究員が参加しました。グローバルプラットフォームは、国連総会で認知された、災害リスク軽減に関する世界での活動への助言や進捗状況の確認を行うことを目的とするフォーラムであり、2007年から2年おきに開催されています。今回は、2015年に仙台で開かれた第3回国連防災会議後の初めて開催となるため、仙台防災枠組に基づく防災目標(Global Target)の運用など、国連防災会議の成果を踏まえた活発な議論が行われました。

小池俊雄センター長は、フォーラムのワーキングセッション「Contribution of Science and Technology to Achieving the 2020 Sendai Target (仙台防災枠組の達成目標への科学技術の貢献)」に準備段階から関わっており、5月23日13:30-15:00のセッションの準備会合及び5月25日11:15-12:45の本セッションに登壇し、ICHARMがIFI(国際洪水イニシアチブ)の活動の一環として現在フィリピンやミャンマー等で支援を行っている「水防災に関するナショナルプラットフォームづくり」についての紹介を行いました。

大原美保主任研究員は、5月26日11:15-12:45に開催されたワーキングセッション「Promoting Land Use and Spatial Planning for Disaster Risk Reduction (災害リスク軽減に向けた土地利用・空間計画の推進)」の4名のパネリスト(メキシコ、チリ、アメリカ、ICHARM)の一人として、日本における災害リスクを考慮した土地利用・空間計画(Risk-based Land Use and Spatial Planning)の事例紹介を行いました。

また、5月24日13:30-14:25には、ICHARMと世界銀行、UNESCO、WMOとの共催によるイベント「Water and disasters – Sustainable, resilient and innovative water cycle

The Global Platform for Disaster Risk Reduction was convened on May 22-26, 2017, in Cancun, Mexico. ICHARM Director Toshio Koike and Senior Researcher Miho Ohara participated in this meeting. The Global Platform is the only forum that is officially recognized by the United Nations General Assembly and has been held biennially since 2007. This has been a great opportunity for international participants to report the progress in disaster risk reduction and share ideas and lessons for further progress in the field. The meeting in Cancun was the first one after the third UN World Conference on Disaster Risk Reduction held in Sendai in 2015, and the participants engaged in active discussions on outcomes delivered after the 2015 conference, such as issues on the implementation of the Global Targets for disaster risk reduction set according to the Sendai Framework for Disaster Risk Reduction.

Director Koike had been involved in preparation for one of the forum's working sessions, "Contribution of Science and Technology to Achieving the 2020 Sendai Target." In Cancun, He attended the session's preparation meeting at 13:30-15:00 on May 23, and delivered a presentation during the session held at 11:15-12:45 on May 25, speaking about the development of a national platform on water-related disaster risk reduction in the Philippines and Myanmar, for which ICHARM has been providing assistance as part of the activities promoted by the International Flood Initiative (IFI).



Director Koike at a session on science and technology

Senior Researcher Ohara participated in a working session, "Promoting Land Use and Spatial Planning for Disaster Risk Reduction," at 11:15-12:45 on May 26 with three other panelists from Mexico, Chile, and the United States. She presented a case in Japan that practices risk-based land use and spatial planning.



Senior Researcher Ohara at a session on land use

Director Koike also attended a pre-event, "Water and Disasters – Sustainable, Resilient and Innovative Water Cycle Management," co-hosted by ICHARM, the World Bank, UNESCO, and the World Meteorological Organization (WMO). As the moderator of the event, he introduced IFI and its activities to the audience and exchanged views and ideas with other panelists.

The forum was very successful in further promoting worldwide efforts in disaster risk reduction and generating more interest in ICHARM. Even after the sessions, some of the audience asked for more information about ICHARM.



For more information on the Global Platform, the documents and movies of the sessions are available at:

<http://www.unisdr.org/conferences/2017/globalplatform/en/programme/working-sessions/>

(Written by Miho Ohara)

management」が開催され、小池センター長がモデレーターとして登壇し、IFIの活動紹介や意見交換を行いました。

各セッションの資料及びビデオは、下記のホームページで公表されています。セッションでは終了後も来場者から質問を受けることがあり、フォーラムへの参加を通じてICHARMの活動への関心も高めることが出来ました。

<http://www.unisdr.org/conferences/2017/globalplatform/en/programme/working-sessions/>

## Chief Researcher Tokunaga attends a TC annual meeting in Korea

The 12th Annual Meeting of the Typhoon Committee (TC) Working Group on Disaster Risk Reduction (WGDRR) and a TC Steering Committee meeting were held on May 31 and June 1 in Ulsan, Korea. TC is an inter-governmental body organized under the joint auspices of the Economic and Social Commission for Asia and the Pacific (ESCAP) and the World Meteorological Organization (WMO). Roughly 30 people gathered for the meetings, including Chief Researcher Yoshio Tokunaga, who is a steering committee member. Other Japanese delegates were from the Regional Specialized Meteorological Center, the Asian Disaster Reduction Center, and Tohoku University. Other participants were from member countries of China, America, Korea, Thailand, Malaysia, Vietnam, and Laos and the rest from the TC secretariat, ESCAP, and WMO.



Typhoon Committee Meetings in Ulsan, Korea

The steering committee mainly discussed anniversary and other events for the 50th general meeting scheduled in Vietnam next February: the content of the technical conference to be held prior to the general conference and the 50th general meeting; and ideas for the anniversary logo, the photo competition, and the anniversary publication. The committee also talked about other issues including ones from the previous meeting.

Tokunaga also attended the WGDRR meeting as an observer representing the TC Working Group of Hydrology (WGH), which he chairs. Through the meeting, he learned more about cross-cutting efforts involving WGDRR and WGH and the linkage between the Sendai Framework for Disaster Risk Reduction and activities led by WGH.



Discussion at a meeting

On June 2, Tokunaga visited WGH Vice-Chair Cho Hyo Seob\* at the River Information Center in Seoul and discussed issues regarding the 6th WGH meeting to be convened next September. They particularly talked about a Japan-led project, "Flash Flood Risk Information for Local Resilience," and agreed that a questionnaire survey on the project will be conducted, and that the results will be provided for discussion at the 6th WGH meeting. They also agreed to continue discussions about holding next year's annual meeting in Japan.

\* Director of River Information Center, Han River Flood Control Office, Ministry of Land Infrastructure, and Transport

ICHARMの徳永 上席研究員は ESCAP/WMOの支援する台風委員会の運営委員のひとりです。2017年5月31日及び6月1日、韓国ウルサン市において、台風委員会第12回防災部会年次会及び運営委員会が行われました。日本からは、気象庁熱帯低気圧地区特別気象センター (RSMC)、アジア防災センター (ADRC)、東北大学から参加があり、メンバー国からは、中国、アメリカ、韓国、タイ、マレーシア、ベトナム、ラオス、そして台風委員会事務局、ESCAP、WMOから約30名が参加しました。

防災部会には、徳永 上席研究員が議長を勤める水文部会代表としてオブザーバー参加し、防災部会と水文部会とのクロスカッティングの取組みや、仙台防災枠組みと水文部会活動の関連付けについて、見識を深めました。特に、運営委員会会議では、来年2月にベトナムで開催される第50回総会の記念イベント及び関連活動に関して、1) 総会前に開催する技術カンファレンスの企画、2) 第50回総会の企画、3) 記念ロゴ、4) 写真コンペティション、5) 記念誌、その他及び前回運営委員会での課題について議論がされました。

6月2日には、ソウルの韓国国土交通部漢江洪水統制所河川情報センター Cho 所長 (水文部会副議長) を訪問して本年9月に開催する台風委員会第6回水文部会 (WGH) 年次会議その他について意見交換を行いました。

ここでは、日本が主導して実施する "Flash Flood Risk Information for Local Resilience" 事業について今後、メンバー国へのアンケート実施・とりまとめを行わない第6回 WGH 年次会議での議論につなげる等方針が確認されました。また、来年の年次会議を日本で開催することにつき検討することとなりました。

(Written by Yoshio Tokunaga)

## A regional workshop in Montevideo, Uruguay

2017年6月12日から16日まで、気候変動に対応する手段に関するワークショップがウルグアイ国モンテビデオにあるリパブリック大学 (UdelaR) で開催されました。ICHARMからは山崎専門研究員が小池センター長に代わり、招待講演者として出席しました。ワークショップには、ラテンアメリカとカリブ海地域の大学や研究所から専門家が出席していました。

このワークショップは、ラテンアメリカ・カリブ海地域科学局が、UdelaRの流体力学・環境工学研究所の協力を得て、南アメリカ諸国の自然災害対応力の強化を目的とするプロジェクトの一環で開催したものです。ワークショップでは、現在ラテンアメリカ・カリブ海地域およびその他の地域で、豪雨や洪水の評価やシミュレーションに用いられている知見や手段を概観するとともに、成功例や不足部分を分析し、洪水リスク管理強化に及ぼす影響についても議論しました。

山崎専門研究員は、ICHARMが開発し、継続的に機能を向上を図っているIFAS（総合洪水解析システム）やRRI（降雨流出氾濫モデル）を利用して降雨流出・洪水氾濫のシミュレーション、さらに、国土交通省が想定最大外力を推定するために新たに開発した方法を紹介しました。ワークショップを通して、ラテンアメリカ・カリブ海地域には、研修を含めたIFASやRRIの実装などICHARMの知見・技術に対するニーズがあることがわかりました。

A regional workshop, "Tools for Managing Hydrological Maximums in a Changing World," was convened on June 12-16, 2017, at the Engineering Faculty of the University of the Republic (UdelaR) in Montevideo, Uruguay. Research Specialist Yusuke Yamazaki participated in this workshop as an invited speaker on behalf of ICHARM Director Toshio KOIKE along with other participants from universities and institutes of Argentina, Bolivia, Brazil, Chile, Costa Rica, Cuba, Ecuador, Guatemala, Mexico, Nicaragua, Panama and Peru.

The workshop was organized by the UNESCO Regional Bureau for Science in Latin America and the Caribbean with the collaboration of the Institute of Fluid Mechanics and Environmental Engineering (IMFIA) of UdelaR in the framework of a project, "Enhancing Natural Hazards resilience in South America (ENHANS)". It aimed at reviewing knowledge and available tools that are currently used in the region for the assessment and modeling of intense rainfall, as well as flood modeling tools, and those promoted by other international centers and institutes. It also looked into good practices and gaps, as well as their impact on the enhancement of flood risk management.

Yamazaki introduced a modelling approach for rainfall runoff and flood inundation processes using the Integrated Flood Analysis System (IFAS) and the Rainfall-Runoff-Inundation (RRI) model, which were developed and have been upgraded by ICHARM. In addition, he also introduced a new methodology that is developed by the Ministry of Land, Infrastructure, Transport and Tourism of Japan for estimating probable maximum precipitation. Through this workshop, he learned that there are regional needs for expertise that ICHARM can offer, such as technical support for the implementation of IFAS and RRI including related training programs.

(Written by Yusuke Yamazaki)

## Outreach

### ICHARM Open Day 2017 held, inviting local school students

2017年4月21日、つくば科学技術週間に開催された土木研究所の一般公開に合わせ、ICHARMは今年も「ICHARM Open Day」を開催しました。つくば市の茨城県立竹園高等学校・茨城県立並木中等教育学校から57名（竹園40名、並木17名）の生徒の皆様及び各校先生方合わせて6名をお招きしました。ICHARMの博士・修士課程の外国人学生及びICHARMスタッフが協力し行うこのイベントは、講演、発表及び質疑応答などすべて英語で行っています。

第1部は、小池センター長の開会挨拶の後、博士課程の学生であるGul Ahamad Ali氏による、水循環のわかりやすい説明や母国パキスタンの水災害や水管理などに関する、「Water Management and Flood Disasters in Pakistan」と題した白熱した講演に、生徒さんたちは熱心に耳を傾けていました。

The "ICHARM Open Day 2017" was held on April 21. It is organized annually as part of the open house event of the Public Works Research Institute (PWRI) during the Tsukuba Science & Technology Week. This year, students studying in ICHARM's graduate programs (ICHARM students) and office assistants cooperated to prepare for this event. Local students, 40 from the Ibaraki Prefectural Takezono High School and 17 from the Ibaraki Prefectural Namiki Secondary School, were invited, as well as six teachers. The event contained a brief lecture, poster presentations and Q&A sessions, which were all conducted in English.



Doctoral and Master course students describe their home countries' water-related disaster, climate, culture, etc.



The open day started with a welcome greeting by Director Toshio Koike. Then, Mr. Gul Ahamad Ali, a doctoral course student, gave a short lecture entitled "Water Management and Flood Disasters in Pakistan." He explained the water cycle, water-related disasters and water management in his mother country, Pakistan, in simple terms for young students. The local students enjoyed this rare opportunity to learn about water and Pakistan firsthand.

After the lecture, the local students enjoyed the poster presentations prepared by the ICHARM students from nine countries including Bangladesh, Pakistan, Malawi, Mozambique, Myanmar, Pakistan, Papua New Guinea, East Timor, and Vietnam. The local students had a very exciting time communicating everything in English at each poster presentation.

Afterwards, we collected comments from the local students participated in the event. Many students found presentations interesting and very easy to understand. They also mentioned that they had many chances to talk to people in English, which was good English conversation practice. Other comments refer to international perspectives and additional knowledge about not-so-familiar countries that were presented by ICHARM students with unique background. The teachers also told us that they had learned something new. One was impressed with points of view that the ICHARM students use to analyze an event of natural disaster. Many were grateful to this kind of opportunity that motivated students to communicate with others in a foreign language.

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



Students and ICHARM staff at the entrance hall

(Written by Mikiko Nakamura)

続いて第2部は、ポスターセッションを行いました。バングラディッシュ、パキスタン、マラウイ、モザンビーク、ミャンマー、パキスタン、パプアニューギニア、東ティモール、ベトナムと、9カ国の学生による、各国の文化紹介から水災害事情にわたる説明を、それぞれの国のパネルの前で聞きました。生徒の皆さんも、英語を駆使してとても熱心に質問したり、コミュニケーションを楽しんでいました。

参加者にお願したアンケート結果では「どの発表も興味深いものでした。災害のことについて、とてもよく分かりました。話す機会もたくさんあったので、自分の会話の勉強にもなりました。」「水災害について、日本の中でのことは知っていても、国際的に見ると、いろんな視点があってとても興味深かったです。水災害だけでなく、その他、国のことについても知ることができて良かったです。」という意見を多数いただきました。随行された先生からは「災害とその要因の1つである気候（気象）についての分析があり、分析の視点など参考となることが多く、ためになった。」「毎年参加させていただき、本校生徒にいい刺激となっております。英語での質疑応答をする機会をいただき、ありがとうございます。」というお言葉をいただきました。

水災害を英語で学ぶこの ICHARM ならではのイベントは、生徒の皆さん、そして外国人学生の双方にとって、とても有意義な機会となっております。

次世代の水文学研究者及び技術者を輩出すべく「ICHARM Open Day」は来年も行う予定です。

## Award

### Senior Researcher Yorozuya wins Bureau Director's Award

The 60th annual conference on technological research for the development of the Hokkaido region was held on February 13-16, 2017, and presentations were made on 199 papers, which are classified into seven categories of safety and security, strategic maintenance and management technology, environment, collaboration and cooperation, winter, technology in general, and administration. Additional 14 presentations were also made in the category-free session. Those papers were then evaluated for creativeness, possibilities, applicability, and possible contributions, in addition to presentation.

2017年2月13日から16日にわたり、「第60回（平成28年度）北海道開発技術研究発表会」が札幌市にて開催されました。このうち、自由課題は7カテゴリー（「安全・安心」、「戦略的維持管理技術」、「環境」、「連携・協働」、「ふゆ」、「技術一般」、「行政一般」）で199論文、フリーセッションで14件の発表が行われました。これらの論文

Award

に対し、研究の創造性、将来の発展性、成果の活用性・貢献性及びプレゼンテーションに関して審査が行われ、「北海道開発局長賞」の9件の1件として ICHARM の萬矢主任研究員らによる以下の論文が受賞しました。授賞式は5月30日に行われました。

**【受賞論文】**

研究課題名：平成 28 年台風 10 号空知川上流における画像処理型流量観測の適用性 一大規模出水に対応した流量観測高度化（その2）  
 発表者：札幌開発建設部 河川管理課 佐藤 匡  
 土木研究所 水工研究グループ 水文チーム 萬矢 敦啓  
 株式会社 福田水文センター 橋場 雅弘

Senior Researcher Atsuhiko Yorozuya and co-authors presented a paper on particle image velocimetry (see below), which was selected among the nine papers winning the Hokkaido Regional Development Bureau Director's Award. The award ceremony took place on May 30.



Senior Researcher Yorozuya (leftmost) is awarded with the Bureau Director's Award.

**Award-winning paper:**

Title: Applicability of particle image velocimetry to the upper Karachi River during Typhoon No.10 in 2016

–Advanced discharge observation for large-scale flooding (part 2) –

Speakers: Tadashi Sato, River Management Section, Development and Construction Department, Sapporo City

Atsuhiko Yorozuya, River and Dam Hydraulic Engineering Research Team, Hydraulic Engineering Research Group

Masahiro Hashiba, Fukuda Hydrologic Center

*(Written by Daisuke Kuribayashi)*

**Senior Researcher Kikumori awarded for his contributions to CommonMP**

CommonMP（※）業績賞は、CommonMP 開発プロジェクトが2007年に発足してから10年目を迎えたことを記念して、これまで CommonMP プロジェクトの発展（運営、開発、普及）に貢献した技術者または組織に対して表彰するとともに、業績を広く紹介することにより、CommonMP の更なる発展を目指すものです。

昨年10月から公募が始まり、CommonMP 推進委員会のメンバーから構成された審査委員会による審査を経て、5月17日に ICHARM の菊森佳幹主任研究員が受賞者の一人として当該賞を受賞することとなりました。菊森主任研究員は、CommonMP プロジェクトが発足した2007年より国土交通省国土技術政策総合研究所（国総研）に在籍し、プロジェクト事務局として、CommonMP の要素モデルの開発やプラットフォームの技術仕様の検討、プロジェクトの組織運営等に務めてきました。これらの活動が評価されたものと思われます。菊森主任研究員は、昨年4月に国総研から ICHARM に異動になり、ICHARM においても研修等で CommonMP の普及・活用に努めているところです。今後も CommonMP の普及・活用ならびに水・物質循環関連の研究に貢献していくことが期待されます。

※「CommonMP プロジェクト発足10周年記念ワークショップ開催報告」（24ページ）参照

On May 17, 2017, Senior Researcher Yoshito Kikumori was awarded with the CommonMP\* Contribution Award. The award was created in commemoration with the tenth anniversary of the CommonMP development project, starting in 2007, to recognize engineers and organizations that have contributed to progress in operation, development and dissemination of the CommonMP project, as well as to widely publicize the project's achievement for further advancement. An awardee-selection team was set up comprising members of the CommonMP Promoting Committee, and the team started to publicly advertise for nominees in October 2016.

The nominees were then screened by the selection team, and Kikumori was selected one of the award winners. Kikumori had been at the National Institute for Land and Infrastructure Management from 2007, when the Common MP project started, until recently, serving as a member of the project secretariat who were mainly responsible for developing element models of CommonMP, studying technical specifications of its platform, and managing the project. The selection team decided that he deserved the award for these contributions. Kikumori was transferred to ICHARM April 2016, where he has continued promoting CommonMP through training and workshops. He wishes to contribute more to wider use of CommonMP and further progress in research on water-material circulation.

\* See page 24 for detailed information on the CommonMP project.



Senior Researcher Kikumori (second from right) is awarded with the CommonMP Contribution Award.

*(Written by Yoshito Kikumori)*



# Others

## Personnel change announcement

### New ICHARM Member

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

**Hiroyuki ITO / 伊藤 弘之**

Chief researcher

Japan



I have started working at ICHARM since June 1. I am excited about joining research using advanced simulations pioneered by ICHARM and international technical cooperation to reduce water-related risks. I will do my best to implement our research outcomes to build a disaster resilient society.

### Leaving ICHARM

- **Katsuhito MIYAKE** : Deputy Director

○三宅 且仁 グループ長

### Position change

- **Hisaya SAWANO** : Chief Researcher (Risk management)  
Deputy Director, On July 1, 2017

○澤野 久弥 上席研究員 (リスクマネジメント)  
グループ長 (2017年7月1日付け)

- **Yoshio TOKUNAGA** : Chief Researcher (Public relations and training)  
Chief Researcher (Risk management), On July 1, 2017

○徳永 良雄 上席研究員 (広報・研修)  
上席研究員 (リスクマネジメント)  
(2017年7月1日付け)

## Comments from internship student

ICHARM accepted an internship student this spring.

Mr. Nikolaos Mastrantonas from Greece stayed at ICHARM. He contributed a short message to this volume of ICHARM Newsletter while looking back at his internship.



**Nikolaos Mastrantonas**

UNESCO-IHE Institute for Water Education, Delft

Intern period: March 6 - May 26, 2017

I was an intern in ICHARM for 3 months between March - May, making research about Satellite Precipitation Products. This research is part of my master's thesis in UN-IHE in the Netherlands, and the reason I wanted to conduct part of the thesis in ICHARM is the knowledge and expertise ICHARM has on remote sensing and satellite data.

During this time, I had the opportunity to gain valuable experience, deepen my knowledge on the field and finalize the most difficult part of the thesis. I would like to take this opportunity to thank my supervisors, Dr. Rasmy and Dr. Shibuo, who, despite their busy schedule, gave me the required guidance and provided me with useful advices. Moreover, I would like to thank the director of ICHARM, Dr. Koike, for his valuable suggestions, as well as, the Ph.D. and Master students that supported me when I faced difficulties in my research.

The working environment was ideal for research and all the members of ICHARM were very kind and made me feel part of the team from the first day. Also, apart from the research, I had the chance to participate in various educational and cultural activities organized by ICHARM, such as fieldtrips and picnic, that enriched my life in Japan and provided me with an insight about the Japanese culture.

Closing, I would like to thank once more my supervisors and all members of ICHARM for this fruitful internship and wish all of them professional success. I am very confident that ICHARM will continue its successful course and I am looking forward to possible future collaboration.

# Publication List

\* April - June, 2017

## A: Peer Reviewed Paper / 査読付論文

- 原田大輔、江頭進治、萬矢敦啓、岩見洋一、2016年度小本川災害における流路・河床変動を伴う洪水流の解析、河川技術論文集 第23巻、土木学会、2017年6月
- 工藤俊、萬矢敦啓、原田大輔、笛田俊治、小本川における洪水時の流水抵抗変化がハイドログラフに及ぼす影響、河川技術論文集 第23巻、土木学会、2017年6月

## B: Non-peer Reviewed Paper / 査読無し論文

- 栗林大輔、大原美保、近者敦彦、澤野久弥、「洪水カルテ」を用いた地区レベルの洪水脆弱性把握手法の適用、地域安全学会梗概集、一般社団法人 地域安全学会、Vol.40、pp.101-104、2017年6月

## C: Oral Presentation / 口頭発表

- Morimasa Tsuda, Indus-IFAS model development, Scope and Upgrade for Indus Basin, International Workshop on Strategic Data for Reliable Models and Timely Flood Forecasts, PCRWR, UNESCO, Islamabad, Pakistan, April 10-11, 2017
- Yusuke Yamazaki, Progress of RRI model development for lower and eastern Indus, International Workshop on Strategic Data for Reliable Models and Timely Flood Forecasts, PCRWR, UNESCO, Islamabad, Pakistan, April 10-11, 2017
- Atsuhiko Yorozyua, ADCP Based Measurement of Flow Regimes, International Workshop on Strategic Data for Reliable Models and Timely Flood Forecasts, PCRWR, UNESCO, Islamabad, Pakistan, April 10-11, 2017
- LIU Tong, Progress and challenges of simulating meltwater simulation in the Upper Indus, International Workshop on Strategic Data for Reliable Models and Timely Flood Forecasts, PCRWR, UNESCO, Islamabad, Pakistan, April 10-11, 2017
- Gusyev M.A., Tokunaga Y., and K. Miyake (2017). ICHARM's Practices of Flood Hazard and Risk Assessment, the International Workshop on Disaster Management for Roads, the World Road Association (PIARC), Tokyo, Japan, 31st May, 2017
- Gusyev M.A., Morgenstern U., Stewart M.K., and Y. Tokunaga (2017). Learning about future applications of tritium-tracer in Japanese river waters from the Hokkaido headwater catchments. JpGU-AGU 2017 Joint Meeting, Chiba, Japan, May 20-25th, 2017
- Stewart M.K., Morgenstern U., M.A. Gusyev and P. Maloszewski (2017). The problem with simple lumped parameter models: Evidence from tritium mean transit times. Poster Presentation at the EGU 2017 General Assembly, Geophysical Research Abstracts, Vol. 19, EGU 2017-10116
- Mohamed Rasmay, ICHARM Activities on Flood forecasting for Disaster Risk Reduction, Space Applications for Environment and SDGs Panel, JAXA and ESCAP, Thailand, May 15-16, 2017
- 原田大輔、江頭進治、萬矢敦啓、岩見洋一、中山間地河川の流路・河床変動に及ぼす土砂供給の影響、第66回 平成29年度砂防学会研究発表会概要集、砂防学会、平成29年度砂防学会研究発表会、(公社)砂防学会、奈良市、2017年5月24~25日
- 山崎祐介、江頭進治、岩見洋一、流域における崩壊起源土石流の発達・減衰に及ぼす地形条件の影響、第66回 平成29年度砂防学会研究発表会概要集、砂防学会、平成29年度砂防学会研究発表会、(公社)砂防学会、奈良市、2017年5月24~25日
- 牛山朋来、フィリピン・パンパンガ川流域におけるアンサンブル降水予報実験、日本気象学会2017年度春季大会、日本気象学会、国立オリンピック記念青少年センター、2017年5月25~28日
- Youngjoo Kwak, Innovative flood monitoring for risk reduction, National Institute of Hydrology, India, National Institute of Hydrology, India, June 1, 2017
- 郭栄珠、朴鍾杰、岩見洋一、バングラデシュ共和国の2015年広域洪水、平成29年度春季学術講演会論文集、日本写真測量学会、日本写真測量学会平成29年度春季学術講演会、東京大学、2017年5月25~26日
- Youngjoo Kwak, 朴鍾杰、岩見洋一、竹内渉, A Syncro Floodwater Index for Flood Risk Mapping using Multiple Satellite Data: A Case Study of 2015 Bangladesh Flood, JpGU-AGU 2017 Joint Meeting, Chiba, May 20-25, 2017
- Youngjoo Kwak, O. Ledvinka, T. Ushiyama, Y. Iwami, J. Danhelka, Multilateral Perspectives on an Interdisciplinary Framework for Flood Forecasting and Flood Risk Projection: A Comparative pilot study, JpGU-AGU 2017 Joint Meeting, Chiba, May 20-25, 2017

## D: Poster Presentation / ポスター発表

- Hasegawa A., Gusyev M.A., and Y. Iwami (2017). Meteorological drought change evaluation using comparative standardized precipitation index with d4PDF future and past experiments. Poster Presentation at the JpGU-AGU 2017 Joint Meeting, Chiba, Japan, May 20-25th, 2017
- Zhang H., Ao T., Gusyev M.A., Li X., Liu X., Liu J., and H. Wang (2017). Development and Application of a Distributed Source Pollutant Transport Model Based on BTOPMC. Poster Presentation at the JpGU-AGU 2017 Joint Meeting, Chiba, Japan, May 20-25th, 2017
- Gusyev M.A., Abrams D., Magome J, and Y. Tokunaga (2017). Coupling MODFLOW and distributed hydrologic model BTOP in the Fujikawa River basin. Poster Presentation at the MODFLOW and More 2017 Conference, Colorado, USA, May 21-24th, 2017
- Youngjoo Kwak, J. Magome, A. Hasegawa, Y. Iwami, Rapid Global River Flood Risk Assessment under Climate and Socioeconomic Scenarios, Geophysical Research Abstracts, European Geosciences Union, EGU-General Assembly 2016, Vinnena, Austria, April 23-28, 2017
- Youngjoo Kwak, O. Ledvinka, T. Ushiyama, Y. Iwami, J. Danhelka, Interdisciplinary Approach for Assessment of Continental River Flood Risk: A Case Study of the Czech Republic, Geophysical Research Abstracts, European Geosciences Union, EGU-General Assembly 2016, Vinnena, Austria, April 23-28, 2017

## E: Paper in technical magazine / 技術雑誌論文

- 宮本守、International Flood Initiative(IFI)による水災害リスク軽減のための新たな展開、河川、日本河川協会、Vol.849、pp.71-73、2017年4月

## F: PWRI Publication / 土木研究所刊行物

None / 該当無し

To subscribe or unsubscribe to our mailing list, please contact us at: [icharm@pwri.go.jp](mailto:icharm@pwri.go.jp)  
1-6 Minamihara, Tsukuba, Ibaraki 305-8516, Japan  
Tel: +81 29 879 6809 Fax: +81 29 879 6709 URL: <http://www.icharm.pwri.go.jp/>

メーリングリストへ登録ご希望の方 / 今後の配信を希望されない方は下記アドレスまでご一報ください。ご意見・ご感想もお待ちしております。  
〒305-8516 茨城県つくば市南原 1-6 国立研究開発法人土木研究所 ICHARM (アイチャーム)  
Tel: 029-879-6809 Fax: 029-879-6709 Email: [icharm@pwri.go.jp](mailto:icharm@pwri.go.jp)