

# Newsletter

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# ICHARM

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

## Message from Director

### Move on to a different dimension from $10^2$ to $10^3$

A hilly and mountainous area in northern Kyushu Island of Japan was seriously damaged in July 2017 by extremely heavy rainfall reaching up to 900mm/12hr, which was estimated using a radar-rain gauge network. Debris flows occurred throughout most of the area, covered with thick decomposed Granodiorite. A huge amount of sediment and fallen trees flowed down with a violent torrent and changed the tranquil landscape of the valley plain dramatically. The narrow river channels were completely filled with the sediment. Then, the flood flow with the driftwood spread while heaving up and down across the valley plain, claimed human lives, and destroyed houses, farmland and roads.



Director Toshio Koike at Global Forum on Science and Technology for Disaster Resilience 2017 (November 2017)

According to Chronicles of Japan, one of the country's oldest histories, a royal palace was once constructed in the damaged area in the year 661. Since then, people there have been constructing infrastructure for livelihood and production, building communities, and developing and nurturing a culture for so long. The valley plain has been formed through geomorphological processes as occurred in 2017 without any doubt. A geographer says, "This is a textbook case of microtopography reformed by floods and sediment."

In the recent flood management of major rivers in Japan, structures are planned for floods of 80-200 year return period. The IPCC 4th Assessment Report, published in 2007, asserted that the warming of the climate system due to anthropogenic green-gas emissions was unequivocal. Exactly the same expression was used in the 5th report in 2014. Associated with the climate change, heavy precipitation events are projected to increase in frequency, intensity, and/or amount. Actually, we are now experiencing heavy rainfall events of an unprecedented scale with the return period shifting from the  $10^2$  order to  $10^3$ ; events of that scale may cause far more drastic topographical modifications. The impacts of the changes can be even more serious in hilly and mountainous areas with smaller basin area and shorter flood travel time. All hydrologists are supposed to know these processes well. I am deeply ashamed of immature scientific knowledge and low-level actions against the changes. By developing our scientific imagination, we should urgently take up the challenge of building a resilient society to disasters of a different dimension.

January 31, 2018  
Toshio Koike  
Director of ICHARM

### 異次元に向かう

—  $10^2$  から  $10^3$  へ —

2017年7月、12時間に900ミリ（解析雨量）にも達する豪雨が九州北部の中山間地を集中的に襲いました。深層までマサ化した花崗閃緑岩で構成される中山間地では至る所で土石流が発生し、生産された大量の土砂と倒木は洪水流によって流下し、のどかな谷底平野の風景は一変しました。土砂の堆積によって細い河道は埋め尽くされ、流れの場を失った洪水流は流木とともに谷底平野の幅一杯に波を打って流れ広がり、尊い人命を奪い、家屋、田畑、交通網を破壊しました。

『日本書紀』によれば、被災した地域には661年に都が構えられており、長年にわたって生活、生産の基盤を築かれ、コミュニティが形成され、文化が育まれてきました。一方、人々が暮らす谷底平野という地形は、今回のような膨大な自然の営力によって形成されたものに違いありません。「氾濫水と土砂堆積による微地形形成が教科書通り進んだ」というのは地理学者の言です。

日本における近年の治水施設整備は、80年から200年に一度の確率で発生する洪水を対象としてきました。2007年にまとめられたIPCC第4次評価報告書では、人間が排出する温室効果ガスによって気候が温暖化しているのは疑う余地はないと断言され、7年後の2014年にまとめられた第5次評価報告書でもまったく同じ表現が用いられました。この気候の変化に伴って、大雨の頻度、強度と降水量の増加が予測されています。実際に、地形の変化をも引き起こす異次元の豪雨、つまり $10^2$ 年に一度から $10^3$ 年に一度にもおよぶ豪雨が生じています。その影響は流域面積が狭く、短時間で洪水が流下する中山間地において大きくなります。水文学を学ぶ者にとってこれらは常識のはずでした。知識と行動力が足りないという、忸怩たる思いです。科学的想像力を高め、技術と制度とコミュニティの力で異次元の災害に対応できる社会づくりに早急に取り組みなければなりません。

## Request to participate in online survey on ICHARM Newsletter

### ICHARMニュースレター購読者アンケートのお願い

ICHARMでは、2006年3月の設立以降、ICHARMの最新の動向をお知らせする「ICHARMニュースレター」を、年4回発行しています。

このたび、一層の内容の充実を図るべく、購読者の皆様にアンケートをさせて頂きたく存じます。

つきましては、以下のサイトにアクセス頂き、アンケートにお答え下さい。

[http://www.icharm.pwri.go.jp/questionnaire/questionnaire\\_en.html](http://www.icharm.pwri.go.jp/questionnaire/questionnaire_en.html)

回答期限：2018年2月28日まで

回答時間（目安）：5分程度

Thank you for subscribing ICHARM Newsletter. ICHARM has been publishing the quarterly newsletter for over 10 years since its establishment in March 2006 to deliver the latest news about research, projects and other activities at ICHARM to readers around the world. As we are currently working on the improvement of the newsletter, we would be grateful if you could spare time to answer the following questions and let us hear your voices about our publication.

Survey posted at: [http://www.icharm.pwri.go.jp/questionnaire/questionnaire\\_en.html](http://www.icharm.pwri.go.jp/questionnaire/questionnaire_en.html)

Survey to be done by: 28 February 2018

Time required: about 5 minutes

# International Flood Initiative (IFI)

## Annual report on IFI activities in 2017

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

2016年10月に承認された「洪水リスク軽減と持続可能な開発を強固にするための学際的な協力に向けた宣言文 (ジャカルタ宣言)」を受け、各国および関係機関と協働しながら、統合洪水マネジメントに貢献する活動を進めています。特に、フィリピン・スリランカ・パキスタン・ミャンマーにおいては、各国の関係機関による「水と災害に関するプラットフォーム」の構築に向けた取り組みが始まり、ICHARMはファシリテーターとしてその活動の促進を図ってきました。これらのIFIに関する活動は国際機関等との連携強化や各国における水災害リスク軽減のための活動など多岐にわたるため、グローバルな活動、アジアにおける活動、各国における活動に分けて下記にそれぞれ報告します。

### グローバルな活動

主なグローバルな活動として、2017年7月の第3回国連水と災害に関する特別会合 (ニューヨーク)、

### INTERNATIONAL FLOOD INITIATIVE

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

In October 2016, the Jakarta Statement towards an interdisciplinary and transdisciplinary partnership to consolidate flood risk reduction and sustainable development, was adopted by the member organizations of IFI. As part of this effort, the Philippines, Sri Lanka, Pakistan and Myanmar have already decided to establish a Platform on Water and Disaster involving various government agencies, and ICHARM has been supporting their decision as facilitator. This article reports the activities of IFI at national, regional and global levels, which ranges widely from strengthening collaboration among international organizations to supporting individual nations in water-related disaster risk reduction.

### Global activities

Among the global activities, three international conferences convened in 2017 should be addressed: the 3rd UN Special Thematic Session on Water and Disasters, the 7th International Conference on Flood Management (ICFM7), and the World Bosai Forum.

The 3rd UN Special Thematic Session on Water and Disasters was held at the UN headquarters in New York on July 20. With Special Envoy of the Secretary-General for Disaster Risk Reduction and Water Dr. Han Seung-Soo chairing the session, President of Hungary János Áder and President of the Republic of Mauritius

International Flood Initiative (IFI)



Photo 1 The Special Session on Science and Technology held at the UN headquarters during the 3rd UN Special Thematic Session on Water and Disasters

Ameenah Gurib-Fakim delivered a keynote speech. His Imperial Highness Crown Prince of Japan joined the conference through video and made a keynote lecture on water and disasters. Japan's Liberal Democratic Party Secretary General Toshihiro Nikai was also at the conference among the keynote speakers. The plenary session stressed the importance of awareness and dialogue to address the issues of water and disasters for successful implementation of the new international decade for Action - Water for Sustainable Development 2018-2028.

In the afternoon, the Special Session on Science and Technology was held, and Director of ICHARM Toshio Koike served as a co-chair (photo 1). The session discussed a broad range of topics on water and disasters: a mechanism to promote the concept of Alliance of Alliances on Water and Disasters, sediment disaster research, research foundation to promote investment and financing, response to Water-related Disasters, as well as Platforms on Water and Disaster, whose establishment has been underway in several nations with help from ICHARM. The representatives of WMO and UNESCO-IHP also proposed further promotion of the international initiatives in the field. The director of ICHARM wrapped up the session as co-chair with a summary of the discussions.

ICFM7 was held at Leeds University in Britain, and the director of ICHARM chaired an IFI special session, which took place on September 8. The session was attended by many experts including Director of WMO Climate and Water Department Johannes Cullmann through a teleconference system. Dr. Abou Amani, the chief of Section of UNESCO-IHP, Prof. Eduardo Mario Mendiondo of Centro Nacional de Monitoramento e Alerta de Desastres Naturais (CEMADEN), and Researcher Mamoru Miyamoto of ICHARM made a presentation on the importance of establishing a Platform on Water and Disaster in each country. Other speakers also delivered very interesting presentations regarding the role of IFI and the need for water-related disaster risk reduction in the world, Africa, Latin America, and Asia. The presentations stimulated insightful discussions that can lead IFI's platform project, which is currently being implemented mainly in Asian countries, to a global effort covering Africa and Latin America.

During the conference, the ICFM special committee met on September 4 and 7, and proposed that the IFI special session be officially included in the plenary session at ICFM8 scheduled in 2020, though it was a parallel session at ICFM7. This shows high expectations of the global community towards IFI.

The World Bosai Forum was held in Sendai, Japan. ICHARM organized a technical session on November 28, and the director of ICHARM served as the moderator. The session discussed the project of a Platform on Water and Disaster from multiple perspectives of ICT, economy, community and dynamics while the invited panelists from the Philippines, Sri Lanka, Pakistan and Brazil spoke about the present situation and efforts of their countries regarding disasters and their management. Prof. Masaru Kitsuregawa of the Institute of Industrial Science of the University of Tokyo presented the latest trend in ICT, explaining its role and power in disaster risk re-

同年9月の第7回洪水管理国際会議 (ICFM7) (イギリス・リーズ)、11月の世界防災フォーラム (仙台) について紹介します。

7月20日にニューヨークの国連本部で開催された第3回水と災害に関する特別会合では、ハン・スンス議長の進行のもとハンガリー大統領やモーリシャス大統領などの基調講演が行われ、日本からは皇太子殿下のビデオメッセージと二階自民党幹事長の講演が行われました。全体会合では、新たな「水の10年」に向けた水と災害に関する問題への気づきと対話について力強いメッセージが述べられました。

午後からは科学技術に関する特別セッションが開催され、小池センター長が共同議長を務めました(写真-1)。科学技術セッションでは、ICHARMが各国と協力して進める水と災害に関するプラットフォームに加え、様々な国際的な水と災害のアライアンスの協調 (Alliance of Alliances) 活動を進めるメカニズム、土砂災害研究、投資とファイナンスを進める研究基盤、複合水災害への対応に焦点を当てて議論され、WMOとUNESCO-IHPの代表より国際イニシアティブの活性化についても提起されました。セッションの最後には共同議長である小池センター長が議論の総括を行いました。

イギリスのリーズ大学で開催されたICFM7では9月8日にIFI特別セッションが開催され小池センター長が議長を務めました。IFI特別セッションでは、WMOのJohannes Cullmann部長が電話会議システムにより参加した他、UNESCO-IHPのAbou Amani課長、ブラジル国家自然災害モニタリング・警報センター (CEMADEN) のEduardo Mario Mendiondo教授が参加し、ICHARMからは宮本研究員が各国における水と災害に関するプラットフォームの重要性に関する発表を行いました。セッションのテーマである、グローバル、アフリカ、中南米、アジアにおける水災害リスク軽減のためのニーズとIFIの意義について、各講演者から非常に興味深い発表が行われ、現在アジア各国で取り組まれているIFIの水と災害に関するプラットフォーム構築のための活動をアフリカや中南米を含むグローバルな枠組みとして展開するための有意義な議論を行うことができました。

また、9月4日と7日に開催された特別委員会において、ICFM7ではパラレルセッションの1つとして開催したIFI特別セッションを2020年に予定されているICFM8では全体会議とすることが提案され、IFIに対する期待の高さが示されました。

仙台で開催された世界防災フォーラムでは11月28日にICHARMの技術セッションが小池センター長の司会により開催され、ICT、経済、コミュニティ、ダイナミクスの視点から、水と災害に関するプラット

International Flood Initiative (IFI)

フォームについて議論し、フィリピン、スリランカ、パキスタン、ブラジルからの専門家によって各国の実情と取り組みが紹介されました。ICTに関しては東京大学生産技術研究所の喜連川優教授が情報分野における最先端の動向を紹介した上で防災分野に果たす役割とパワーについて発表し、経済に関してはアジア開発銀行研究所所長の吉野直行教授が農業、工業、サービス業等業種に応じた洪水被害の影響について具体的な事例と解析手法を発表し、ダイナミクスに関してはICHARMの江頭進治研究・研修指導監が地すべりおよび土石流について、被害の実態や挙動を表す支配方程式、数値解析事例について発表し、コミュニティに関してはICHARMの大原美保主任研究員が災害時の避難の実態と改善のための情報提供の在り方について発表しました。

パネルディスカッションでは、フィリピンのRenato Solidum 科学技術省次官が水災害に対する理解、監視、警報、対応の重要性とそのため取り組みについて解説し、スリランカのAsiri Karunawardena 国家建築研究所長は、地すべりのリスク軽減のための取り組みを紹介し、パキスタンのManzoor Ahmad Malik 水資源調査評議会局長は、インダス川における早期洪水警報システムの特徴を説明し、ブラジルのMarengo Jose Antonio 国家自然災害モニタリング・警報センター (CEMADEN) 研究総括コーディネーターは、洪水や渇水等の自然災害の実態と省庁や大学が協力した取り組みについて紹介しました。セッションを通して、水防災に対する科学技術の重要性と多面的な取り組みを連携して進めることが確認されました。

以上のような国際的に重要な機会においてIFIに関するセッションを主催することでグローバルな枠組みとの連携強化やネットワーク構築を行いました。今後も国際的な機関と協働して世界の水災害リスク軽減のための取り組みをさらに加速させる予定です。

アジアにおける活動

2017年1月に東京で開催された第9回 GEOSS アジア太平洋シンポジウムにおいてサイドイベントとして「IFI 実施計画ワークショップ」を開催し、インドネシア、マレーシア、ミャンマー、フィリピン、パキスタン、スリランカの関係機関から参加者を招へいしプラットフォームの重要性を共有することでプラットフォーム構築のための活動を始動させることができました。

さらに9月にハノイで開催された第10回 GEOSS アジア太平洋シンポジウムに小池センター長と宮本研究員が参加し、アジア水循環イニシアティブ (AWCI) セッションを主催

duction. Prof. Naoyuki Yoshino, the dean of the Asian Development Bank Institute, talked about the impact of flood disasters on agriculture, manufacturing, services and other sectors with examples and an analysis method. ICHARM Research and Training Advisor Shinji Egashira spoke about landslides and debris flows including actual cases of damage from such hazards, governing equations to explain their behaviors, and examples of numerical analysis. ICHARM Senior Researcher Miho Ohara delivered a presentation on the evacuation behavior observed at a community in time of a disaster and how to communicate information to the public to improve the current evacuation practice.

In the panel discussion, Dr. Renato Solidum\*<sup>1</sup> explained the importance of understanding, monitoring, warning, and response in terms of water-related disaster risk reduction and introduced how those four components can be improved. Dr. Asiri Karunawardena\*<sup>2</sup> outlined Sri Lanka's efforts in landslide risk reduction, and Dr. Manzoor Ahmad Malik\*<sup>3</sup> spoke about the basic characteristics of the flood early warning system installed to monitor the Indus River. Dr. Marengo Jose Antonio\*<sup>4</sup> introduced natural disasters in Brazil such as floods and droughts and joint efforts involving government agencies and universities to reduce their risks. The session agreed on the importance of science and technology in water-related disaster risk reduction and concluded that risk reduction efforts should be diverse and closely coordinated.

Throughout the year, IFI was active at strengthening collaboration with other international frameworks and expanding the global network of experts and organizations by hosting sessions at important international conferences. IFI will accelerate the efforts to reduce water-related disaster risk around the world in cooperation with other international organizations.

\*1 Renato Solidum, undersecretary for Disaster Risk Reduction and Climate Change, Department of Science and Technology (DOST)

\*2 Asiri Karunawardena, director general, National Building Research Organization (NBRO)

\*3 Manzoor Ahmad Malik, director, Pakistan Council of Research in Water Resources (PCRWR)

\*4 Marengo Jose Antonio, coordinator general, Centro Nacional de Monitoramento e Alerta a Desastres Naturais (CEMADEN)

Regional activities in Asia

The 9th GEOSS\* Asia-Pacific Symposium was held in Tokyo, Japan, in January 2017, and as the secretariat of IFI, ICHARM organized a side event, "Implementation Planning Workshop on International Flood Initiative (IFI) in Asia-Pacific." With participants invited from relevant national organizations of Indonesia, Malaysia, Myanmar, the Philippines, Pakistan, and Sri Lanka, this international workshop was successful in forming a consensus on the importance of a Platform on Water and Disaster and a great start for them to take concrete actions for implementing the idea.

In addition, the 10th GEOSS Asia-Pacific Symposium was held in Hanoi, Vietnam, in September 2017, and the director of ICHARM participated with Researcher Mamoru Miyamoto. They hosted an Asia Water Cycle Initiative (AWCI) session during the conference and arranged a separate meeting with the participants from main organizations of the Philippines and Myanmar to facilitate the establishment of a Platform on Water and Disaster.

Miyamoto also took advantage of other occasions, such as a UNESCO special session at AOGS2017 held in Singapore in August 2017 and APAN44 held in Dalian, China, and explained IFI activities to further promote IFI's platform campaign in Asian countries.

GEOSS: Global Earth Observation System of Systems

International Flood Initiative (IFI)

Activities in each country

After the IFI workshop in Tokyo in January 2017, the project for establishing a platform on water and disaster started in the Philippines, Sri Lanka, Myanmar and Pakistan.

In the Philippines, the IFI Coordinating Meeting was organized twice in March and June 2017 (photo 2), gathering organizations involved in disaster management. Another meeting was arranged with Philippine experts when they participated in the 10th GEOSS Asia-Pacific Symposium to accelerate preparation for the establishment of a Platform on Water and Disaster.

In Pakistan, a meeting was held in March 2017 to discuss the establishment of a Platform on Water and Disaster.

In Sri Lanka, ICHARM supported their emergency response efforts during the flood and sediment disaster in May 2017. We assisted the country in testing an early flood warning system as part of the emergency response efforts, and in August a coordinating meeting was arranged to coordinate relevant organizations towards the establishment of a Platform on Water and Disaster.

In Myanmar, high-level meetings with bureau chief class officials were held twice in Nay Pyi Taw in May and November 2017 to create a framework towards the establishment of a Platform on Water and Disaster. Another meeting was arranged with Myanmar experts when they participated in the 10th GEOSS Asia-Pacific Symposium to make further progress in the process.

The following reports the 2nd High Level Consultation Meeting held in November 2017.



Photo 2 Participants in the IFI Coordinating Meeting in the Philippines in March 2017 for the establishment of a Platform on Water and Disaster

(Written by Mamoru Miyamoto)

各国における活動

2017年1月に東京で開催されたIFI実施計画ワークショップを踏まえ、水と災害に関するプラットフォームの構築に向けた取り組みをフィリピン、スリランカ、ミャンマー、パキスタンで開始しました。

フィリピンにおいては2017年3月と6月にマニラにおいて関係機関が参加して水と災害に関するプラットフォームの全体会議を開催し(写真-2)、9月の第10回GEOSSアジア太平洋シンポジウム(ハノイ)においてフィリピンからの主要機関の参加者と個別会議を実施しプラットフォームの更なる推進に努めました。

パキスタンにおいては、2017年3月にイスラマバードにおいてプラットフォーム構築に向けた会議を開催しました。

スリランカにおいては2017年5月に発生した洪水・土砂災害に対する緊急対応として早期警報システムを試行するとともに、プラットフォーム構築のための全体会議を8月にコロンボで開催、これにより関係機関による推進体制を整えることができました。

ミャンマーにおいては、2017年5月と11月にプラットフォーム構築に向けた各機関の局長クラスのハイレベル会合をネピドーで開催することでプラットフォームの枠組み作りを行うとともに、フィリピン同様、9月の第10回GEOSSアジア太平洋シンポジウムにおいて主要機関からの参加者と個別会議を行うことでプラットフォームの活動を推進しています。

以下、11月に行ったハイレベル会議の概要を報告します。

第2回ミャンマーにおけるIFI連携に関するハイレベル諮問会議

ICHARMは現在、「ミャンマー水と災害プラットフォーム(PWDM)」の設立に関して、ミャンマー政府を支援しています。この一環として、2017年11月1日、同国ネピドーで、第2回ミャンマーにおけるIFI連携に関するハイレベル諮問会議を開催しました。ちなみに、第1回会議は2017年5月9日に同じくネピドーで開催されました。第2回会議には、

2nd High Level Consultation Meeting on IFI Coordination in Myanmar

ICHARM has been supporting Myanmar Government for establishing a Platform on Water and Disasters in Myanmar (PWDM). For this purpose, the 2nd High Level Consultation Meeting on IFI Coordination in Myanmar was held jointly by ICHARM and SATREPS (Science and Technology Research Partnership for Sustainable Development) on 1st November 2017 in Nay Pyi Taw, Myanmar. The 1st High Level Consultation Meeting was organized on 9th May 2017 in Nay Pyi Taw. In the 2nd high level consultation meeting, a total of 30 participants attended, including ICHARM Director Toshio Koike, Deputy Director Hisaya Sawano and Senior Researcher Badri Shrestha. The Director Generals and Directors level representative from four core

International Flood Initiative (IFI)

ICHARM からは小池センター長、澤野グループ長、Shrestha 主任研究員が参加し、ミャンマーからは、今回のプロジェクトで中心的役割を果たす 4 省庁である水資源・河川整備総局 (DWIR)、気象・水文局 (DMH)、灌漑・水利用管理局 (IWUMD)、救済・再復興省 (RRD) から、それぞれ長官職レベルの職員が参加しました。その他、諮問機関であるミャンマー国家水資源委員会の代表、ヤンゴン工科大学副学長および教授、日本から、SATREPS (地球規模課題対応国際科学技術協力) を進める東京大学、日本水フォーラム、JICA 事務所の参加があり、合計 30 人が出席しました。

第 2 回会議では、第 1 回会議で承認された合意事項を確認するとともに、PWDM 設立に向け準備すべきデータ、データ管理に関わるガイドラインについて議論しました。ガイドラインでは、データの種別を 3 つのカテゴリーに分類することが提案されました。

**Category 1:** 初期設定で Open Data として共有されるデータ

**Category 2:** PWDM 参加者のみで共有されるデータ

**Category 3:** データ提供者から許可を得た者のみが共有できるデータ

会議では、ガイドラインで提案されたデータ共有方針およびデータ区分が承認され、同様に提案されたデータリストについても基本的に同意が得られました。さらなるコメントと提案があれば、会議の後に提供することが求められました。今後、ICHARM を含め各組織で担当者を決め、担当者間で提案されたデータリストについて議論し、データごとに責任機関を決定していくこととなります。その他、対象地域 (バゴ川流域、シタン川流域) に関するデータ収集の対象期間について議論しました。また、データ使用者の参加者について、担当者間で議論することになっています。

次のステップとして、データアーカイブに向けて、各機関が提供するメタデータの項目が、上記 3 つのデータカテゴリーのどれに相当するのか特定することを要望されました。

PWDM では、社会や気候の変化を考慮した現在および将来のリスクの総合的な評価が可能になるよう、プロジェクトを進めていく予定です。

management departments of the PWDM such as the Directorate of Water Resources and Improvement of River Systems (DWIR), Department of Meteorology and Hydrology (DMH), Irrigation and Water Utilization Management Department (IWUMD), Relief and Resettlement Department (RRD), attended the meeting, among the representatives from advisory group of National Water Resources Committee of Myanmar, and the pro-rector and professor of Yangon Technological University. The representatives from the University of Tokyo, Japan Water Forum and JICA also attended the meeting.

In the 2nd high level consultation meeting, the participants reviewed on agreement made at the 1st meeting and discussed on proposed draft data sharing guidelines of the PWDM. In the guidelines, three categorization of PWDM data was proposed as follows:

Category 1: Data sets are shared as Open Data by default

Category 2: Data sets are fully shared only among the PWDM Participants

Category 3: Data sets are shared with those who get a permission from the data provider

The participants basically agreed on proposed draft data sharing guidelines and data categorizations. Further comments and suggestions, if any, were requested to provide after the meeting for incorporation in the draft data sharing guidelines. The participants also agreed on proposed draft data list, and after assigning focal points by Director General of each department and assigning focal point of ICHARM, focal points will discuss on the proposed draft data list and will identify the responsible organizations for each data. The participants also discussed on the period of data archiving for the target areas, i.e., Bago and Sittoung River basins, and the focal points will discuss to identify the participants of data users.



Photo 1 Opening remarks by Director Generals, (a) Left photo (left side): U Htun Lwin Oo, Secretariat of NWRC and Director General of DWIR, (b) Middle photo (left side): U Kyaw Myint Hlaing, Director General of IWUMD, (c) Right photo (middle side): Dr. Ko Ko Naing, Director General of RRD



Photo 2 (a) Left photo (right side): Opening remarks and presentation on recent international activities by Prof. Toshio Koike, Director of ICHARM, (b) Right photo (right side): Presentation of DMH's recent activities on IFI by Daw Tin Yi, Director of DMH



Photo 3 Group photo of the 2nd high level consultation meeting

As next steps, each department was requested to assign focal person and also requested to identify data category and items of Meta data of data provider for data archiving.

The PWDM will move ahead for integrated risk assessment which includes current risk assessment and future risk assessment with changes in society and climate.

(Written by Badri Bhakta Shrestha)

# ■ Research

## Introduction of ICHARM research projects

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

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

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

This issue introduces four studies as listed below:

**Mohamed Rasmy Abdul Wahid**, Senior researcher

The 24th Session of the Asia-Pacific Regional Space Agency Forum (APRSAF-24)

**Naoko Nagumo**, Research specialist

Sediment transport in the lower Stung Sen River owing to backwater effect of the Lake Tonle Sap

**Liu Tong**, Research specialist

Forecasting in the Upper Indus Basin considering snow and glacier meltwater

**Gul Ahmad Ali**, Doctoral student

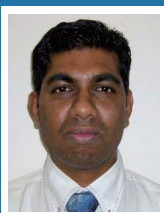
Field observations in Jamuna River, Bangladesh

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

そのうち、研究としては

- (1) 水災害データの収集、保存、共有、統計化
  - (2) 水災害リスクのアセスメント
  - (3) 水災害リスクの変化のモニタリングと予測
  - (4) 水災害リスク軽減の政策事例の提示、評価と適用支援
  - (5) 防災・減災の実践力の向上支援
- の5つの柱のもと、革新的な研究活動を行っています。

本号では、モハメッドラスミー アブドゥルワヒド主任研究員の参加した「第24回アジア・太平洋地域宇宙機関会議 (APRSADF-24)」、南雲直子専門研究員の行っている「トンレサップ湖による塞き上げ効果を考慮したセン川下流域の土砂輸送」、リュウトン専門研究員の行っている「Forecasting in the Upper Indus Basin considering snow and glacier meltwater」、博士課程学生のグルアハマドアリ氏の行っている「Field observations in Jamuna River, Bangladesh」の4つの研究を紹介します。



## The 24<sup>th</sup> Session of the Asia-Pacific Regional Space Agency Forum (APRSAF-24)

### 第24回アジア・太平洋地域宇宙機関会議 (APRSADF-24)

**Mohamed Rasmy Abdul Wahid**, Senior Researcher

モハメッド ラスミー アブドゥル ワヒド 主任研究員

The Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT), the Japan Aerospace Exploration Agency (JAXA), the Department of Space (DOS) India, and the Indian Space Research Organisation (ISRO) presented the 24th session of the Asia-Pacific Regional Space Agency Forum (APRSAF-24) from November 14 to 17, 2017, in Bengaluru, India, under the theme "Space Technology for Enhanced Governance and Development". The forum was attended by 539 participants from 31 countries and regions and ten international organizations, including six heads of space agencies and three deputy heads in Asian-Pacific countries as well as high-level officials from governmental institutions in charge of space policy. The attendees shared common issues and interests in the Asian-Pacific region and

第24回アジア・太平洋地域宇宙機関会議 (APRSADF-24) が、インド宇宙庁、インド宇宙研究機関、文部科学省、宇宙航空研究開発機構 (JAXA) の共催で、2017年11月14日から17日まで、インド・ベンガルールにおいて、「よりよいガバナンスと社会経済発展のための宇宙技術」というテーマのもと開催されました。会議には、各国宇宙機関の長官や政府高官を含む、31の国や地域、10の国際機関から539人が参加しました。会議を通し

Research

て、アジア・太平洋地域で共通する課題や関心が共有されると同時に、APRSADF が、社会問題解決に向けて協働するための枠組み作りにおいて、さらに積極的な役割を果たしてくれるよう期待する声が聞かれました。

ICHARM からは Rasmy 主任研究員が、JAXA の支援を受けて実施されている SAFE スリランカプロジェクト（正式名称は英文参照）の技術アドバイザーとして、参加しました。灌漑局を代表して、主任エンジニア Sugeeshwara 氏が各プロジェクトの現状を説明し、Rasmy 主任研究員と JAXA 評価委員は、今後の活動および近くスリランカで開催される関係者会議について紹介しました。また、Rasmy 主任研究員は会議開催期間中に宇宙利用分科会が主催した統合的土地・水資源管理に関する分科会で、スリランカでの効果的な洪水災害管理を目指した SAFE と IFI（国際洪水イニシアティブ）の活動（正式名称は英文参照）について口頭発表を行いました。

第 25 回会議は、シンガポール宇宙技術協会が文部科学省、JAXA と共催で、2018 年 11 月、シンガポールで開催される予定です。

expressed their expectations of the great contributions of APRSAF toward building a cooperative framework to help solve social issues.

Senior Researcher Mohamed Rasmy joined the events as a technical supporter of the Space Applications for Environment (SAFE) Sri Lanka project on “Developing and Implementing an Operational Prototype for Advanced Flood Forecasting, Early Warning, and Data Sharing System in the Kalu Ganga Basin, Sri Lanka” with the support from JAXA. A representative of Sri Lanka’s Irrigation Department, Chief Engineer Sugeeshwara, presented the status of the projects. Rasmy and JAXA review board members discussed future activities and an upcoming stakeholders meeting in Sri Lanka. He also delivered an oral presentation on “SAFE and IFI activities: Towards effective Flood Disaster Managements in Sri Lanka” in the session on Integrated Land and Water Resource Management, which was organized by the Space Applications Working Group during the event.

The next meeting, APRSAF-25, is planned to be held in Singapore in November 2018, and will be co-organized by the Singapore Space Technology Association (SSTA), MEXT and JAXA.



Participants of the Satellite Application For Environments (SAFE) Workshop at APRSAF-24



## Sediment transport in the lower Stung Sen River owing to the backwater effect of the Lake Tonle Sap

### トンレサップ湖による塞き上げ効果を考慮したセン川下流域の土砂輸送

**Naoko Nagumo**, Research specialist  
南雲 直子 専門研究員

カンボジアにあるトンレサップ湖には 11 の支川が流入するとともに、南東部から流出するトンレサップ川を介してメコン川と接続する (Fig.1)。雨季にメコン川が氾濫するとトンレサップ川は逆流し、湖にはメコン川の洪水が流入する。このような特徴的な洪水の流入によって、雨季のトンレサップ湖の面積は乾季の 3~5 倍程度まで拡大することが知られている。このような環境において、トンレサップ湖岸の地形は流入支川からの土砂供給と、湖水位の周期変動、及び湖岸域の流れの相互作用で形成される。この地形形成において、支川からの土砂供給と

Lake Tonle Sap, located in Cambodia, has eleven tributary systems and is connected to the Mekong River through the Tonle Sap River (Fig. 1). During the rainy season, flood water from the Mekong River flows into Lake Tonle Sap by the reverse flow of the Tonle Sap River. This unique flood regulating system induces the expansion of lake surface area, which becomes three to five times larger than that during the

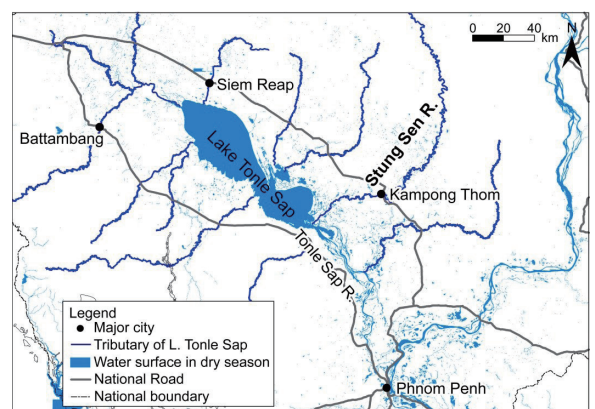


Fig. 1 Map of Tonle Sap basin



dry season. Therefore, topography in the lake coast has been constructed by the interaction of sediment supply by inflowing tributaries, cyclic water level changes, and flood flow near the lake coast. Evidently, sediment supply, transport and accumulation by inflowing tributaries play an important role in constructing the coastal topography of the lake; however, lake level changes, particularly as a result of the backwater effect of the lake, are also an essential component in the topographical development of the lake coast. This study revealed the effects of lake level changes on sediment transport by the Stung Sen River, which has the largest drainage basin (16,000 km<sup>2</sup>) in the Tonle Sap systems, focusing on modern channel bars in its lower reach.

Fig. 2 shows channel bars that appear in the same place every year at the study site near Kampong Thom city, which is located at 83 km from the lake. There is accommodation space for sediment accumulation at a meandering channel bend, and a concave bank bench develops with recent alternate layers of silt and sand, as shown in Fig. 3. Fig. 4 illustrates calculated sediment transport capacity in the study area on the basis of the water surface profile. The sediment transport capacity declines as the flow discharge decreases and the water surface level of the lake increases. For example, the bed shear stress drops to a 60% level at the lowest flow discharge of 200 m<sup>3</sup>/s. As sediment transport capacity depends on the n-th power of bed shear stress (n > 1), the sediment transport capacity can decrease by more than 60% in this case. Our investigation revealed that the accumulation of the alternate sediment layers and the development of the channel bar at the study site were accelerated by the decreased sediment transport capacity due to the severe backwater effect particularly in the late rainy season, as well as due to the horizontal sediment transport caused by meandering channel bends.

輸送・堆積が重要な役割を演ずるが、これには湖水位の変動、とくに塞き上げ効果が影響していると考えられる。そこで本研究では、トンレサップ水系で最大の流域面積を持つセン川（約 16,000 km<sup>2</sup>）下流域の河床に出現するチャンネルバーに着目し、湖水位の変動がセン川の土砂輸送に与える影響を明らかにした。

Fig.2 が示すように、湖との合流点から 83 km 地点にあるコンポトム市近傍の調査地点では、毎年同じ場所にチャンネルバーが出現する。このうち、流路の屈曲部にあたるポケット状の空間にはベンチ状のチャンネルバーが発達しており、Fig. 3 に示すように、ごく最近堆積した砂とシルトの互層からなることが明らかになった。Fig. 4 は調査地点における土砂輸送能力を示す水面形計算の結果である。これによれば、セン川の流量が低下し、トンレサップ湖の水位が増加した際に土砂輸送能力が低下する傾向が認められる。たとえば、流量 200 m<sup>3</sup>/s 時に湖水位が 8 m に達した場合には、セン川の河床せん断力は等流のときの 6 割程度にまで減少し、土砂輸送能力は河床せん断力の n 乗 (n>1) に依存するので、6 割以上減少することが分かる。調査地点付近では、屈曲した流路における横断方向の土砂移動に加え、湖の塞き上げ効果が特に顕著になる雨季の後半にこのような輸送能力の減少が生じるために、特徴的な互層を形成しながらチャンネルバーが発達していることが明らかになった。



Fig.2 Study site (83 km from the Lake Tonle Sap)

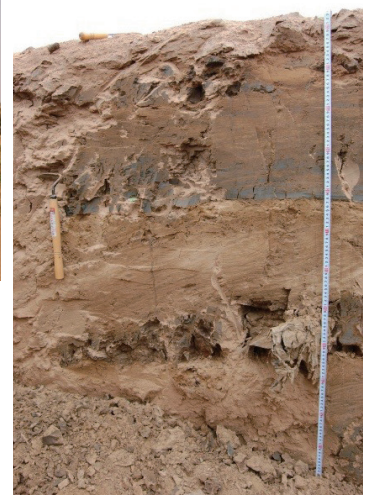


Fig.3 Alternate layers of silt and sand

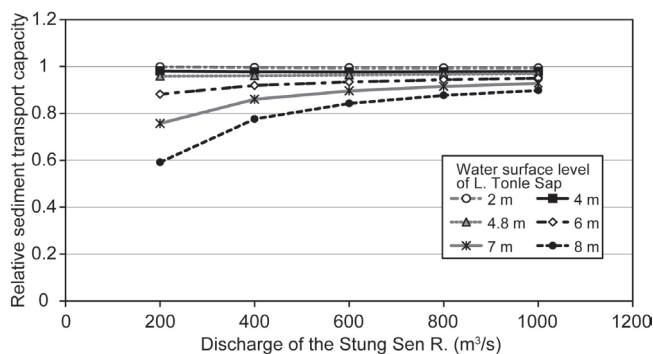


Fig. 4 Relative sediment transport capacity at the study site

**References:**

Nagumo, N., Kubo, S., Sugai, T., Egashira S. (2017): Sediment accumulation owing to backwater effect in the lower reach of the Stung Sen River, Cambodia. *Geomorphology*, 296, 182-192.



## Forecasting in the Upper Indus Basin considering snow and glacier meltwater

**LIU Tong**, Research specialist  
 リュウ トン 専門研究員

Flooding in the monsoon season is a challenging problem in the Indus River, Pakistan. The operational flood early warning system, known as Indus-Integrated Flood Analysis System (Indus-IFAS), was established by ICHARM through a UNESCO project in conjunction with Japan International Cooperation Agency (JICA). IFAS provides the Flood Forecasting Division (FFD) of the Pakistan Meteorological Department (PMD) with scientifically based flood forecast information along the main stream of the Indus River and the Kabul River, which originates in Afghanistan and is known as one of its main tributaries<sup>[1]–[5]</sup>. This system can forecast the peak discharge with hours of lead time with both ground-observed and satellite-based rainfall as input. The objective of this study is to improve the simulated discharge by the current flood forecasting system in the Upper Indus Basin by developing and applying degree-day method for simulating glacier and snow meltwater reliably with limited observed meteorological data (Fig. 1)<sup>[6]</sup>.

The simulated discharge with glacier melt and snowmelt could capture the variations of the observed discharge in terms of peak volume and timing, particularly in the early monsoon season. It can be concluded that the snow and glacier meltwater methods are effective when precipitation is properly observed. According to the analysis, glacier melt and snowmelt contribution at Skardu was estimated to be 43.2–65.2% of the average daily discharge during the monsoon season in 2005–2012. Glacier and snow meltwater occurring between Skardu and P. Bridge was estimated to be 22.0–29.3% of the average daily discharge observed at P. Bridge. The glacier melt and snowmelt originating from sub-catchments between P. Bridge and Tarbela were calculated to be 6.3–19.9% of the average daily discharge observed at Tarbela.

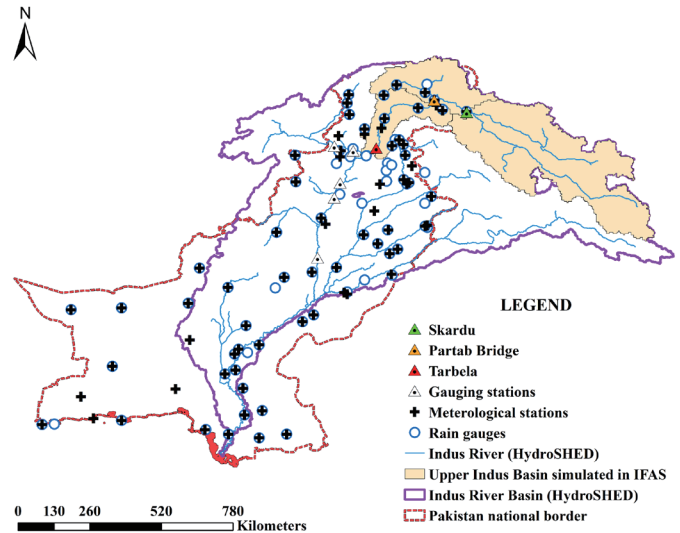


Fig. 1 Map of the Indus River Basin.

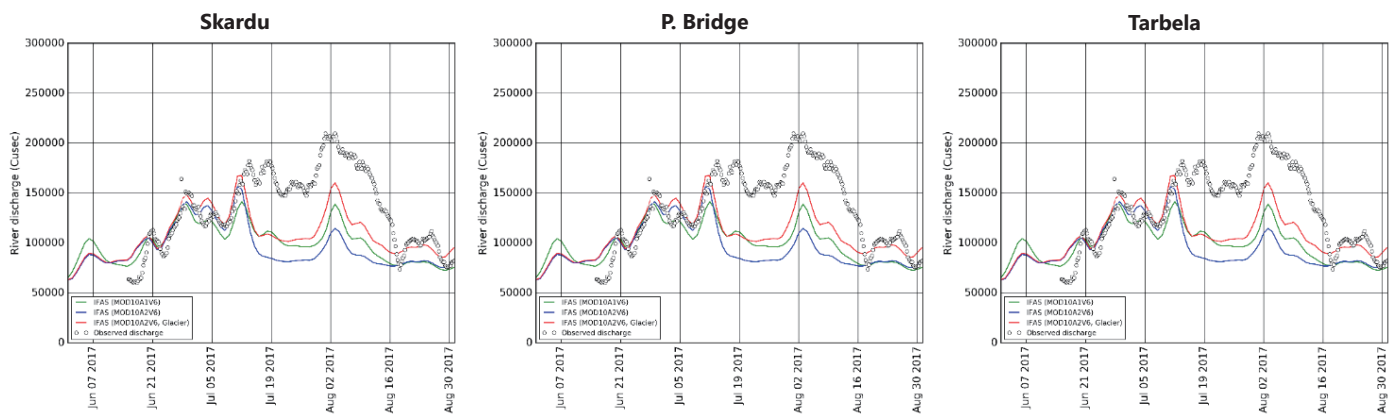


Fig. 2 Simulation with glacier and snow melt in 2017

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## Field observations in Jamuna River, Bangladesh

**Gul Ahmad Ali**, Doctoral program student (D2) and Research assistant  
 গুল আহমাদ আলি 博士課程 (2 回生)・リサーチアシスタント

A three-member team from ICHARM composed of Senior Researcher Atsuhiko Yorozuya, Researcher Hiroshi Koseki (PWRI, Hydrologic Engineering Research Team), Research Assistant Ahmad Ali Gul visited Bangladesh from August 19-26, 2017 to conduct field investigations and measurements in collaboration with Bangladesh Water Development Board (BWDB) in the Jamuna River at Bahadurabad. Mr. Tanjir Saif Ahmed, Sub-Divisional Engineer at the BWDB and an ICHARM alumni, also accompanied the team during the measurement exercise.

The processes of sediment transport and riverbed evolution vary in rivers where sediment transport is dominated by bedload or by suspended load. While a lot of research has been conducted in understanding sediment transport processes in bedload-dominated rivers through observation and numerical simulation, similar research is uncommon for suspended-sediment-dominated rivers. The measurements in Jamuna River, which is a large, braided, suspended-sediment-dominated river are therefore an important part of ICHARM research activities. The Jamuna river flows into Northern Bangladesh from India (as Brahmaputra) having a catchment area of 583,000 sq. km and a length of 2,850 km before entering Bangladesh. High flows occur between April and October during monsoon season with a mean peak discharge around 69,000 m<sup>3</sup>/s and maximum recorded peak at 102,535 m<sup>3</sup>/s (Sept, 1998). Field measurements were conducted at Bahadurabad section which is located 30 km downstream of the Teesta-Brahmaputra confluence (Figure 1). The measurement exercise focused on

the suspended sediment generation and distribution, and bedform changes during high flows. The measurement setup consisted of a TRDI RiverRay aDcp mounted on a tethered boat, along with turbidity meter, water sampler, and dredge sampler for point measurement of turbidity, suspended sediment and bed material composition respectively.

Dense measurements were also conducted in various parts of the Bahadurabad section, including locations where extensive boil ejection was observed at the river surface. Boil occurs due to turbulence on the lee side of dune formations which can result in ejection on the surface of the river (as shown in figure 2). Measurements of flow velocity distribution, bed form, bed and suspended sediment composition were made using the measurement setup described earlier, to help create a better understanding of the boil phenomenon and its role in generation of suspended sediment.

The total discharge measured at Bahadurabad during the 5-day field measurement exercise was around 61,300 m<sup>3</sup>/s with a decreasing trend as the flood wave receded (Figure 2). Suspended Sediment Concentration (SSC) was calculated using aDcp acoustic backscatter, using equation by Kitsuda et al, 2006 calibrated by Turbidity measurements. Using velocity measurements at each depth interval and multiplying with calculated SSC, suspended sediment discharge at Bahadurabad was calculated as 24.87 m<sup>3</sup>/s (Figure 3). Bedload discharge at Bahadurabad, calculated using Egashira et al, (1997) and using bedload velocity measured by the aDcp was calculated as 1.13 m<sup>3</sup>/s. The ratio of suspended sediment discharge and the bedload discharge was 22.01 which is in agreement with the findings of Okada et al, 2016 also from Jamuna River. The data collected and associated analysis is part of ongoing research exploring suspended sediment characteristics and generation mechanisms in suspended



Figure 1. Map showing the location of measurements at Bahadurabad, Jamuna River.

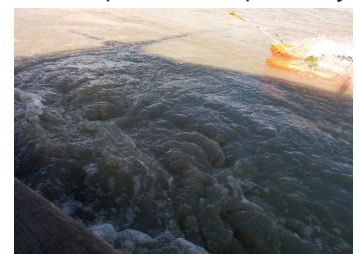


Figure 2. Boil ejection observed at the surface during measurements

Research

sediment dominated rivers such as Jamuna.

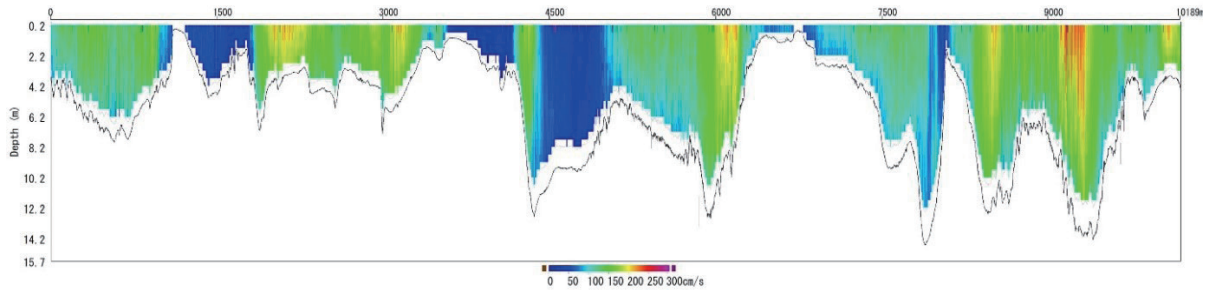


Figure 3. Velocity Contour Profile along a cross-sectional path at the Bahadurabad Section measured using aDcp

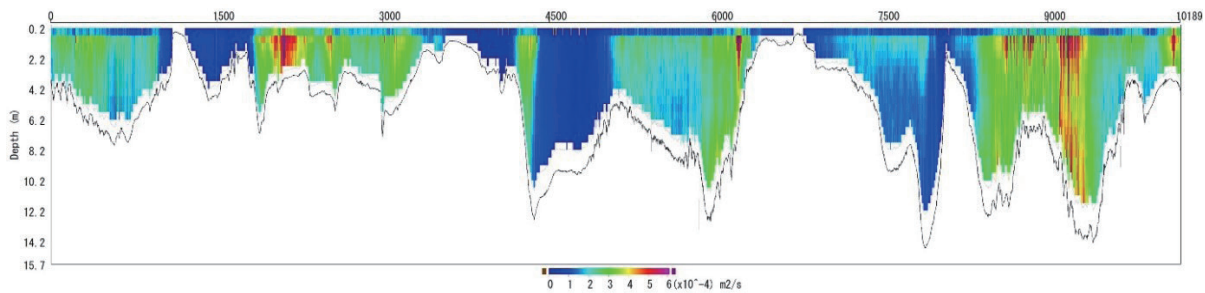


Figure 4. Suspended Sediment Discharge calibrated using Turbidity measurements along a cross-sectional path at the Bahadurabad Section.

## Workshop on flood disaster response for businesses in Yokohama

ICHARM は、総合科学技術・イノベーション会議が推進する戦略的イノベーション創造プログラム (Cross-ministerial Strategic Innovation Promotion Program: SIP) の「レジリエントな防災・減災機能の強化」分野において、「地域連携による地域災害対応アプリケーション技術の研究開発」の研究課題の一つである「首都圏複合災害への対応・減災支援技術 (研究代表機関：工学院大学、期間：2014-2018 年度)」に共同研究機関として参加しています。本課題では、事前に策定した行動ルールに基づき、地震・水害関連情報を地域の事業所等の関係者に速やかに配信し、円滑な災害対応を支援するためのアプリケーションの開発を行っています。

研究対象地区の一つである横浜駅西口地区は、県管理河川である帷子川沿いに立地しており、浸水の危険性が想定されています。2017 年 9 月 26 日午後には、横浜駅西口共同防火防災管理協議会を構成する横浜駅西口地下街及び同地下街と接続する主要な事業所とともに、帷子川浸水時の災害状況をイメージし、浸水時の対応と課題を検討するためのワークショップを開催しました。当日は、台風上陸から避難準備・高齢者等避難開始・避難勧告・避難指示・出水・復旧という一連のタイムラインに沿って、各社で行うべき情報収集・浸水防止・避難誘導・営業継続判断などの対応について議論するとともに (図 1)、災害対応支援アプリケーションによる支援のニーズ

ICHARM is involved in the Cross-ministerial Strategic Innovation Promotion Program (SIP), Japan's national project led by the Council for Science, Technology and Innovation, and is assigned to study disaster response and risk reduction support technology for multiple-hazard disasters in the Tokyo metropolitan area. This particular research project is led by Kogakuin University for the period 2014-2018 as one of the research tasks aiming at the development of applications for regional disaster response as regional collaboration, which is categorized in the Enhancement of Societal Resiliency against Natural Disasters. ICHARM participates in this research project as a joint research organization. The goal of the project is to develop an application to support smooth disaster response by quickly delivering earthquake and flood information to local businesses and other stakeholders according to an action plan prepared for emergency.

On September 26, 2017, the research project team including ICHARM held a workshop for businesses around the West Exit of Yokohama Station. The West Exit area is one of the study areas and is considered to be at high inundation risk because it is located on the prefecturally-managed Katabira River. The workshop was attended by major businesses in the underground shopping mall and in its surrounding area, which jointly organize a community council for fire and disaster management. The



Figure 1 Discussion among the participants

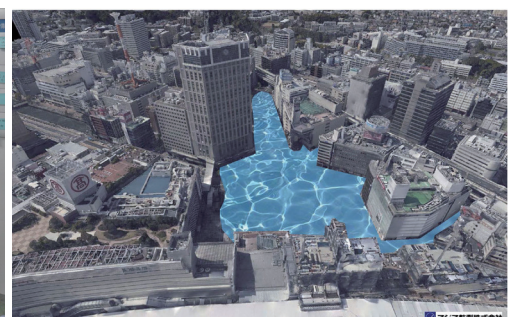


Figure 2 A 3D image of inundation around Yokohama Station

purpose of the workshop was to have a concrete image of how it would be if inundation actually occurs and discuss how businesses should respond to the situation and what problems may arise during the response efforts.

In the workshop, the timeline of events was presented, starting from the landfall of a typhoon, followed by evacuation preparation, evacuation of elderly and other vulnerable citizens, evacuation advisory, evacuation order, flooding, and restoration in this sequence. The participants discussed what each business needs to do in order to collect information, prevent inundation, lead evacuation, and make decisions on whether to continue or stop business activities (Figure 1), as well as whether businesses need support for disaster response using disaster management applications. ICHARM, in charge of preparing an inundation scenario, also provided images of possible inundation around Yokohama Station (Figure 2), created using a 3D spatial model in collaboration with Asia Air Survey Co., Ltd. The simulation helped the participants to have a common image of disaster damage that the area may actually suffer.

ICHARM wishes to prepare more dynamic visualization of the inundation process for the next workshop so that participants have more realistic flood images to discuss necessary countermeasures.

(Written by Miho Ohara)

についての意見交換も行いました。ワークショップでの浸水シナリオの想定は ICHARM が担当しており、アジア航測株式会社の協力により駅周辺の 3 次元空間モデルを用いた浸水状況の表現 (図 2) を行い、リアルな災害イメージの共有を目指しました。今後は、動的な氾濫表現も活用したワークショップ手法も検討していきたいと考えています。

## ■ Training & Education

### Educational Program Updates



Scenes from the lectures

The 2017-2018 M.Sc. course commenced with the opening ceremony held on October 3. The lectures started the week after the opening ceremony, including Hydrology by Prof. Koike, Basic Concepts of Integrated Flood Risk Management by Prof. Takeuchi, Hydraulics by Prof. Egashira, and Flood Hydraulics and River Channel Design by Prof. Fukuoka. At about the same time started Practice on GIS and

今年度の修士コースは 2017 年 10 月 3 日の開講式によって開始されました。

第 2 週目からは本格的に講義が開始され、小池センター長による Hydrology、竹内前センター長による Basic Concepts of Integrated Flood Risk Management、江頭研究・研修指導監による Hydraulics 及び中央大学研究開発機構福岡教授による Flood Hydraulics and River Channel Design 等の講義が始まりました。ほぼ同時に、実習科目 Practice on GIS and Remote Sensing Technique についても開始され、11 月からはさらに江頭研究・研修指導監による Mechanics of Sediment Transportation and Channel Changes 及び実習科目 Practice on Flood Forecasting and Inundation Analysis についても開始されました。1 年間の修士コースである特性上、コース前半については 1 日 4 講義実施されることも少なくなく、学生にとって非常に多忙なスケジュールとなっていますが、学生達は意欲的に講義をこなしています。

10 月 12 日には、東京において、同じ政策研究大学院大学防災政策プログラムの (国研) 建築研究所国際地震工学センターの学生と合同講義を実施、あわせて東京消防庁本所防

Training & Education

災館を訪問して同じプログラムの学生同士の交流を深めました。

10月25日から27日にかけては、第1回目の研修旅行として鬼怒川流域等を訪問しました。2015年9月の関東・東北豪雨災害によって被災した鬼怒川の復旧工事現場、鬼怒川上流の川治ダム、五十里ダムなどを見学しました。11月10日には、国土地理院を訪問し、災害時における活動などの講義を受けました。

11月27日から12月8日にかけては、研修員は東京に滞在し、政策研究大学院大学において実施された集中講義を受講しました。

12月13日から15日にかけては、第2回目の研修旅行として、都市型の洪水対策を学ぶ為に鶴見川流域の鶴見川多目的遊水地及び川和遊水地並びに江戸川に接続する首都圏外郭放水路を見学しました。併せて国土交通省関東地方整備局において同局における河川管理及び2015年の関東・東北豪雨災害の際の対応などの講義を受けました。

なお、今期コースの開始とともに、ICHARMでは修士コースの活動を出るだけ多くの方に伝えるべく、Facebookにおいて研修のページを開きました。こちらも併せてご覧下さいますようお願いいたします (<https://www.facebook.com/icharmtrainingcourse>)。

Remote Sensing Technique. In November, Mechanics of Sediment Transportation and Channel Changes by Prof. Egashira and Practice on Forecasting and Inundation Analysis also started. Since this master's degree program is a one-year course, the schedule can be extremely tough particularly in the first half of the year; the students sometimes have to attend four lectures a day. However, they are so motivated that they have scarcely had any problems managing the course work.

On October 12, the students participated in a lecture at Tokyo and visited the Honjo Life Safety Learning Center of the Tokyo Fire Department with the students of the International Institute of Seismology and Earthquake Engineering (IISEE). It was planned to promote the exchange between the students of IISEE and ICHARM, as their master's courses are both part of the Disaster Management Policy Program (DMP), which the two institutes collaborated to establish with JICA and the National Graduate Institute for Policy Studies (GRIPS).

On October 25-27, the students went on the first study tour to the Kinu River basin in the northern Kanto region to see progress in recovery from the damage caused by the Kanto Tohoku heavy rain in September 2015. They visited restoration sites along the Kinu River and the Kawaji and Ikari dams located in the upper Kinu River.

On November 10, the students visited the Geospatial Information Authority of Japan (GSI) and learned the roles of GSI in disasters.

From November 27 through December 8, the students attended the two-week intensive lectures at GRIPS.

The second study tour took place on December 13-15. The students visited the multi-purpose retarding ponds and Kawawa retarding basin in the Tsurumi River basin in Kanagawa Prefecture and the Metropolitan Area Outer Underground Discharge Channel in Saitama Prefecture to learn about flood control measures specifically designed to protect urban areas. They also visited the Kanto Regional Development Bureau of the Ministry of Land, Infrastructure, Transportation and Tourism (MLIT) and listened to lectures about river management in general and the disaster response efforts during the 2015 Kanto Tohoku heavy rain.

The major activities of this M.Sc. program for the last three months, which have been reported here, are also posted on the 'ICHARM training course' Facebook page just launched this year. Please visit our Facebook page at: <https://www.facebook.com/icharmtrainingcourse>.



Site visit to the Kawaji dam and the Ashio sabo dam

(Written by Takashi Shirai)

## Hydrological Modeling Workshop for Pakistan Officials

A hydrological modeling workshop was held at ICHARM on October 2-4, 2017, on a request from the Asian Institute of Technology, and attended by eight government officials from Pakistan. The workshop began with a lecture on hydrological modeling by Senior Researcher Mohamed Rasmy on the first day, Senior Researcher Badri Shrestha gave hands-on training on the Rainfall-Runoff-Inundation model on the following day, and Senior Researcher Yoshio Kikumori and Research Specialist Liu Tong gave hands-on training on the Integrated Flood Analysis System (IFAS) on the final day. In the IFAS hands-on training, after outlining IFAS, Kikumori explained the PWRI Distributed Runoff Model, which is the computing engine of IFAS. Then the participants installed IFAS software in their laptop PCs, and spend the day practicing runoff simulation utilizing sample data to learn the basic usage of IFAS. The participants diligently attended the workshop, asking the lectures questions about the function of flood control using dam operation and other related issues.

**Date:** October 2-4, 2017

**Venue:** Training Room on the 1st floor of ICHARM Building, Public Works Research Institute

**Lecturers:** Dr. Abdul Wahid Mohamed Rasmy, Senior researcher

Dr. Shrestha Badri Bhakta, Senior researcher

Dr. Yoshito Kikumori, Senior researcher

Dr. Liu Tong, Research specialist

**Participants:** 8 governmental officials from Pakistan

### Content of the Workshop

Lecture on hydrological modeling (Dr. Rasmy)

RRI model hands-on training (Dr. Shrestha)

IFAS hands-on training (Dr. Kikumori and Dr. Liu)



Senior Researcher Kikumori gives IFAS hands-on training to Pakistan officials in the workshop

(Written by Yoshito Kikumori)

2017年10月2日から4日、アジア工科大学の依頼により ICHARM においてパキスタンの行政官 8 名に対して水文モデリングのワークショップが開催されました。ワークショップでは初日に、ラスミー主任研究員による水文モデリングに関する講義を行った後、翌日、シュレスタ主任研究員により RRI モデル（降雨流出氾濫モデル）の操作演習と翌々日に菊森主任研究員とリュウ専門研究員により IFAS（総合洪水解析システム）の操作演習が実施されました。IFAS 操作演習では、IFAS の機能紹介と IFAS の計算エンジンである土研分布型流出モデルの解説を行った後、受講者各自が持参したコンピュータを用いて、IFAS のインストールからサンプルデータを用いた流出解析まで、一通りの IFAS の利用方法の講習を 1 日かけて行いました。受講者は、ダムによる洪水調節のシミュレーション機能について、詳しく質問をするなど、終始積極的に講義に臨みました。

■ 日時：2017年10月2日～4日

■ 場所：土木研究所 ICHARM 棟 1 階研修室

■ 講師：ラスミー主任研究員、シュレスタ主任研究員、菊森主任研究員、リュウ専門研究員

■ 参加者：パキスタン国行政官 8 名

■ 講習の内容：

水文モデリングに関する講義（ラスミー主任研究員）

RRI 操作演習（シュレスタ主任研究員）

IFAS 操作演習（菊森主任研究員、リュウ専門研究員）

## Follow-up Seminar in Myanmar

ICHARM has been holding Follow-up Seminar overseas annually since 2008 as part of its capacity development effort. The purposes of the seminar include giving advice to former participants and students of ICHARM's educational and training

フォローアップセミナーは、ICHARM で行なう能力育成に関連し、2008 年以降、年 1 回、海外の

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1ヶ国を選び、帰国研修員を中心とした参加者を得てセミナー、現地見学を行なう活動です。この主なねらいは、帰国研修生の活動のフォローアップ、ICHARMの今後の研修テーマの検討や研修内容の質向上、関係機関とのネットワーク強化、今後の研修に優秀な研修生を派遣してもらうための広報があります。

本年度は2017年12月13日及び14日の2日間ミャンマーのヤンゴン市においてセミナー及びエーヤワディ川の現地見学を実施しました。ICHARMから小池センター長、澤野グループ長、江頭研究・研修指導官、池田上席研究員、徳永上席研究員、佐野アシスタント、ミャンマーからは水資源・河川系開発局(DWIR) Htun Lwin Oo 局長はじめ、灌漑・水利用局 (IWUMD)、救済復興局(RRD)、ヤンゴン工科大学、JICA 事務所職員など総計28名が参加しました。

第1日目は、ICHARMからIFI(国際洪水イニシアティブ)、ADBプロジェクトなど最近の活動報告、技術講義、7名の修士課程卒業生及び7名のIFAS研修など短期研修を受けた帰国研修生の活動及び今後のICHARMへの期待についての報告と意見交換を行いました。

第2日目は、帰国研修員を含む14名とともにヤンゴン近郊のニヤンドン区を訪問し、エーヤワディ川支川のライン川沿いにある灌漑・洪水用施設及び出水時の地域の状況の説明及び意見交換を行ないました。また、ニヤンドン区における越水があった堤防及びエーヤワディ川を横断する橋梁の橋脚近くの河岸侵食の状況などを見学し、対策事務所職員の説明を受けました。

2日間のフォローアップ研修を通じて日本とミャンマーの水災害関係科学技術者が集まり、両国の状況や違い、ミャンマーの課題など多くの知見を有することができました。特に、水防団の活動や牛水制などの対策工の説明では、日本の伝統的な水防工法と同じとの印象を持ちました。

programs on their current activities, collecting feedback from them to improve our capacity development programs, strengthening ties with overseas organizations, and providing information on the capacity development programs to attract more talented program candidates. The seminar is usually attended by former participants and students of ICHARM education and training programs, offering lectures on new development and technology in the field of disaster management and a study tour to local sites having water-related problems.

This year's Follow-up Seminar was held on December 13-14, 2017, in Yangon, Myanmar. The seminar was attended by 28 participants from the two countries. From Myanmar, Mr. Htun Lwin Oo, the director general of the Directorate of Water Resources and Improvement of River Systems, participated along with other officials from the Irrigation and Water Utilization Management Department, Relief and Resettlement Department, the Yangon Technological University, and a JICA local office. Participants from ICHARM were Director Toshio Koike, Deputy Director Hisaya Sawano, Research and Training Advisor Shinji Egashira, Chief Researcher Tetsuya Ikeda, Chief Researcher Yoshio Tokunaga, and Assistant Maiko Sano.

On the first day, a series of presentations were delivered from both sides. ICHARM researchers spoke about recent activities of the International Flood Initiative and the Asian Development Bank project and gave a technical lecture. From the Myanmar side, seven former master's students and seven former training participants of ICHARM educational and training programs made presentations on their activities and advice for ICHARM to improve the programs.



Follow-up seminar in Yangon, Myanmar



Participants in follow-up seminar

On the second day, the researchers of ICHARM visited Nyandong near Yangon with 14 seminar participants. At the first place of Nyandong, they listened to explanation about irrigation and flood-control structures installed along the Line River, a tributary of the Ayeyarwady River, and how the area will be in case of a flood. The party also visited a few other places in Nyandong and listened to local river managers explaining the current situation and their activities. One was where floodwaters overtopped the levee, and the other was where the river bank erosion is in progress near the piers of a bridge across the Ayeyarwady River.



Site visiting at Nyandong

The two-day seminar was very informative, gathering scientists and engineers in water-related disaster management from Japan and Myanmar. Both parties learned a lot from each other including the current practice in disaster management and issues faced by Myanmar. The Japanese researchers were particularly interested in the flood fighting corps system and skeleton work employed in Myanmar as flood control measures, for those measures are just like traditional measures that have been widely used in Japan.

(Written by Yoshio Tokunaga)



# Information Networking

## Regional cooperative expert conference in Thailand

On October 9-11, 2017, a regional cooperative expert conference was held at the ESCAP\*<sup>1</sup> headquarters in Bangkok, Thailand, to discuss issues on early warning for floods, flash floods and landslides in international rivers in Asia. The conference was organized by 16 Asian countries, ESCAP, WMO\*<sup>2</sup>, seven international organizations in water-related disaster management, and GIZ\*<sup>3</sup> of Germany. Chief Researcher Yoshio Tokunaga participated as a representative of Japan. It was convened as a side event during the week of the 5th session of the ESCAP Committee on Disaster Risk Reduction. Representatives of nations and organizations attended the meeting to exchange views and ideas, which were compiled and published as a report, "Disaster Resilience for Sustainable Development," on the final day.

In the meeting, we also had an opportunity to speak about major projects in which ICHARM is currently involved, such as the UNESCO Pakistan project and the International Flood Initiative. We also explained educational and training programs managed by ICHARM, telling that many people from Asian countries have studied and are studying Japan's experience and technology in water-related disaster management in our master's and doctoral programs.

\*1 ESCAP: Economic and Social Commission for Asia and the Pacific

\*2 WMO: World Meteorological Organization

\*3 GIZ: Gesellschaft für Internationale Zusammenarbeit (German Society for International Cooperation)



Participants in the regional cooperative expert conference

(Written by Yoshio Tokunaga)

2017年10月9日から11日の3日間、タイ王国バンコクのESCAP本部において、アジアの16ヶ国及びESCAP、WMO、7国際水災害関係機関、ドイツGIZによる「アジア国際河川の洪水、フラッシュフラッド、地すべりのための早期警報に関する地域協力専門家会合」が開催され、ICHARMから徳永上席研究員が日本の代表として参加しました。本会議は、ESCAP第5回防災会議週間の関連会議として行なわれ、各国・各機関の代表者が各々の知見を説明する場であり、最終日にESCAPは「Disaster Resilience for Sustainable Development (<http://www.unescap.org/publications/asia-pacific-disaster-report-2017>)」レポートを公表しました。

会議中、徳永上席研究員はICHARMの進めるUNESCOパキスタンプロジェクト、及び国際洪水イニシアティブ (IFI) について説明を行いました。また、ICHARMの研修活動についても触れ、現在修士及び博士課程で多くのアジアの国の方などが水災害に関する日本の経験や技術を学んでいることを紹介しました。

## The International Atomic Energy Agency (IAEA) activities: a mid-term progress review meeting of the Regional Cooperative Agreement (RCA) RAS/7/030 project coordinators in Colombo, Sri Lanka, November 6-10

Research specialist Maksym Gusyev, who is an alternate national project coordinator (ANPC) of Japan, and Professor Maki Tsujimura, who is a faculty of Tsukuba University and the NPC of Japan, were dispatched by Japanese Ministry of Foreign Affairs (MoFA) to participate in the mid-term progress review meeting of the International Atomic Energy Agency (IAEA)/Regional Cooperative Agreement (RCA) RAS/7/030 Project. The mid-term meeting was hosted by the Sri Lanka Atomic Energy Board (SLAEB) and held in Colombo, Sri Lanka, from November 6 to 10, 2017, to bring together project coordinators from Asia-Pacific Region countries under the IAEA/RCA RAS/7/30 Project (Photo 1).

In the opening ceremony, Dr. Adi Paterson, Chief Executive Officer of Australian Nuclear Science and Technology Organization (ANSTO) was a guest of honor and gave an invited talk emphasizing the importance of international collaboration un-

Gusyev 専門研究員は、IAEA 日本国代表プロジェクト調整官代理を務めていますが、今回、IAEA 日本国代表プロジェクト調整官である辻村真貴筑波大学教授とともに、IAEA 地域協力条約プロジェクトの中間進捗連絡会議に外務省から派遣されました。本会議はスリランカ原子力委員会が主催し、11月6日～10日、同国首都コロンボで開催されました。会議にはアジア・太平洋地域の本プロジェクト参加国から各国調整官が集まりました。

開会式では、オーストラリア原子力科学技術機構のCEOであるAdi

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Paterson 博士が参加者を代表して話され、IAEA/RCA の枠組みでの国際協力の重要性を強調されました。各技術セッションの連絡会議は円卓形式で行われ、各国調整官が第一期(2016-2017)の活動および第二期(2018-2019)の計画について報告を行いました。続くグループディスカッションでは、同位体を利用した水循環の特性評価について技術的な意見交換を行いました。また、ディスカッションを通して、本会議の成果となる本プロジェクトの中間報告書がまとめられました。会議は、同位体を利用した水資源の持続的な確保に向けた重要なステップとして成功裏に終わりました。

der the IAEA/RCA framework such as between ANSTO and SLAEB. For the technical sessions, the mid-term meeting was conducted in a round-table format and each country coordinator reported the first phase activities (2016-2017) and the planned activities in the final phase (2018-2019) of the RAS/7/030 project. After each report presentation, the group discussions allowed country coordinators to receive general views and specific technical recommendations from high-level international experts about the use of isotopes for water cycle characterization in their countries. The meeting concluded with a drafted mid-term report of the RAS/7/030 Project prepared by coordinators during the group discussions and is considered a successful and important step towards achieving water resources sustainability with isotope techniques.



Participants of the IAEA/RCA Mid-Term Progress Review Meeting and national project coordinators of the RCA RAS/7/030 Project from fourteen countries: Australia, China, India, Indonesia, Japan, Malaysia, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, Philippines, Sri Lanka, and Thailand

(Written by Maksym Gusyev)

## UNESCO IHP 25<sup>th</sup> Regional Steering Committee Meeting for Southeast Asia and the Pacific

東南アジア太平洋地域諸国との緊密な連携を図りつつ、ユネスコ国際水文学計画 (International Hydrological Programme : IHP) の活動を遂行する観点から、17か国のIHP国内委員会の代表をメンバーとして東南アジア太平洋地域運営委員会 (RSC-SEAP) が25年前に設立されました。設立にあたっては、高橋裕・東京大学名誉教授と竹内邦良・ICHARM前センター長がメンバー各国との調整に尽力されました。

RSC-SEAP 会合は1993年以降、毎年、地域内の異なる国で開催され、様々なIHP活動についての報告・評価・考察がなされるとともに、新たな活動計画について議論が行われてきました。また本会合に併せて、国際会議やシンポジウムも開催されており、本会合は4半世紀にわたって水分野の科学者間で科学的な議論・意見交換を行う場として活用されてきました。

2017年11月13日に第25回RSC-SEAP会合がフィリピン・マニラで開催され、各国からの代表やユネスコ・カテゴリー2センターの代表が出席し、また今回、初めてインド・パキスタンがオブザーバーとして招かれました。ICHARMからは池

The Regional Steering Committee for Southeast Asia and the Pacific (RSC-SEAP) was established 25 years ago, with a membership of representatives from 17 IHP National Committees in the region, to maintain frequent contact and carry out UNESCO IHP activities at the regional level. In its establishment, Professor Emeritus of Tokyo University Yutaka Takahashi and Professor Emeritus of Yamanashi University Kuniyoshi Takeuchi, who was also the former director of ICHARM, made great efforts at coordinating among the member countries.

Since 1993, annual RSC-SEAP meetings have been convened in different countries of the region in order to report, evaluate and review various activities carried out within the framework of IHP, as well as to design new ones. In conjunction with the RSC-SEAP meetings, the international conferences and symposia have also been held. In this regard, RSC-SEAP has served as a mechanism for scientific exchange and discussion among water scientists in the region over the past quarter-century.

On November 13, 2017, the 25th RSC-SEAP was held in Manila, the Philippines, with attendance from member country delegates, representatives of the UNESCO category-2 water centres, and observers from India and Pakistan taking part for the first time. Chief Researcher Tetsuya Ikeda participated and presented the current activities of ICHARM.

At the meeting, significant decisions have been made. Currently, countries in the Asia-Pacific region are increasingly interconnected and facing shared water-related challenges. Considering this situation, the RSC-SEAP decided unanimously that it should welcome as its member any country in the Asia-Pacific region with a desire



participants of 25th IHP-RSC SEAP Meeting

to participate in its work. In order to better reflect its expanded geographical coverage, the RSC-SEAP also decided to rename itself the "IHP Regional Steering Committee for Asia and the Pacific".

Along with this year's RSC-SEAP meeting, the UNESCO-JASTIP\* Joint Symposium on Intra-Regional Water Security and Disaster Management was held on November 15-16.

In celebrating the 25th anniversary of the RSC-SEAP meeting, special commemorative addresses on its history and achievements were delivered by the founding members: Professor Kuniyoshi Takeuchi of Japan and Professor Soontak Lee of the Republic of Korea. At the technical session on "Disaster Preparedness, Recovery and Governance", Chief Researcher Ikeda made a presentation on the recent progress of IFI.

(Link)

- UNESCO Jakarta Regional Science Bureau for Asia and the Pacific  
[http://www.unesco.org/new/en/jakarta/about-this-office/single-view/news/regional\\_unesco\\_water\\_science\\_network\\_welcomes\\_all\\_of\\_asia\\_a/](http://www.unesco.org/new/en/jakarta/about-this-office/single-view/news/regional_unesco_water_science_network_welcomes_all_of_asia_a/)
- IHP RSC for Asia and the Pacific  
<http://hywr.kuciv.kyoto-u.ac.jp/ihp/rsc/index.html>
- 25<sup>th</sup> RSC-SEAP  
<http://jfit-for-science.asia/25th-rsc-meeting-and-unesco-jastip-symposium/>

\* Japan-ASEAN Science, Technology and Innovation Platform: Promotion of Sustainable Development Research

(Written by Tetsuya Ikeda)

田上席研究員が出席し、ICHARMの活動報告を行いました。

本会合では重要な決定がなされています。現在、アジア太平洋地域では、ますます相互関連性が高まるとともに、水に関連する共通課題に直面するようになってきており、そうした状況に鑑み、アジア太平洋地域のいかなる国でも、希望すれば本会合にご参加いただけることを、満場一致で決定しました。またこれによる地理的な対象範囲の拡がりを示すために、「アジア太平洋地域運営委員会」と改名することも決定されました。

RSC-SEAP 会合に合わせ、11月15日から16日にかけて、ユネスコと JASTIP (日 ASEAN 科学技術イノベーション共同研究拠点—持続可能開発研究の推進)との合同シンポジウム「地域をまたいでの水の安全保障と防災」が開催されました。ここで RSC-SEAP 会合 25 周年を記念して、創設メンバーである竹内教授と韓国の Soontak Lee 教授による記念講演が行われ、RSC-SEAP の歴史や業績についてお話いただきました。またテクニカルセッション「災害への備え、復旧とガバナンス」においては、池田上席研究員が IFI (国際洪水イニシアティブ) の最近の進捗状況について発表しました。

(関連サイト)

- ユネスコ・ジャカルタ アジア太平洋地域科学局  
[http://www.unesco.org/new/en/jakarta/about-this-office/single-view/news/regional\\_unesco\\_water\\_science\\_network\\_welcomes\\_all\\_of\\_asia\\_a/](http://www.unesco.org/new/en/jakarta/about-this-office/single-view/news/regional_unesco_water_science_network_welcomes_all_of_asia_a/)
- 東南アジア太平洋地域運営委員会  
<http://hywr.kuciv.kyoto-u.ac.jp/ihp/rsc/index.html>
- 第 25 回東南アジア太平洋地域運営委員会会合  
<http://jfit-for-science.asia/25th-rsc-meeting-and-unesco-jastip-symposium/>

## Global Technology Cooperation Forum (GT-DAY)

In 2017, the Ministry of Trade, Industry and Energy of South Korea established the Korea Technology Advisory Group (Japan K-TAG), through which South Korean businesspersons, scientists and other experts presently living in Japan help the country solve issues by participating in consulting, planning, reviewing and implementing projects. Research Specialist Young-Joo Kwak became a member of Japan K-TAG and was invited to the 2017 Global Technology Cooperation Forum (GT-DAY), held at the Seoul Convention & Exhibition Center in Seoul, South Korea, on November 16-18. The GT-DAY forum gathered 130 people from Korea and 70 from overseas, in addition to 73 small- and middle-sized corporations in international business, and discussed various topics in four principal areas of ICT convergence, new materials & components, new energy, and bio & health. Kwak had a brief meeting

2017年韓国の産業通商資源部が、日本駐在の韓国人または在日韓国人科学者がコンサルティング、企画、評価、課題推進等に参加する「グローバル技術協力支援団」(以下、日本 K-TAG) を設立し、ICHARM の郭専門研究員は日本 K-TAG の委員として韓国ソウル市、ソウル COEX センターで開催される 2017 グローバル技術協力フォーラム (GT-DAY、11月16日～11月18日) に招へいされました。本 GT-DAY フォーラムは、情報通信技術、新素材、新エネルギー、バイオ・健康の4分野で

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い、参加者は約 200 人（韓国 130 人、海外 70 人、国際中小企業・団体 73）でした。郭専門研究員は、主催者である韓国技術振興院の 鄭 (Jung) 院長との歓談会後、情報通信技術分野で最先端「i-Construction 実用化に向けて、スマート建設に役に立つ GNSS と連携したドローン測量の活用案」について講演しました。

この GT-DAY フォーラムでは、韓国と日本の情報通信技術 (ICT) 分野において中小企業向けの技術協力の現状、アメリカ、欧州からの中小企業への産学官協力についての現状及び実用化研究事例も把握でき、K-TAG 委員や韓国・海外企業との人的・研究ネットワークを確立することができました。

with President Jae-Hoon Chung of the Korea Institute for Advancement of Technology, the main organizer of this forum, and delivered a presentation in the area of ICT convergence about the use of unmanned aerial vehicles with global navigation satellite systems for the implementation of i-Construction.



Meeting with the president of the Korea Institute for Advancement of Technology

The GT-DAY forum was a great opportunity to learn the current status of Korea's cooperation with foreign countries in technology, such as technical cooperation among domestic businesses of South Korea and Japan in ICT, and industry-academia-government collaboration with western countries for Korean domestic businesses. It was also a great occasion to learn the progress in research on technological implementation and create a network with other K-TAG members and Korean and foreign businesspersons.



A scene from the GT-DAY forum with other overseas participants

(Written by Young-Joo Kwak)

**Global Forum on Science and Technology for Disaster Resilience 2017**

2017 年 11 月 23 日～25 日にかけて、日本学術会議、UNISDR、国際科学会議 (ICSU)、災害リスク統合研究 (IRDR)、土木研究所、防災科学技術研究所の 6 機関が主催となり、「持続可能な社会のための科学と技術に関する国際会議－災害レジリエンス構築のための科学・技術国際フォーラム 2017」が開催されました。

本フォーラムは、仙台防災枠組 2015-2030 で強調された、信頼できる事実と科学に基づくリスク情報を踏まえた発展と投資の重要性を認識することを目的としており、同時に、持続可能な開発目標 (SDGs) やパリ協定、ニュー・アーバン・アジェンダといった 2030 年の各指針が、災害リスク軽減にとって重要な関連を持ち、相互に補強する関係にあることに焦点を当てています。フォーラムには、大学・研究機関からの科学者・研究者、防災に関する各国行

The Global Forum on Science and Technology for Disaster Resilience 2017 was held in Tokyo on November 23-25, 2017, co-organized by six organizations: United Nations Office for Disaster Reduction (UNISDR), International Council for Science (ICSU), Integrated Research on Disaster Risk (IRDR), Science Council of Japan (SCJ), Public Works Research Institute (PWRI), and National Research Institute for Earth Science and Disaster Resilience (NIED).



participants of Global Forum on Science and Technology for Disaster Resilience 2017

The forum was organized to recognize the importance of a solid evidence and science base for risk-informed development and investment, just as it was emphasized at the Sendai Framework for Disaster Risk Reduction 2015–2030. The forum also aimed to highlight the important linkages and mutual reinforcement for disaster risk reduction with the 2030 agendas: the Sustainable Development Goals (SDGs), the Paris Agreement on Climate Change, and the New Urban Agenda. The forum meeting brought together scientists and researchers from universities and academic institutions, representatives of disaster risk reduction national authorities and key United Nations and international organizations, policy makers, and other relevant development partners. The participants were 228 from 42 countries in total.

To pursue steady implementation of the four priorities for action\* of the Sendai Framework, the forum aimed to call on all stakeholders to develop plans for the following two outputs:

- 1) Guidelines for strengthening DRR national platforms and coordination mechanisms through enhanced contribution of science and technology; and
- 2) Periodic synthesis reports on the state of science and technology for reducing disaster risk.

- (\*) Priority 1: Understanding disaster risk.  
 Priority 2: Strengthening disaster risk governance to manage disaster risk.  
 Priority 3: Investing in disaster risk reduction for resilience.  
 Priority 4: Enhancing disaster preparedness for effective response and to “Build Back Better” in recovery, rehabilitation and reconstruction.

For this purpose, it was composed of seven working group sessions on the four priorities for action and three cross-cutting topics (promotion of interdisciplinary collaboration, strengthen national platforms for more effective use of science and technology for disaster risk reduction in each country, and synthesis), and each group produced a “Policy Brief”.

On the last day, with the attendance of H.I.H. Crown Prince of Japan, the High Level Panel session was held, attended by Mr. Hachiro Okonogi, the minister of State for Disaster Management, Professor Juichi Yamagiwa, the president of the Science Council of Japan, Dr. Robert Glasser, the special representative of the UN Secretary-General for Disaster Risk Reduction, and other representatives from international agencies. At the end of the forum, “Tokyo Statement 2017 -Science and technology action for a disaster-resilient world-” was adopted.

This Tokyo Statement 2017 and seven Policy Briefs are available online at:  
<http://wci.t.u-tokyo.ac.jp/ResilienceForum2017>

(Written by Tetsuya Ikeda)

政機関の代表、政策決定者、国連及び他の国際機関や関係機関の代表者が一堂に会し、参加総数は42カ国から228名に及びました。

本フォーラムでは、『仙台防災枠組』の4つの優先行動(\*)の着実な実施に向けて、1) 科学・技術分野と社会との連携による全国的防災組織の強化に向けたガイドライン、2) 災害リスク軽減に資する科学・技術の現状と将来像に関する統合的知見の取り纏め(シンセシス)報告書の作成を最終目標としています。

(\*) **優先行動1**：災害リスクの理解

**優先行動2**：災害リスク管理のための災害リスクガバナンス

**優先行動3**：強靱化に向けた防災への投資

**優先行動4**：効果的な応急対応に向けた準備の強化と「より良い復興(Build Back Better)」

このため、本フォーラムでは、4つの優先行動と、3つの横断的課題(分野間連携の促進、災害リスク軽減に向けた科学技術のより有効な利用を図るための各国でのナショナルプラットフォームの強化、シンセシス)に関する7つのワーキンググループセッションが開催され、それぞれポリシーブリーフが取りまとめられました。

最終日には、皇太子殿下ご臨席の下、小此木内閣府特命担当大臣(防災)、山極日本学術会議会長、ロバート・グラッサー国連事務総長特別代表(防災担当)や国際機関の代表などが参加するハイレベル会議が開催され、最後に「東京宣言2017—災害に対して強靱な世界に向けた科学技術からの行動」が採択されました。この「東京宣言2017」及び7つのポリシーブリーフは次のウェブサイトでご公表されています。

<http://wci.t.u-tokyo.ac.jp/ResilienceForum2017>

## A thematic session, "Water and Disasters in the Context of Climate Change –From the Mountains to the Islands–" held at the 3rd Asia-Pacific Water Summit

The Asia-Pacific Water Summit (APWS) is a regional conference to provide top-level policy and decision makers, such as heads of national governments, of the region with opportunity to meet together for setting out a course for sustainable development with a perspective on water and sharing concrete actions, solutions and innovations. APWS has been organized by the Asia-Pacific Water Forum (APWF); first in Beppu, Japan, in 2007 and second in Chiang Mai, Thailand, in 2013. The third conference, APWS3, took place for two days from December 11 to 12, 2017, in Yangon, Myanmar.

From the afternoon of December 11 until the morning of December 12, ten (10) parallel thematic sessions were held, in which a thematic session of “Water and Disasters in the Context of Climate Change - From the Mountains to the Islands -” was held on the afternoon of December 11 co-organized by ICHARM, the International

アジア太平洋水サミット (APWS) は、同地域の政府首脳など、最高レベルの政策・意思決定者に対し、水の視点から、持続的な発展のための針路を定める機会を提供するとともに、具体的な行動、問題の解決方法、新たな手法を共有することを目的として開催されています。APWSは、アジア太平洋水フォーラム事務局 (APWF) によって主催され、2007年に日本・別府で第1回サミット、2013年にタイ・チェンマイで第2回サミットが開催されました。

このたび、ミャンマーのヤンゴンで第3回アジア太平洋水サミット (APWS3) が、2017年12月11

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日から12日の2日間開催され、11日の午後には ICHARM が ICIMOD、SPC、HELP との共催でセッション「気候変動下の水と災害—山岳から島嶼まで—」を開催しました。

アジア太平洋地域は水及び水による多くの事象によって緊密に関係しており、水は同地域の生命、経済、生態系を支えています。また、水は洪水や渇水といった災害をもたらす、これらは山岳部から沿岸部、小島嶼に至るまで、気候変動によって激甚化されることとなります。こうしたアジア太平洋地域における水問題の共通性や相互関連性から、山岳部から島嶼部に至るまでの全体的な取り組みが必要とされています。

この観点から本セッションは、アジア太平洋諸国のハイレベル・リーダーや各国代表が一堂に会し、気候変動によって甚大化する水災害や環境リスクについて議論を行い、共通の課題と解決策を考察し、効果的な行動の枠組みを構築するための協働の場となりました。本セッションは、3部構成で行いました。第1部では東ティモールの José Ramos-Horta 上級大臣（元東ティモール大統領、1996年ノーベル平和賞を受賞）、石井啓一国土交通大臣を含むハイレベル・リーダーによる基調講演、第2部ではアジア太平洋地域7か国からの気候変動下における水と災害についての国別発表、第3部では小池 ICHARM センター長とミャンマー水文気象局 Kyaw Moe Oo 局長を共同議長としたパネルディスカッションをそれぞれ行いました。

12日の午後には、本セッションの成果について池田上席研究員から報告がなされ、その後、閉会式でヤンゴン宣言が採択されました。

本セッションに関する資料および詳細な報告については、以下のサイトをご覧ください。

[http://www.pwri.go.jp/icharm/special\\_topic/thematic\\_session\\_ja.html](http://www.pwri.go.jp/icharm/special_topic/thematic_session_ja.html)

(※) 関連サイト：アジア太平洋水フォーラム事務局 <http://apwf.org/>  
第3回アジア太平洋水サミット <http://apwf.org/summit/myanmar2017/>



Opening and welcoming remarks by H. E. Daw Aung San Suu Kyi, State Counsellor, Myanmar



Keynote Speech at the session by H. E. Mr. Keiichi Ishii, Minister of Land, Infrastructure, Transport and Tourism, Japan

Centre for Integrated Mountain Development (ICIMOD), the Pacific Community (SPC), and the High-Level Experts and Leaders Panel on Water and Disasters (HELP).

Asia-Pacific countries are closely related through water and many water-associated phenomena. Water supports lives, economies and ecosystems in the region. On the other hand, it also causes hazards such as floods and droughts, which are exacerbated by climate change and posing a threat to mountains, coasts, and small islands in the region. The commonality and inter-connection of water issues in the Asia-Pacific region necessitates a holistic approach to problems emerging across the region from mountains to islands.

In this regard, the session was a unique platform for high-level leaders and representatives of Asia-Pacific states, in which they discussed water-related disaster and environmental risks intensified by climate change, explored common challenges and their solutions, and sought for collaboration in the development of effective frameworks for action.

The session was composed of three (3) parts:

- Part 1: Keynote speeches were delivered by high-level leaders: H. E. Dr. José Ramos-Horta, the senior minister of the Democratic Republic of Timor-Leste, the former president of Timore-Leste, and the Nobel laureate for peace prize in 1996; H. E. Mr. Keiichi Ishii, the minister of Land, Infrastructure, Transport and Tourism, Japan; and H.E. Dr. Swarnim Wagle, the vice chair of the National Planning Commission of Nepal.
- Part 2: Country presentations on water and disasters were delivered in the context of climate change from seven countries of the Asia-Pacific region: Myanmar, Bhutan, Indonesia, Japan, Korea, Sri Lanka, and Tonga.
- Part 3: Panel discussion took place, co-chaired by Dr. Kyaw Moe Oo, the director general of DMH, Myanmar, and ICHARM director Toshio Koike. The co-chairs and five panelists talked about problems presented in the country presentations and highlighted key issues from their expertise.

The outcomes of the session were reported by Chief Researcher Tetsuya Ikeda on the afternoon of December 12 along with those of the other sessions. Finally, the Yangon Declaration was adopted at the closing plenary.

A detailed report and other documents from the session are available at; [http://www.pwri.go.jp/icharm/special\\_topic/thematic\\_session\\_en.html](http://www.pwri.go.jp/icharm/special_topic/thematic_session_en.html)

(\*) Link: Asia-Pacific Water Forum <http://apwf.org/>  
3rd Asia-Pacific Water Summit <http://apwf.org/summit/myanmar2017/>

(Written by Daisuke Kuribayashi)

# Local Practices

## Meeting on a new SATREPS project

The Japan Science and Technology Agency (JST) and JICA is planning to launch a new research project of the Science and Technology Research Partnership for Sustainable Development (SATREPS) from 2018 in Thailand, aiming at the implement of "Area Business Continuity Management (Area-BCM)" for the enhancement of resilience of industry complexes in Thailand. As part of this effort, a project planning meeting was held at Chulalongkorn University in Thailand on October 10, 2017, and Researcher Mamoru Miyamoto participated in the meeting along with other Japanese experts including Prof. Kenji Watanabe<sup>\*1</sup>, Prof. Haruo Hayashi<sup>\*2</sup>, Dr. Ryohei Misumi<sup>\*3</sup>, and Dr. Hideyuki Kamimera<sup>\*4</sup>. The representatives of Thailand were from the College of Population Studies of Chulalongkorn University, the Thai Environmental Institute, the Urban and Local Planning Bureau of the Public Works Department of the Ministry of the Interior, and the Asian Disaster Preparedness Center (ADPC). In this meeting, Miyamoto outlined ICHARM and its activities related to flood and inundation forecasting and its possible contribution to the new Area-BCM project. He also joined the discussion about how this project should be carried out, based on the progress in its preparation process on the Thai side, including the current status of data collection.



Meeting at the College of Population Studies of Chulalongkorn University

On October 11, Miyamoto and the others attended an Area-BCM workshop held in Ayutthaya, which was co-hosted by Japan's Ministry of Economy, Trade and Industry with other organizations. Discussing issues about the 2011 flood, he learned what kind of information corporations were hoping to have in the middle of the disaster and what kind of information should be offered to produce effective Area-BCM. On October 12, they paid a courtesy call on the director general of the Department of Disaster Prevention and Mitigation (DDPM) of the Ministry of the Interior. After that, they had a meeting with officials of the departments in charge of the new project and collected information about industrial complexes besides Rojana Industrial Park. The meeting was a good preparation for starting up the new project.

\*1 Kenji Watanabe, professor, Graduate School of Social Engineering, Nagoya Institute of Technology

\*2 Haruo Hayashi, president, National Research Institute for Earth Science and Disaster Resilience

\*3 Ryohei Misumi, principal senior researcher, National Research Institute for Earth Science and Disaster Resilience

\*4 Hideyuki Kamimera, associated research fellow, National Research Institute for Earth Science and Disaster Resilience

(Written by Mamoru Miyamoto)

## Training on discharge observation and riverbed topography measurement

ICHARM has been involved in a UNESCO Pakistan project, "Strategic Strengthening of Flood Warning and Management Capacity," since 2012. In phase I of this project, ICHARM assisted local experts in developing a localized flood inundation forecasting system using the Integrated Analysis System (IFAS) and the Rainfall-Runoff-Inundation (RRI) model. Phase II started in 2015, aiming to equip the developed system with the capabilities of estimate flow discharge and riverbed topography so that the system works with better forecasting accuracy. To this end, ICHARM provided river discharge observation equipment for the Pakistan Council of Research in Water Resources (PCRWR). ICHARM also offered training for local engineers to learn how to use the devices.

2018年度から実施予定であるJST-JICAのSATREPS研究課題「タイ王国産業集積地のレジリエンス強化を目指したArea-BCM体制の構築」について2017年10月10日にタイのチュラロンコン大学で研究計画会議が開催され、ICHARMから宮本研究員が参加しました。会議には、名古屋工業大学の渡辺教授、防災科学技術研究所の林理事長、三隅総括主任研究員、上米良特別研究員が日本側から参加し、チュラロンコン大学人口研究所、タイ王国環境研究所、内務省公共事業・都市地方計画局、アジア防災センターがタイ側から参加しました。会議ではICHARMの概要、これまでの洪水氾濫予測に関する活動、Area-BCMに対する貢献内容を宮本研究員が発表し、タイ側のデータ取得状況や取り組みを踏まえて今後の研究活動の進め方について議論しました。

10月11日にはアユタヤにおいて経済産業省等主催で行われたArea-BCMのワークショップに参加しました。ワークショップでは2011年に発生した洪水で実際に被害にあった企業が洪水発生時にどのような情報が必要であったか、Area-BCMに提供すべき情報が何なのかを議論することができました。10月12日には内務省災害防止軽減局(DDPM)を訪ね、局長を表敬訪問しました。その後、担当部局と打ち合わせを行い、ロジャナ工業団地以外の対象サイト等に関して話し合い、具体的な活動の始動に向けて詳細を確認することができました。

ICHARMはユネスコパキスタンプロジェクト「Strategic Strengthening of Flood Warning and Management Capacity」を2012年から実施している。phase1ではIFASとRRIモデルを用いて洪水氾濫予測システムを構築してきた。2015年から始まったphase2では、同システムの精度を向上するために流量の把握、河床地形をモデルに実装することが一つの目的となった。それを受けてICHARM

Local Practices / Field Survey

は Pakistan Council of Research in Water Resources (PCRWR) に Acoustic Doppler Current Profiler (ADCP) を含む河川水流量計測機器の提供、使用方法に対する訓練を実施することになった。

ICHARM は流量観測機器としてインダス川下流、急流地の計測を可能とするために二台の ADCP のセットと一台の非接触型流速計 (RYUKAN) を提供することを決定し、それが 2017 年 7 月頃、パキスタンへの輸送が完了した。その後、7 月、11 月に室内及び現地トレーニングを実施した。これらのトレーニングでは PCRWR を始めとして、パキスタン国の各州の灌漑局から技術者が参加した。

7 月のトレーニングでは ADCP の理論、使用方法、RRI モデルへの計測結果の実装方法、ジェラム川における現地訓練を実施した。ここでは PCRWR の技術者が率先して機器を操作し、現地訓練を終えた。またこのトレーニングでは ICHARM から、萬矢主任研究員、原田専門研究員、Ahmad Gul リサーチアシスタント、水工研究グループから小関研究員が参加した。

11 月のトレーニングでは、ADCP の検定方法、流量の品質の評価方法、非接触型流速計 (画像・電波式) を用いた表面流速の計測方法、流砂計測方法を紹介すると共に、これらの現地における観測を実施すると共に、それらを用いたデータの分析方法を議論した。またこのトレーニングでは ICHARM から萬矢主任研究員、水工研究グループから小関研究員、その他にユネスコから招待された 4 名の日本の技術者が参加した。



Participants in the July training

The equipment provided by ICHARM includes different types of river discharge observation devices for different purposes: two ADCP observation systems for the lower Indus River and a non-contact type current meter (RYUKAN) for rapid streams. In July 2017, when the devices finally arrived in Pakistan, and also in November, ICHARM sent researchers to conduct indoor and on-site training for local engineers from irrigation departments of different provinces in Pakistan, as well as for those from PCRWR.

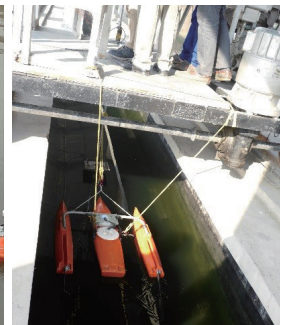


Researcher Koseki of PWRI (second from left) with local engineers

For the July training, ICHARM sent out Senior Researcher Atsuhiro Yorozuya, Research Specialist Daisuke Harada, Research Assistant Ahmad Gul. PWRI also sent Researcher Hiroshi Koseki of the Hydraulic Engineering Research Group. In this training, PCRWR engineers took the leadership in conducting tasks such as operating the devices, and the training ended successfully.



Measurement training in the Jhelum River



Calibration of ADCP

For the November training, Yorozuya and Koseki were again sent to Pakistan along with four Japanese engineers invited by UNESCO. In this training, the participants learned calibration of ADCPs, quality evaluation of discharge measurements, measurement of surface flow velocity using non-contact type current meters (using river surface images or radio waves), and sediment discharge observation. They practiced those measurements in actual rivers and discussed how collected data should be analyzed.

(Written by Atsuhiro Yorozuya)

## Field Survey

### Field Survey in the West Rapti River of Nepal

2017 年 10 月 31 日より 11 月 5 日まで、ネパール西部のウエストラプティ川において、河床材料の粒径における縦断分級に着目した現地調査を行いました。同河川上流の山岳地帯では土砂生産が顕著であり、それに加えて上流域にダムがないことから、生産された土砂が中下流まで流下していきます。このことから、同河川は土砂の縦断分級現象を捉える貴重な調査地であります。

調査方法は、ネパール国 Nepalgunj 近郊の約 25km の河道区間において、ゴムボートで川を下り

A team of researchers from ICHARM and PWRI conducted a field survey in the West Rapti River in Western Nepal. The survey was carried out from October 31 through November 5, 2017, to characterize the longitudinal grading of the river based on the grain size of riverbed materials. As sediment production is high in the upper reach and no dams have been built in the river, the sediment produced is transported downstream to the middle and lower reaches. For this reason, the target river offers significant survey points to observe the longitudinal grading phenomenon.

The survey team used a rubber boat, moving downstream in the 25-kilometer section of the river running in Nepalgunj and confirmed changes in the distribution of riverbed materials while taking photos for the area grid method and sampling fine



particles. Photo 1 shows how the team conducted the survey by rubber boat. A researcher (in the middle with a cap on) carries a high accuracy GPS receiver on his back, which collects data necessary for measuring the longitudinal surface profile of the target river. Photo 2 shows the riverbed materials collected from the upper and lower reaches. The survey confirmed that the grain size of the riverbed materials becomes finer in the lower reach. The results of this survey provide valuable information to understand the phenomena of the topography, flow and sediment transport in the mountain area. We will continue in-depth analysis for better understanding of those phenomena.



Photo 1 Field survey on a rubber boat



Photo 2 River materials collected from the upper (left) and lower reaches (right)

Five researchers were sent for this survey from Japan. Among them, Research Specialists Yusuke Yamazaki, Naoko Nagumo and Daisuke Harada were from ICHARM, and Senior Researcher Atsuhiko Yorozuya and Researcher Hiroshi Koseki were from the Hydrologic Engineering Research Team of Hydraulic Engineering Research Group, PWRI. Mr. Gopal Sharma, a senior divisional engineer of the Department of Water Induced Disaster Management Division Office of the Ministry of Irrigation also joined this survey. He completed the master's course at ICHARM in 2016, and made great contribution to our survey this time. The team also paid courtesy visits to the Survey Department and JICA Office in Kathmandu after the completion of the field survey.

*(Written by Yusuke Yamazaki)*

## Field Survey in the Sittaung River of Myanmar to Investigate Riverbank and Coastal Erosion

The downstream of the Sittaung River in Myanmar consists of complex and dynamic system of shoals and braided channels. Morphology of the estuary changes actively owing to river flow and tidal motion including tidal bore. Severe riverbank and coastal erosion around the mouth of the Sittaung River has been a pressing issue in Myanmar. Since 2014 erosion at the west side has caused substantial loss of agriculture land.

Under the background, in May 2017, the government of Myanmar requested ICHARM to plan erosion control measures. After discussing how it should respond to this request, ICHARM decided to conduct a joint field survey with the University of Tokyo, which has been involved in other research projects in Myanmar, to investigate and understand the current situation of erosion-related issues. The survey was conducted on October 29 and 30, 2017, assisted by the Directorate of Water Resources and Improvement of River Systems (DWIR). From ICHARM, Research and Training Advisor Shinji Egashira, Deputy Director Hisaya Sawano, Senior Researcher Badri Shrestha, and Research Specialist Young-Joo Kwak joined this survey.

Before the field survey at the selected sites, the preliminary image analysis was applied to severe coastal change region using ALOS-2 and Landsat-8 satellite data between 2007 and 2017 processed by Dr. Kwak. For example, Figure 1 shows that the maximum lateral erosion distance on the right bank is over 2 km despite one year.

During these two days survey, the team collected sediment materials from the riverbed and the bank for analysis of grain size distribution and sediment properties. The Aerial photos and videos were also captured the representative eroded areas (H marks in Figure 1) using Drone (MAVIC pro, DJI) to investigate river bank ero-

ながら、河床材料の分布の変化を確認し、適宜、河床材料の面積格子法のための写真撮影および細粒成分の採取を行いました。写真1はゴムボートによる調査風景であり、小関研究員（土木研究所 水工研究グループ）が装備しているのは高精度のGPS受信機で、これにより得られるデータからウエストラプティエ川の水面の縦断勾配が計測できます。また、写真2は上流における河床材料と下流における河床材料の写真です。下流に行くに従って、河床材料は分級により細かくなっていることが確認できます。本調査結果の本格的な分析はこれからであり、山岳地帯の地形と流れと流砂の現象解明についての貴重な情報が得られています。

本調査の実施には、ICHARMから山崎、南雲、原田の各専門研究員、土木研究所・水工研究グループから萬矢主任研究員と小関研究員が参加しました。また、2016年にICHARMの修士コースを修了し、現在はネパール国灌漑省水災害管理部門で主任エンジニアを務めるGopal Sharma氏の多大なる尽力をいただきました。現地調査終了後には、カトマンズにて同国調査部門やJICAネパール事務所に表敬訪問を行いました。

ミャンマー国・シッタウン川河口域は、砂州や網状河道などの特徴が見られ、激しく変動しています。これは、河川流と潮汐運動の双方の影響を受けて、侵食と堆積が活発に起こっているからです。特に2014年以来、シッタウン川西側では、河岸侵食によりかなりの農地が消失するなど、その対策は喫緊の課題となっています。

2017年5月、ミャンマー政府からICHARMに、浸食対策立案の要請があり、検討の結果、ミャンマーで研究実績を有する東京大学と共同で、現地の基礎調査を行うこととしました。

現地調査に先立ち、特に著しい侵食が認められる河岸部分について、ICHARMの郭栄珠専門研究員が、2007年から2017年の10年間変化を事前に把握するために、ALOSおよびALOS-2 (©JAXA) の SAR データと Landsat-8 (©NASA) の光学衛星データを組み合わせて画像分析を実施しました。図1はその結果の一例であり、一年足らずのうちに、最大侵食距離が2 km 超に達していることがわかります。

この事例を含め、現状を把握するため、ミャンマー国水資源・河川整備総局の協力を得て、2017年10

Field Survey

月 29・30 日に東京大学と共にシッタ川現地調査を実施しました。ICHARM からは、江頭研究・研修指導監、澤野グループ長、Shrestha 主任研究員、郭専門研究員が参加しました。

2 日に渡り実施した調査では、土砂の粒径等の性質を分析するため、河床および河岸から土砂を採集し、また、河床・河岸侵食の現状把握のため、ドローン (©MAVIC pro, DJI, China) を利用して、代表侵食箇所 (図 1 内の H 印) の空中写真・映像を撮影しました。さらに、Su Pa Nu 村付近のシッタ川に水圧センサーを設置し、潮位の影響を受けていると考えられる河川水位測定を行いました。水深は、魚影センサーを使って、ボートの軌跡に沿って測定しました。

今回の基礎調査の結果に基づいて、実現可能な堤防建設や海岸浸食対策の詳細計画のために、更なる追加調査の内容や必要なデータの種類の提案されることとなります。

sions as well as to understand the current situation of the problem of riverbed and bank erosion. The team also measured river water level which seems to be affected by tidal level by installing water pressure sensor at the River in Su Pa Nu Village for these two days. The water depth along the boat route during the field investigation were also measured using fish detector (fish sonar).

Based on the findings of this primary study, additional investigations and data that will be required for detailed planning of the feasible measures for riverbank and coastal erosion control will be proposed.

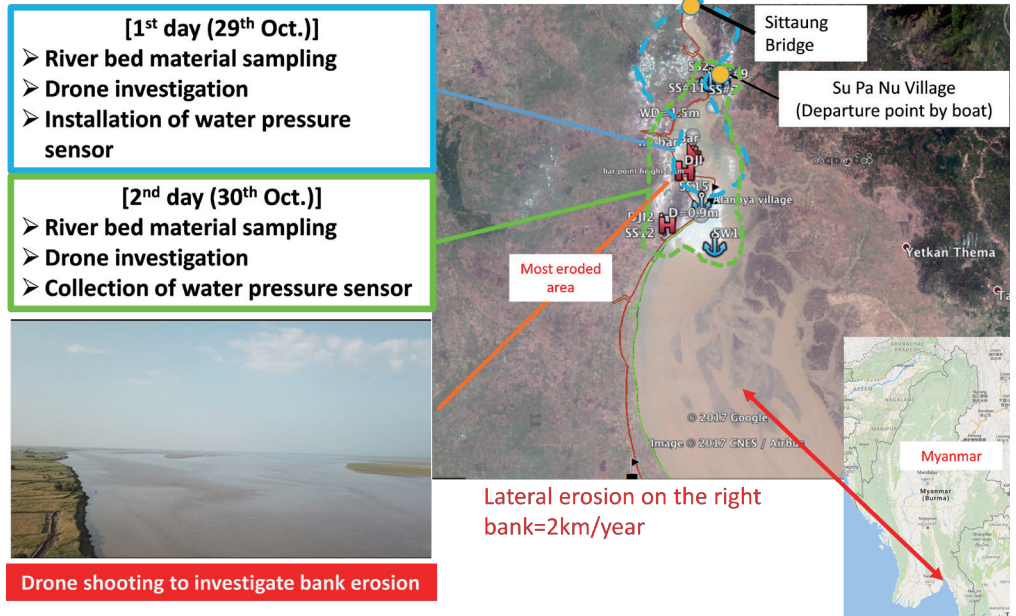


Figure 1: Shows the location and activities of field survey on 29 and 30 October 2017



Figure 2: Collection of sediment material from the riverbed and bank for analysis of grain size distribution and sediment properties



Figure 3: Installation of water pressure sensor (left), and water depth measurement using fish detector (fish sonar) (right)



Figure 4: Eroded riverbank and areas (west side)

(Written by Badri Bhakta Shrestha)

# 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 Tsutsui**

*Research Specialist*

*Japan*

I am pleased to be a member of ICHARM from November 2017. While I was at the University of Tokyo and the Japan aerospace exploration agency (JAXA), I investigated the drought monitoring by eco-hydrological variables based on the microwave remote sensing.

I would like to implement the drought monitoring and its hazard analysis for economic damage at ICHARM.

## Comments from visiting researcher & internship students

ICHARM accepted one visiting researcher and two internship students: Dr. Zhang Hongbo from China as a visiting researcher and Ms. Juhyn Kim from Korea and Ms. Jamila Rajabi from Afghanistan as internship students.

They contributed a short message to this volume of ICHARM Newsletter while looking back at their studying at ICHARM.



**Zhang Hongbo**

*Kunming University of Science and Technology*

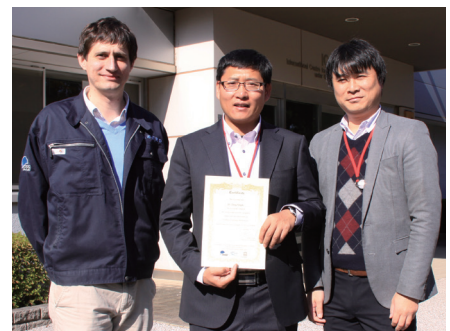
*Stay in ICHARM period: November 24, 2016 - January 31, 2017*

*(Stay in University of Yamanashi period: February - November, 2017)*

I am a visiting researcher of ICHARM for one year, from Kunming University of Science and Technology, Yunnan, China, making research about the rainfall-runoff simulation using BTOP model, a distributed hydrological model. My major is hydrology and water resource. I stayed in ICHARM during the first two months of my one-year visiting period in Japan. As an international center for water hazard and risk management under auspices of UNESCO, ICHARM has many excellent scientists with rich research experiences and research projects on climate change, hydrological and water resource problems in many countries around the world and is also an ideal place for the students and researchers like me to study and research the theory, simulation methodology and problems of global water cycle. Although two months are not long, I started my BTOP study and research and gained a lot which expanded my knowledge and broadened my horizons in field here during this time.

Fortunately for me, I met many kind and great ICHARM people who not only gave me much guidance and constructive suggestions in my study and research but also gave me lots of help and care in my living that made my staying in Japan easy and enjoyable. So I would like to take this opportunity to thank my supervisors in ICHARM, Prof. Takeuchi (the former Advisor of ICHARM) and Dr. Maksym, who, despite their busy schedule, spent much time on discussing my research plan, answering my questions and giving me good suggestions. I would also like to thank the former and current Deputy directors of ICHARM, Mr. Miyake and Mr. Sawano, for the kindly support to my study and research in ICHARM as a visiting researcher. And I would like to thank Mr. Tokunaga, Mr. Umino, Ms. Okawa, Ms. Nakamura, Ms. Nishi, Ms. Mie and Dr. Liu Tong, who gave me many help and encouragement in my work and living in ICHARM. Meanwhile, I would like to take this platform to thank my supervisors in International Research Center for River Basin Environment (ICRE) of University of Yamanashi, Dr. Jun Magome and Assoc. Prof. Hiroshi Ishidaira, who gave me many guidance and support to my study and research in ICRE after ICHARM. I also would like to thank Ms. Hiroko, Prof. Takeuchi's wife, who gave me many care and help in my living in Kofu.

Closing, I would like to thank ICHARM for giving me this chance to study and research in Japan, which will be an impressed and good memory in all my life. I am confident that ICHARM will continue their success in training students and water problem research and wish the members of ICHARM professional success and happy living. I am looking forward to possible future collaboration.



Visiting researcher, Zhang Hongbo (center), Assistant Professor of University of Yamanashi, Jun Magome (right) and Research Specialist of ICHARM, Maksym Gusyev (left)

Others



**Juhyn Kim**

*Pukyong National University*

*Internship period: September 4 - November 29, 2017*

First and foremost, I would like to thank all members of ICHARM for giving me this great opportunity. Especially, I would like to express my gratitude to my supervisor, Maksym-san, from the bottom of my heart for his help. Regardless of how busy he is, he kindly helped me to study on my research. Whenever he have the information of workshops and conference which is related to my research topic and major, he always gave it to me. Not only research he helped me to study English too. I thank him for his support. Without his guidance I could not finish my internship successfully.

As an intern in ICHARM, my academic knowledge could improve better than before. I was also able to learn Rainfall Runoff Inundation (RRI) model and improve my ability of using Grid Analysis and Display system (GrADS). The research using GrADS further solidified my insightful knowledge on meteorology. I hope I can use both program in the future.

During 3-months with academic comprehension, I could learn cultural diversity, especially Japanese culture. While spending time with other internship students and master course students, we shared our culture and language. It was very unforgettable experience. Time with staff members widen my information on Japanese culture too. In addition everyone kindly helped me to adjust in Tsukuba. I was impressed by their sincere help.

Intern in ICAHRM led me to improve myself. It was very happy to be an intern in ICAHRM.



**Jamila Rajabi**

*Kyoto University / 京都大学*

*Internship period: December 4-8, 2017*

First of all I would like to express my gratitude to my Professor Kaoru Takara (Disaster Prevention Research Institute, Kyoto University) for providing me this opportunity to participate in the internship program in ICHARM and second I would like to thank Ms. LIU Tong as my supervise in ICHARM and Mr. Umino and Ms. Uedaira for their support and kindness during the program. Finally, big thanks to all ICHARM members and students for their kindness, cooperation and sharing information with me during my internship period. The internship program was great and helpful experience for my research study and I hope I could get another opportunity to attend the future programs of this research institute.

Visiting ICHARM in my case was a short time internship program to achieve knowledge for the IFAS (Integrated Flood Analysis System) snowmelt function and using the achieved knowledge in my master's research thesis. Although the period was short but I really appreciate all the efforts that ICHARM put on my internship program and the knowledge that I learned due to one-week internship. In the program, I learn several things such as snowmelt function in IFAS model, error correction and calibration. Moreover, the institute was a nice place to get to know many researches and their research with warm and friendly environment.

**Business Trips**

\* October - December 2017

- October 8–12, Bangkok, Thailand, Yoshio Tokunaga, to participate in the ESCAP Expert Group Meeting
- October 8–12, Hanoi, Ving Yen and Ha Giang in Vietnam, Toshio Koike, Maksym Gusyev, Yusuke Yamazaki, (1) Meeting with Royal Haskoning (2) Meeting with local Vietnam government (3) Field survey at Ving Yen (4) Field survey at Ha Giang
- October 9-13, Bangkok, Thailand, Mamoru Miyamoto, to attend the meeting on SATREPS (Area-BCM) and the workshop
- October 17-29, Paris, France & DC, USA, Toshio Koike, (1) The Knowledge Forum on Water Security and Climate Change (2) GEO Week 2017
- October 28- November 7, Nepal, Atsuhiko Yorozuya, Hiroshi Koseki (PWRI Researcher), Yusuke Yamazaki, Daisuke Harada, Naoko Nagumo, (1) to participate in Workshop "7th International Workshop of Multimodal Sediment Disasters" (2) field survey on West Rapti River
- October 27-30, Dalian, China, Liu Tong, 1st China-Japan-South Korea Water Science Research Forum - Sustainable Development of Regional Water Resources Under Changing Environment
- October 29-November 3, Jeju, Korea, Yoshio Tokunaga, Takafumi Shinya, To participate in the 12th ESCAP/Typhoon Committee Integrated Workshop
- October 28-November 3, Yangon and Naypyidaw, Myanmar, Toshio Koike, Shinji Egashira, Hisaya Sawano, Badri Bhakta Shrestha, Young-Joo Kwak (1) Field survey at Bago River and Sittung River (2) Meeting about Bago River and Sittung River with DWIR (3) The 2nd IFI High-level coordination meeting (4) Meeting at Embassy of Japan in Myanmar
- November 5-12, Sri Lanka, Maksym Gusyev, IAEA/RCA Mid-Term Progress Review Meeting of the RCA Project RAS/7/030
- November 6-12, New Delhi, India, Naoko Nagumo, To participate in 9th International Conference on Geomorphology (9th ICG)
- November 12-16, The Philippines, Tetsuya Ikeda, 25th IHP Regional Steering Committee Meeting for Southeast Asia and the Pacific in conjunction with UNESCO-JASTIP Joint Symposium on Intra-Regional Water Security and Disaster Management
- November 12-16, India, Mohamed Rasmy Abdul Wahid, to attend APRSF-24
- November 15-18, Seoul, Korea, Young-Joo Kwak, to attend "2017 Global Technology Cooperation Forum (GT-DAY)" and give a speech
- November 19-28, Lahore, Muzaffarabad and Islamabad in Pakistan, Atsuhiko Yorozuya, Hiroshi Koseki (PWRI Researcher), (1) to participate in the training workshop; ADCP Calibration and surface flow measurement in mountainous areas of Pakistan river (2) meeting in PCRWR office

- November 24-December 9, Egypt and Oman, Hironori Inomata, As a Member of Mission for Wadi Flash Floods Integrated Management in Egypt by Considering Climate Change for Secured Development in Wadi Basins (WaFFIME) and to participate in "The Third International Symposium on Flash Floods in Wadi Systems"
- November 28-December 1, Malaysia, Tetsuya Ikeda, Regional Workshop of UNESCO Natural Sciences related Centres and Chairs in Asia and the Pacific
- December 4-6, China, Yoshio Tokunaga, to participate in ASEAN Regional Forum Workshop on Typhoon Disaster Risk Reduction and Damage Mitigation
- December 6-11, New Zealand, Maksym Gusyev, IAEA/RCA Project RAS/7/030 collaboration with New Zealand
- December 10-17, New Orleans, USA, Yoshihiro Shibuo, 2017 American Geophysical Union (AGU) Fall Meeting
- December 9-16, Yangon, Myanmar, Toshio Koike, Hisaya Sawano, Shinji Egashira, Tetsuya Ikeda, Yoshio Tokunaga, Daisuke Kuribayashi, Maiko Sano, (1) 3rd Asian Pacific Water Summit (2) 11th ICHARM Follow-up Seminar
- December 18-22, Jakarta, Indonesia, Toshio Koike, Atsuhiko Yorozuya, Hironori Inomata, to participate in the UNESCO Pakistan project "Internal Technical Assessment Workshop of Second year of implementation of the Strategic Strengthening Flood Capacity and Management of Pakistan-phase 2"

## Visitors

\* October - December 2017

- Visited by delegate from Water Institution for Sustainability (WIS), Thailand, December 20, 2017  
 Purpose: to study the analysis methods and risk management methods on water disaster and also to improve and raise the ability of flood disasters management in Thailand
  - Charubutr Kirdudom, Assistant Managing Director, Charoen Pokphand Foods Public Company Limited
  - Wattanakorn Mekrasmee, Central Region Operation Coordinator, Global Utilities Services Company Limited
  - Pilawan Onrua, Factory Manager, Global Utilities Services Company Limited
  - Chouvalit Vichiraprasirt, Engineer Level 11, Electricity Generating Authority of Thailand
  - Sombat Yusamart, Deputy Managing Director, Universal Utilities Public Company Limited
  - Seubtrakul Binthep, Managing Director, Southen Water Management Company Limited
  - Chuchat Saitin, Managing Director, Amata Water Co., Ltd.
  - Amornrat Jaisathaporn, Assistant Managing Director, Anurak Water Treatment Facilities
  - Supavinee Kitsanawattana, Corporate Environment Manager, SCG Chemicals Co., Ltd.
  - Monthika Potavorn, Public Relation Manager, Eastern Water Resources Development and Management Public Company Limited
  - Sirithorn Singhorn, Environmental Senior Officer, Panasonic Appliances Refrigeration Devices Co., Ltd.
  - Samrit Ruenhan, Assistant Manager, The Siam Ceement Public Company Limited
  - Boonsong Peetanonchai, Assistant Director Survey Department, Electricity Generating Authority of Thailand
  - Supitcha Ditthacharoen, Senior Officer, The Federation of Thai Industries



- Visited by the delegate from i-WSSM (International Center for Water Security and Sustainable Management), South Korea, December 22, 2017  
 Purpose: 1) Meeting on ICHARM Doctoral & Master courses, Observation of educational facilities 2) Explanation of i-WSSM Educational policy 3) Meeting with GRIPS (National Graduate Institute for Policy Studies)
  - Dr. Seok, Kwan-Soo, Programme Manager, Division of Planning and Management
  - Ms. Kim, Saebhom, Programme Officer, Division of Education and Publication
  - Ms. Kim, Sang-Min, Programme Officer, Division of Planning and Management



## Publications

\* October - December 2017

### A: Peer Reviewed Papers / 査読付論文

- Naoko Nagumo, Sumiko Kubo, Toshihiko Sugai, Shinji Egashira, Sediment accumulation owing to backwater effect in the lower reach of the Stung Sen River, Cambodia, *Geomorphology*, Elsevier, Vol.296, pp.182-192, November 2017
- 栗林大輔、大原美保、近者敦彦、澤野久弥、「洪水カルテ」による地区危険度評価手法の提案、地域安全学会論文集、地域安全学会、Vol.31、2017年11月
- Edangodage Duminda Pradeep Perera, Takahiro Sayama, Jun Magome, Akira Hasegawa, Yoichi Iwami, RCP8.5 based future flood hazard analysis for the Lower Mekong River Basin, *Hydrology*, 2017, 4(55), pp1-17, doi:10.3390/hydrology4040055, November 2017

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

- Tetsuya IKEDA, Mamoru MIYAMOTO, and Toshio KOIKE, International Flood Initiative - Recent Progress in Asian countries -, UNESCO-JASTIP Joint Symposium on Intra-Regional Water Security and Disaster Management, Quezon City, Philippines, November 15-16, 2017

### C: Oral Presentations / 口頭発表

- 長谷川聡、Maksym Gusyev、日本域d4PDFにおける将来の気象学的渇水の変化、日本気象学会2017年度秋季大会講演予稿集、日本気象学会、Vol.112、pp.223、2017年10月
- 中村要介、阿部紫織、佐山敬洋、降雨分布が中山間地河川の河川流量に及ぼす影響評価、日本気象学会2017年度秋季大会講演予稿集、日本気象学会、Vol.112、pp.168、2017年10月
- 牛山朋来、瀬古弘、藤田美季子、小司慎哉、船舶搭載GPS PWVの同化インパクト実験、日本気象学会2017年度秋季大会講演予稿集、日本気象学会、Vol.112、pp.265、2017年10月
- 牛山朋来、小池俊雄、生駒司朗、喜連川優、大井川・犀川流域のアンサンブル降雨予測システムの開発、日本気象学会2017年度秋季大会講演予稿集、日本気象学会、Vol.112、pp.394、2017年11月
- Naoko Nagumo, Shinji Egashira, Hisaya Sawano, Characteristics of the 2016 flood focusing on fluvial topography and flood impact on local communities in the Omoto River Basin, northeastern Japan, 9th International Conference on Geomorphology, International Association of Geomorphologists, New Delhi, India, November 6-11, 2017
- 南雲直子、江頭進治、2017年7月九州北部豪雨における赤谷川流域の土砂流出特性と集落立地条件、日本地形学連合2017年秋季大会、日本地形学連合、九州大学、2017年12月2~3日
- Miho OHARA, Hisaya SAWANO, Michiko BANBA, Hitoshi NAKAMURA, Analysis on Residents' Attitudes toward Risk-Based Floodplain Regulation of Shiga Prefecture in Japan, 4th Asian Conference on Urban Disaster Reduction, ISSS, Tohoku University, November 26, 2017
- Stewart M.K., Morgenstern U., Toews M., van der Raaij R. and M. Gusyev (2017). Uncertainty estimation for tritium ages of baseflow. 57th New Zealand Hydrological Society Annual Meeting 2017, Napier, November 28th-December 1, 2017, New Zealand.
- 郭栄珠、朴鍾杰、複数の時系列データによる広域洪水リスクマップ作成に向けたシンク口洪水指標、平成29年度秋季学術講演会論文集、日本写真測量学会、2017年11月
- 郭栄珠、だいち2号の高分解能SARデータを用いた2016年小本川の浸水域抽出、平成29年度秋季学術講演会論文集、日本リモートセンシング学会、2017年11月
- Young-Joo Kwak, (Invited talk) Smart Field Survey using GNSS applications with labor-saving drone and GIS Survey, 2017Global Technology Cooperation Forum, Korea Institute for Advancement of Technology, Seoul COEX, November 16-18, 2017
- M.Rasmy, Satellite Application For Environment (SAFE) and International Flood Initiative (IFI) activities: Towards effective Flood Disaster Managements in Sri Lanka, The 24th Session of the Asia-Pacific Regional Space Agency Forum (APRSAP-24), Bengaluru, India, November 14-17, 2017

### D: Poster Presentations / ポスター発表

- 栗林大輔、大原美保、岩崎貴志、徳永良雄、「eコミュニティ・プラットフォーム」を活用した汎用的な自治体防災情報システムの提案、地域安全学会梗概集、一般社団法人 地域安全学会、Vol.41、pp. 41-44、2017年11月
- 大原美保、栗林大輔、黒木健二、寺脇学、徳永良雄、災害対応ヒヤリ・ハット事例の収集と傾向分析、地域安全学会秋季研究発表会梗概集、一般社団法人 地域安全学会、Vol.41、2017年11月

### E: Papers in technical magazines / 技術雑誌論文

None / 該当無し

### F: PWRI Publications / 土木研究所刊行物

None / 該当無し

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