

Newsletter

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ICHARM

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

Message from Director

The passions, the interests, and the science and technology

In his book, *The Passions and the Interests*, on the history of social thought, Albert Harsanyi explains the shift of the governance from confusion to stability in each European country in the early modern period. He points out that it was the interests, that is to say "moneymaking passion", that successfully controlled the kings' malevolent passions, which had been repressed under the Roman Catholic power in the Middle Ages, released during the Renaissance, and then disrupted the societies in the post-Renaissance era. The interests that had been recognized as one of the three big moral sins in the Middle Ages turned into a driving force for governing a nation and providing relief to people.

In the preparation for the 3rd World Conference on Disaster Risk Reduction held in Sendai in March 2015, the Science Council of Japan, in cooperation with the science and technology communities in the world, emphasized that science and technology should be introduced to disaster risk reduction including governance, investment, early warning and recovery, and also stressed that dialogues between relevant stakeholders and science and technology communities should be promoted at the national platform on disaster risk reduction. This proposal was clearly included in the negotiated outcome document of the Conference, "Sendai Framework". At the 8th World Water Forum held in Brasilia, Brazil, in March 2018, H.I.H. the Crown Prince of Japan introduced the historical ingenuity and efforts for sharing water, explained the key roles of the water cycle in the diversity and connectivity of the regions on the planet earth scientifically, and highlighted the importance of the knowledge fusion between society and science and technology communities for prosperity, peace and happiness.

We recognize climate change as well as changes in societies with regards to population, land use and so on. We need to improve our capacity of simulating the changes and assessing and predicting their impacts, and share the obtained scientific knowledge with society to support in making practical policies and taking informed actions. As with the past paradigm shift from the passions to the interests, a new dynamic shift is needed for science and technology to be truly integrated in society.



Director Toshio Koike delivers a presentation
at 8th World Water Forum (WWF8) on March 20, 2018

* Photo by courtesy of the Japan Water Forum / 写真：日本水フォーラム

情念、利益、科学技術

A. ハーシュマンの著作に、欧州各国の統治の混乱から安定への過程を読み解いた「*The Passions and the Interests* (情念の政治経済学)」と題する社会思想史書があります。国王の情念は中世においてはローマカトリックによって統制され、ルネッサンス時代に解き放たれ、近世においては社会の混乱を引き起こしており、その邪悪な情念を統制することに成功したのが金銭欲という情念に他ならないと述べられています。中世では人間の三大悪の一つとされていた金銭欲は、近世では経済の駆動源となったのです。

2015年3月に仙台で開催された第3回世界防災会議の準備過程において、日本学術会議は世界の科学技術コミュニティと協力して、災害リスク軽減のための統治、投資、予防と復興には科学技術が必要と主張し、その実現のためには災害リスク軽減のナショナルプラットフォームにおける関連のステークホルダーと科学技術コミュニティと対話の重要性を強調しました。この考えは、会議の合意の成果文書である仙台防災枠組に色濃く反映されました。2018年3月にブラジリアで開催された第8回世界水フォーラムにおいて、皇太子殿下は水を共有するための歴史的な創意工夫を紹介され、各地域の多様性をつなぐを読み解く水循環の科学的理解の重要性を講術され、それは人々の繁栄、平和、幸福につながると強調されました。

人口や土地利用などの社会的要因の変化に加え気候が変化しています。社会が築いてきた経験知に加え、これらの変化を関連する様々な学術分野が協力して統合的にシミュレーションして、変化の影響を評価し、予測する能力を高め、その科学知を社会と共有することが、政策の決定や人々の行動に必要となっています。情念から利益へ変化したように、科学技術の理解を社会と共有する新たなパラダイムシフトが求められています。

April 27, 2018
Toshio Koike
Director of ICHARM

Special Topics

- 3. 3rd ICHARM Governing Board Meeting held in Tokyo / 第3回 ICHARM 運営理事会
- 5. ICHARM R&D seminar held / ICHARM R&D Seminar の開催

Research

- 7. Introduction of ICHARM research projects / 研究紹介
- 7. Yousuke Nakamura, Exchange researcher [RRI-model simulation of a flash flood in the Kagetsu River due to the northern Kyushu heavy rain in July 2017] / 中村要介 交流研究員「平成 29 年 7 月九州北部豪雨での花月川における RRI モデルを用いた洪水予測」
- 9. Akira Hasegawa, Former Research specialist [Meteorological drought assessment of climate projections with different GHG scenarios in the end of 21st century] / 長谷川聡 元専門研究員「異なる温室効果ガス排出シナリオによる 21 世紀末気候実験の気象学的渇水の評価」
- 11. Yoshito Kikumori, Senior researcher [Development of Learning Support Materials for Hydrology and Hydraulics using CommonMP] / 菊森佳幹 主任研究員「CommonMP を用いた水文・水理学学習支援教材の開発」
- 12. Hitoshi Umino, Senior researcher [Estimation of flood damage in the upper Citarum River basin, Indonesia] / 海野仁 主任研究員「インドネシア国チタルム川上流における洪水被害の推計」

Field Survey

- 14. Second Field Survey in the Sittaung River of Myanmar to Investigate Riverbank and Coastal Erosion / 第2回ミャンマー国シタン川現地調査

Information Networking

- 15. The 50th Annual Session of Typhoon Committee in Hanoi / 台風委員会 (TC) 第50回総会、ハノイ
- 17. Meeting with the Philippine organization and field survey / フィリピン関係機関との会議と現地視察
- 18. Participation in the 8th World Water Forum / 第8回世界水フォーラムへの参画

International Flood Initiative (IFI)

- 20. Establishment of IFI Platform in Indonesia and discussion on "TOUGOU" Research Project / IFI プラットフォームの構築と統合プログラムの協議、インドネシア
- 22. Meeting with the core organizations of the IFI Platform in the Philippines / フィリピンにおける IFI プラットフォームの主要機関との個別会議
- 22. 2nd Plenary Session for the Platform on Water Resilience and Disasters held in Sri Lanka / スリランカで「第2回・水のレジリエンスと災害プラットフォームに関する会議」を開催

Training & Education

- 25. Educational Program Updates / 修士課程研修 活動報告

Others

- 26. Annual Hanami lunch / お花見ランチ
- 27. Personnel change announcement / 人事異動のお知らせ
- 29. ICHARM will renew the website soon / ICHARM ホームページ リニューアルのお知らせ
- 29. Comments from visiting researchers / 交流研究員 感想文
- 30. Awards / 受賞リスト
- 30. Business Trips / 海外出張リスト
- 31. Visitors / 訪問者リスト
- 32. Publications / 発表論文リスト

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_ja.html

回答期限：2018 年 5 月 31 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

Survey to be done by: 31 May 2018

Time required: about 5 minutes

Special Topics

3rd ICHARM Governing Board Meeting held in Tokyo / 第3回 ICHARM 運営理事会



Third ICHARM governing board meeting participants

On February 14, 2018, the third ICHARM Governing Board Meeting was held at the International Congress Room of MLIT in Tokyo, Japan. The board meeting is held every two years in compliance with the agreement between the government of Japan and UNESCO, signed and concluded on July 23, 2013. In the meeting, the governing board members review the reports on ICHARM's activities in the last two years, and examine and adopt the long- and medium-term programmes and the work plan for the next two years. The governing board had met twice before: first on February 25, 2014, and second on March 3, 2016.

As defined in the agreement, the governing board is composed of seven members. The current members include: Kazuhiro Nishikawa, the president of PWRI, as the chairperson; Masafumi Mori, the vice-minister for Engineering Affairs of MLIT, as a representative of the government of Japan; Blanca Jiménez-Cisneros, the director of the Division of Water Sciences and the secretary of IHP as a representative of the the director-general of UNESCO; Andras Szöllösi-Nagy, the chairperson of UNESCO-IHP Intergovernmental Council; Yuki Matsuoka, the head of the UNISDR Office in Japan; Akihiko Tanaka, the president of GRIPS; and Kunihiro Yamauchi, the director general of the Global Environment Department of JICA.

At the meeting, Director Toshio Koike reported on the activities of ICHARM in the last two years from 2016 to 2017, which were examined by the board members. He also explained the work plan for the next two years from 2018 to 2019, which was also examined and unanimously adopted by the board.



View of the meeting

Overall, the governing board highly appreciated the efforts by ICHARM. In addition, they gave some important advice for further improvement of the activities and the organization. One member suggested that ICHARM should expand its activity to a global scale, especially to cover Africa and Latin America. Another member expected ICHARM to build closer relationships with other UN organizations and UNESCO category 2 centres.

By following the work plan adopted at the meeting and taking the suggestions into consideration, ICHARM will continue striving for disaster risk reduction on a global basis.

The distributed materials and presentation slides are available at ICHARM website: http://www.icharm.pwri.go.jp/special_topic/icharm_3rd_gb_en.html

2018年2月14日、東京・国土交通省国際会議室において、第3回 ICHARM 運営理事会を開催いたしました。この運営理事会は、2013年7月23日に署名・締結された日本国政府とユネスコとの協定に基づき、ICHARMの活動に関する報告書の審査、ICHARMの長期・中期計画や事業計画を審査・採択するために、2年に1回、開催することとされています。

これまで、2014年2月25日に第1回会合、2016年3月3日に第2回会合がそれぞれ開催され、今回は第3回目の会合となりました。運営理事会の委員は、本協定の規定により、土木研究所・西川理事長が議長を務め、日本国政府の代表者として国土交通省・森技監、ユネスコ事務局長の代理としてブランカ・ヒメネス・シスネロス科学部長・IHP事務局長、ユネスコIHP政府間理事会のアンドラス・ソロシ・ナジ議長が出席するとともに、国連国際防災戦略事務局（UNISDR）から松岡駐日事務所代表、政策研究大学院大学（GRIPS）から田中理事長、国際協力機構（JICA）から山内地球環境部長の7名が出席いたしました。

会合では、小池センター長から2016年から2017年の2年間にわたる活動報告がなされて、その審査が行われるとともに、今後の2年間（2018～2019年）の事業計画について説明し、その審査が行われ、満場一致で採択されました。また、出席委員からは、ICHARMのこれまでの活動に対して大いに評価していただく一方で、アフリカや南米なども視野に入れたグローバルな活動展開、他の国連機関やユネスコ・カテゴリー2センターなどとの連携強化を期待する意見などいただきました。

ICHARMでは、本会合で採択いただいた事業計画に基づき、また委員の皆様よりいただいたご助言などを踏まえ、今後も精力的な活動に取り組んでまいります。

なお、本会合での配布資料および発表スライドは、ICHARMホームページでご覧いただけます。

http://www.icharm.pwri.go.jp/special_topic/icharm_3rd_gb_ja.html

Summary of the 3rd ICHARM Governing Board meeting

Date: 10:00-12:00, Wednesday, 14th February 2018

Venue: International Congress Room, MLIT

Agenda:

- Confirmation of the rules and procedures for the ICHARM Governing Board meeting
- Examination of ICHARM Activity Report
- Examination and adoption of ICHARM Work Plan

Participants (listed in an alphabetical order of their organizations):

Akihiko Tanaka, President, National Graduate Institute for Policy Studies (GRIPS)

Andras Szöllösi-Nagy, Chairperson, International Hydrological Programme (IHP) Intergovernmental Council

Kunihiro Yamauchi, Director General of Global Environment Department,
on behalf of Mr. Shinichi Kitaoka, President, Japan International Cooperation Agency (JICA)

Masafumi Mori, Vice Minister for Engineering Affairs, Ministry of Land, Infrastructure, Transport and Tourism (MLIT)

Kazuhiro Nishikawa (Chairperson), President, Public Works Research Institute (PWRI)

Blanca Jiménez-Cisneros, Director, Division of Water Sciences, and Secretary, IHP,
on behalf of Ms. Audrey Azoulay, Director-General, United Nations Educational, Scientific and Cultural Organization (UNESCO)

Yuki Matsuoka, Head, United Nations Office for Disaster Risk Reduction (UNISDR) Office in Japan,
on behalf of Ms. Shoko Arakaki, Chief, Intergovernmental Processes, Interagency Cooperation and Partnerships Branch, UNISDR



Kazuhiro Nishikawa (PWRI)



Blanca Jiménez-Cisneros (UNESCO)



Masafumi Mori (MLIT)



Andras Szöllösi-Nagy (IHP)



Akihiko Tanaka (GRIPS)



Yuki Matsuoka (UNISDR)



Kunihiro Yamauchi (JICA)



Toshio Koike (ICHARM)

(Written by Takafumi Shinya)

ICHARM R&D seminars held / ICHARM R&D Seminar の開催

ICHARM R&D Seminars are held as an opportunity for researchers to keep up with the latest knowledge and information by inviting domestic and international experts in the field of hydrology and water-related disasters. The following reports the 59th, 60th and 61st seminars held in February and April 2018.

	Lecturer	Position	Title
59 th 15th Feb. 2018	Dr. Blanca Jiménez-Cisneros	<ul style="list-style-type: none"> ● Secretary of the International Hydrological Programme (IHP), ● Director of the Division of Water Sciences, Natural Science Sector, UNESCO 	U N E S C O - I H P : International Hydrological Programme
60 th 15th Feb. 2018	Prof. András Szöllösi-Nagy	<ul style="list-style-type: none"> ● Chairperson of the International Hydrological Programme (IHP) Intergovernmental Council ● Professor of Sustainable Water Management of National University of Public Service (NUPS) 	The state of global water resources and Nine Risk(y) Challenges for ICHARM to consider
61 st 10th Apr. 2018	Dr. Wouter T. Lincklaen Arriens	Leadership Couch, Transformation First. Asia	Leading Change in Projects: What It Takes

<59th>

Dr. Jiménez-Cisneros delivered a lecture, "UNESCO-IHP: International Hydrological Programme." IHP is the only intergovernmental programme of the UN system devoted to water research, water resources management, and education and capacity building. Since its inception in 1975, IHP has evolved from an internationally coordinated hydrological research programme into an encompassing, holistic programme to facilitate education and capacity building and enhance water resources management and governance (quoted from IHP web site). She explained six themes in the eighth phase of IHP (IHP-VIII, 2014-2021), the "UNESCO Water Family," which includes ICHARM and supports IHP activities, and the relationship between SDGs and IHP.



(59th) Dr. Blanca Jiménez-Cisneros

<60th>

Prof. Szöllösi-Nagy delivered a lecture, "The State of Global Water Resources and Nine Risk(y) Challenges for ICHARM to Consider." Showing various statistics and graphs, he explained "Looming Water Crises", which are caused by many reasons, such as climate change, increasing water demand above the population growth rate, etc., and emphasized nine challenges that should be addressed to solve the situation. He concluded his lecture by sharing a famous quote by John. F. Kennedy, the 35th President of the USA: "Anybody who can solve the problems of water will be worthy of two Nobel Prizes – one for peace and one for science."



(60th) Prof. András Szöllösi-Nagy

ICHARM では、水災害分野に関する国内外の専門家を招へいし、最新の知識や知見を習得し、研鑽する機会として「ICHARM R&D Seminar (ICHARM 研究開発セミナー)」を開催しています。このほど左の表のように第 59,60,61 回セミナーを開催しましたので、概要をご報告します。

<第 59 回>

開催前日の ICHARM 第 3 回運営理事会会合に委員としてご出席いただいた、Blanca Jiménez-Cisneros 氏を講師としてお招きしました。

Jiménez-Cisneros 氏からは、水に関する研究・水資源マネジメント・教育や人材育成に関する政府間プログラムとしてユネスコが 1975 年に設立した IHP の概要及びその最近の取り組み状況等について、ご講演いただきました。具体的な内容として、IHP の 8 期計画 (2014-2021) として履行中の 6 つのテーマの概要と、IHP を支える "UNESCO Water Family" (ICHARM もその一員です)、及び SDGs (持続可能な開発目標) と IHP の関わりなどについてご講演頂きました。

<第 60 回>

Jiménez-Cisneros 氏と同じく、ICHARM 第 3 回運営理事会会合に委員としてご出席いただいた、Andras Szöllösi-Nagy 氏を講師としてお招きしました。講演では、気候変動や人口増加率を上回る水需要の増加による「Looming Water Crises (忍び寄る水危機)」について、様々なデータやグラフを用いてご説明頂き、それを解決するための 9 つの課題について強調されました。そして最後には、John. F. Kennedy アメリカ 35 代大統領による「Anybody who can solve the problems of water will be worthy of two Nobel Prizes -one for peace and one for science.」の言葉で締めくくられました。



Group photo with audience (15th Feb.)

<第 61 回>

Wouter 氏は 20 年以上アジア開発銀行に勤務し、その際の経験をもとにリーダーシップ能力開発に従事し、現在では世界各地でトレーニングによる高度なコミュニケーションスキル、マネジメントスキルの開発に取り組んでいます。

氏からは、3 つのテーマで講演頂きました。「1. Become a T-shaped Professional」では、効果的な専門家 (Professional) になるためには、「Organizing」と「Leading」の 2 つの異なる要素を両手のように広げるとともに、より深い「Understanding」を追求することが重要であることを説明されました。「2. Boost Your Influencing Skills」では、コミュニケーションにおける話し方や態度、内容によって話者を 7 つの色で分類するユニークな考え方を紹介しました。「3. Lead Yourself in 3 Worlds」では、「Alignment-Personal World」「Direction-Observed World」「Commitment-Social World」の 3 つの世界における自己変革の重要性と方法について述べられました。

なお、R&D セミナーの前日には、Wouter 氏によるトレーニング「Leadership Training -Work in all Colors」が行われ、ICHARM 主任研究員ら 9 名が参加し、「7 つの色」の概念を基軸としたリーダーとしての心構えや話し方、チームワークの取り方、コーチングの方法などを学びました。

ICHARM では今後も様々な機会を捉え、セミナーを開催していく予定です。

【関連情報】

・ 国際水文計画 (IHP) : <https://en.unesco.org/themes/water-security/hydrology>

・ 持続可能な開発目標 (SDGs) : <http://www.un.org/sustainabledevelopment/>

(あるいは国際連合広報センターのページ (日本語))

http://www.unic.or.jp/activities/economic_social_development/sustainable_development/2030agenda/

・ TransformationFirst.Asia Pte Ltd: <https://transformationfirst.asia/>

<61st>

Dr. Wouter T. Lincklaen Arriens was the speaker of the 61st ICHARM R&D seminar. He is an expert instructor specialized in training for the development of leadership capabilities based on his long-term experience that he acquired while working at the Asian Development Bank for over 20 years. He has also been providing training for people around the world to further improve communication skills and management skills.

(61st) Couch Wouter

In this seminar, his presentation consisted of three themes:

1. Become a T-shaped Professional; 2. Boost Your Influencing Skills; and 3. Lead Yourself in 3 Worlds. Explaining the first theme, Dr. Wouter stressed the importance and the difference of two elements, "Organizing" and "Leading" for further "Understanding" to be an effective professional. He pointed out that "Organizing" and "Leading" are two separate skills like right and left arms, and that effective professionals should have a good command of them to carry out a project successfully. In addition, He advised the participants to always seek for a deeper "Understanding" of factors involved. Concerning the second theme, he introduced a unique concept to communicate ideas to people involved, for example, in a project. His advice was to be conscious of "seven colors" to categorize the people according to the way they speak and behave, what they talk about, etc. and employ a suitable approach to a different group of people for better communication. As for the third theme, he spoke about the three types of worlds: "Alignment-Personal World," "Direction-Observed World" and "Commitment-Social World." Each world refers to a different aspect of oneself, and he emphasized the importance of self-transformation in each world, proposing concrete actions to take for the purpose.

Group photo with audience (10th Apr.)

Prior to the R&D seminar, Dr. Wouter conducted "Leadership Training -Work in all Colors" on April 9 for nine researchers of ICHARM, instructing how to act and speak as leader, how to create a sense of teamwork, and how to coach staff members, of "seven colors".



Leadership training at ICHARM by Coach Wouter

ICHARM will continue holding R&D seminars at various occasions to further strengthen expertise of researchers.

< Related information >

- International Hydrological Programme (IHP):

<https://en.unesco.org/themes/water-security/hydrology>

- Sustainable Development Goals (SDGs): <http://www.un.org/sustainabledevelopment/>
- TransformationFirst.Asia Pte Ltd: <https://transformationfirst.asia/>

(Written by Daisuke Kuribayashi)

Research

Introduction of ICHARM research projects / 研究紹介

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

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

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

This issue introduces four studies as listed below:

Yousuke Nakamura, Exchange researcher

RRI-model simulation of a flash flood in the Kagetsu River due to the northern Kyushu heavy rain in July 2017

Akira Hasegawa, Former Research specialist

Meteorological drought assessment of climate projections with different GHG scenarios in the end of 21st century

Yoshito Kikumori, Senior researcher

Development of Learning Support Materials for Hydrology and Hydraulics using CommonMP

Hitoshi Umino, Senior researcher

Estimation of flood damage in the upper Citarum River basin, Indonesia

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、中村要介 交流研究員の行っている「平成29年7月九州北部豪雨での花月川におけるRRIモデルを用いた洪水予測」、長谷川聡 元専門研究員（現 東京大学）の行っている「異なる温室効果ガス排出シナリオによる21世紀末気候実験の気象学的湯水の評価」、菊森佳幹 主任研究員の行っている「CommonMPを用いた水文・水理学学習支援教材の開発」、海野仁 主任研究員の行っている「インドネシア国チタルム川上流における洪水被害の推計」の4つの研究を紹介します。



RRI-model simulation of a flash flood in the Kagetsu River due to the northern Kyushu heavy rain in July 2017

平成29年7月九州北部豪雨での花月川におけるRRIモデルを用いた洪水予測

Yousuke Nakamura, Exchange researcher

中村 要介 交流研究員

In recent years, flood damage caused by heavy rain in mountainous rivers has been frequently reported in Japan. In order to ensure a sufficient lead time for safe evacuation, it is necessary to predict river water levels in real time by utilizing a hydrological model.

In this study, we conducted simulation of the July 2017 flash flood in the Kagetsu River basin (136.1 km², Fig. 1) by utilizing the RRI model and rainfall forecasted for the next 6 hours, and showed the effectiveness of flood prediction in disaster management by evaluating the lead time for evacuation.

近年、中山間地域の中小河川では豪雨による洪水被害が相次いで報告されている。安全な避難のために十分なリードタイムを確保するためには、水文学モデルを利用してリアルタイムで河川水位を予測する必要がある。

本研究では、図1に示すように平成29年7月九州北部豪雨における花月川(136.1km²)を対象とし、6時間先までの降雨予測データとRRIモ

デルを用いて洪水予測シミュレーションを実施するとともに、リードタイムを明らかにし洪水予測の有効性について示した。

図2には、30分毎に予測した6時間先の水位を示す。本研究では、水文モデルと予測雨量による誤差分布を対象としているため、水位へのデータ同化は行っていない。予測水位①～④は微増傾向を示しているが、観測水位(▲)に対して過小評価されている。また、予測水位⑤～⑩は2~3時間先までは上昇傾向を示すが、その後は大きく減少することがわかる。予測水位⑩以降はピーク水位の再現性が高い結果になっている。これは、後述する図3からわかるように、ピーク付近に近づくほど予測雨量が的確に再現できているためである。

図3には、7/5 15:00と16:00時点における6時間先の予測雨量とRRIモデルによって計算した予測水位を示す。15時時点は本洪水に対して最も早く避難判断水位の超過を予測した時間である。このとき、予測水位は概ね2時間先までは精度良く再現できていた。しかしながら、それ以降、予測水位は下降傾向を示し、最終的には水防団待機水位を下回っていることがわかる。これは、2時間先以降の予測雨量が過小評価されていることが原因であり、実際のピークより50mm/hr小さかった。1時間後の16時になると、観測水位は氾濫注意水位を超え、3時間後に氾濫危険水位の超過を予測した。実際に氾濫危険水位の到達したのが18時であることから、16時の時点で避難していればリードタイムは2時間確保できていたことになる。

本研究では、平成29年7月九州北部豪雨を対象とし、花月川におけるリードタイムを明らかにすることを目的としてRRIモデルを用いたリアルタイム予測シミュレーションを実施した。その結果、避難のためのリードタイムは約2時間確保することができ、防災・減災に資するために洪水予測の重要性を改めて示すことができた。

Fig. 2 shows the water levels predicted for the next 6 hours at 30-minute intervals during the flood. In this case, data assimilation to the observed water levels was not conducted. Forecasted water levels No.1 (forecasted at 10:30) to No.4 (at 12:00) show a slight increase, but these water levels are underestimated, compared with the observed water levels (indicated by "▲" in Fig. 2). In addition, forecasted water levels No.5 (at 12:30) to No.11 (at 15:30) sharply rise for the next 2-3 hours but thereafter decline. It was the result that the peak water level could be reproduced after the forecasted water levels No.12 (at 16:00). This is because the forecasted rainfall have been accurately reproduced as approaching the peak as shown Fig. 3 which is to be described later.

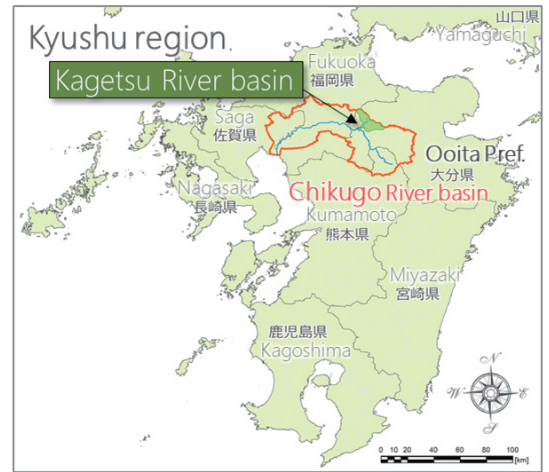


Fig. 1 Location map of the Kagetsu River basin in the Kyushu region
図1 花月川流域位置図

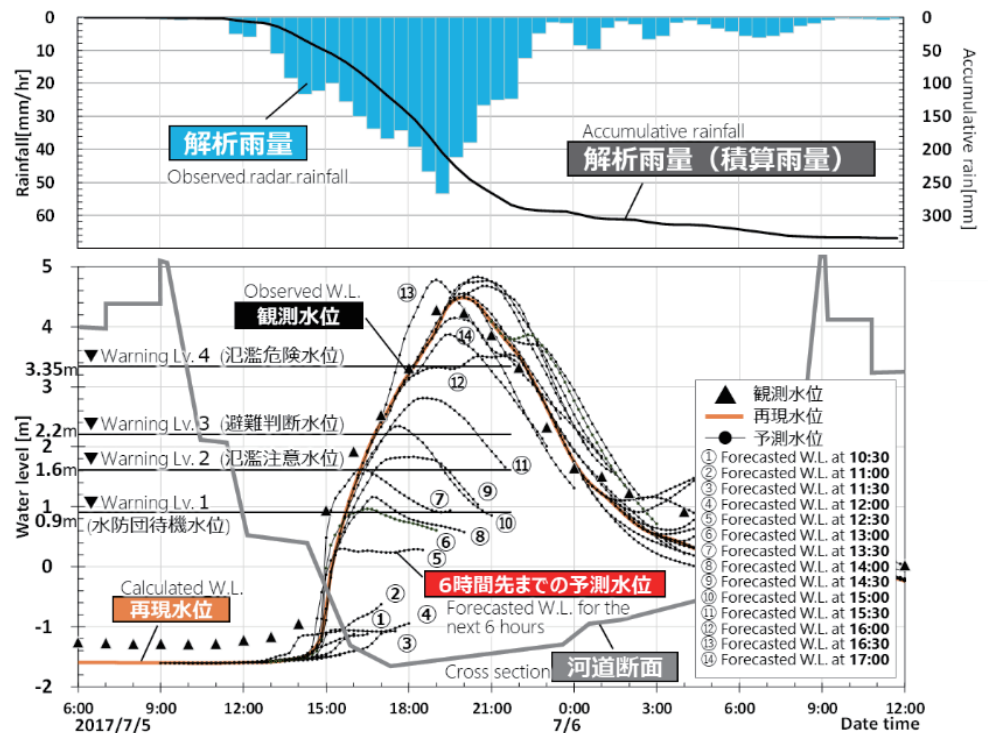


Fig. 2 Forecasted water levels by the RRI model every 30 minutes for the next 6 hours at the Kagetsu Station
図2 花月水位観測所におけるRRIモデルを用いた6時間先の水位予測結果

Fig. 3 shows the predicted precipitation for the next 6 hours and the forecasted water levels by the RRI model at 15:00 and 16:00 on 5 July 2017. At 15:00, the RRI model made the earliest prediction suggesting that the water level may reach Warning Level 3 (water level to start evacuation). At the time, the water level was predicted was able to be accurately reproduced for the next 2 hours. However, after that, the water level was predicted shows a downtrend, which is finally below the Warning Level 1. This is due to the underestimation of the forecasted rainfall after 2 hours, it was about 50 mm/hr smaller at the actual peak. At 16:00, only an hour later, the actual water level had already exceeded Warning Level 2, and the simulation forecasted that the water level may even exceed Warning Level 4 in the next 3 hours. Since it was around 18:00 that the actual water level reached Warning Level 4, a lead time of about 2 hours would have been ensured for the evacuation of local residents if they had started evacuation at 16:00.

In this study, we conducted real time simulation using the RRI model to find out the length of lead time local residents could have had for safe evacuation in the flood

event in the Kagetsu River due to the northern Kyushu heavy rain in July 2017. The simulation confirmed that a lead time of at least about 2 hours could have been ensured for safe evacuation, and the results stress the importance of real-time flood forecasting in water disaster prevention.

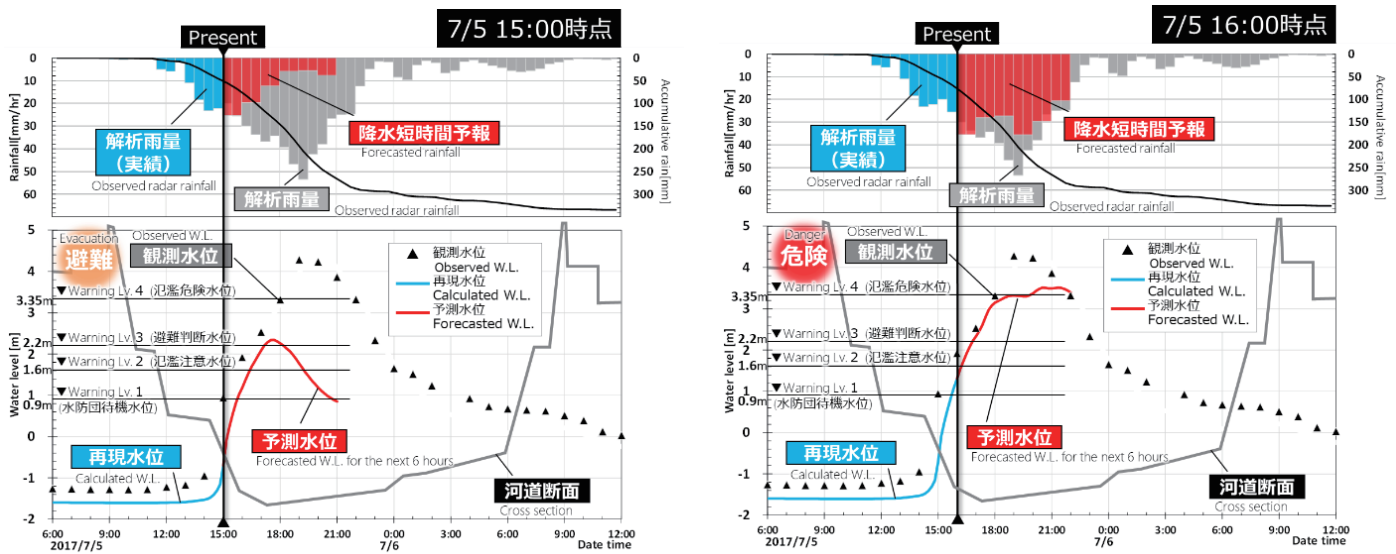



Fig. 3 Predicted rainfall and forecasted water levels by the RRI model at 15:00 (left) and 16:00 (right) on 5 July 2017
 図3 予測雨量と予測水位 (左図: 7/5 15 時、右図: 16 時)



Meteorological drought assessment of climate projections with different GHG scenarios in the end of 21st century

異なる温室効果ガス排出シナリオによる 21 世紀末気候実験の気象学的渇水の評価

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 長谷川 聡 元専門研究員

We proposed a new approach developed from the Standardized Precipitation Index (SPI) to evaluate change in climatic conditions at the reference period as the comparative SPI (cSPI) ^[1,2]. The SPI is one of the most commonly adopted standardized drought indices to monitor and predict meteorological droughts with only long-term precipitation ^[3,4]. Since the regular SPI range of interannual variation occurs between -1 and +1 with the median of SPI=0, the SPI value describes both drier and wetter climatic conditions by $SPI \leq -1$ and $SPI \geq +1$, respectively. Utilizing SPI case makes it easier to compare the severity of meteorological droughts across various locations due to the standardization: moderate drought with the SPI values below -1, severe drought with $SPI \leq -1.5$, and extreme drought with $SPI \leq -2$. Therefore, the comparative approach is a flexible tool to evaluate present and future climate projections at various locations in selected areas as well as globally ^[5,6].

The cSPI values were computed for 12-month timescale at the end of 21st century climate projections with 4 types of greenhouse gas (GHG) Representative Concen-

SPI (Standardized Precipitation Index) は、降水量だけで計算できる気象学的渇水の指標の一つで、渇水の予測・モニタリングのために世界で広く用いられています ^[3,4]。SPI が 0 で中央値を示し、一般に ±1 の間で通常の年々変動の範囲内、+1 以上で湿潤、-1 以下に達すると気象学的渇水が生じるとされ、SPI の負の値が大きくなると渇水の深刻度が増すことを意味します。このように標準化することで、渇水の深刻さを地域間で比較することが容易となります。異なる気候状態で比較可能とするため、現在気候の降水量を基準に将来気候の降水量を標準化する比較 SPI (comparative SPI) に拡張しました ^[1,2]。この拡張のアプローチ

は、全球や特定の地域間だけでなく現在・将来気候実験の比較も可能とし、さらに他の標準化指標にも順応することができるとされています^[5,6]。

気象研究所による水平解像度 60 km の全球大気気候モデルによる現在気候実験を基準として、温室効果ガスの排出シナリオが異なる四種類の将来気候実験の 12 ヶ月スケールの比較 SPI を算出し解析しました。RCP (代表濃度経路) シナリオは IPCC (気候変動に関する政府間パネル) の第五次報告書から用いられた温暖化シナリオで、RCP2.6、RCP4.5、RCP6.0、RCP8.5 からなります。RCP に続く数字は工業化以前から 2100 年まで増加する放射強制力の大きさ (単位: W/m^2) を示します。RCP8.5 は温室効果ガス排出削減の緩和策を全く行わない場合、RCP2.6 はあらゆる緩和策を行なって気温上昇を $2^{\circ}C$ に抑えるよう想定したシナリオです。

図 1 は将来気候の通常の状態が陸面でどれだけ乾湿側に移行するかを表し、現在状態からの変化が小さければほぼ 0 となります。上の図ほど温暖化の緩和策が控えめのために温度上昇が大きく、降水量の増減が大きいために将来気候の通常の状態が広い地域で乾湿に大きく振れます。それに伴って、渇水・洪水の増加・激甚化が進むと推測され、温暖化による災害や水資源に関する困難に対する適応策の地域別の充実が大いに必要となります。一方、下の図ほど温暖化の緩和について全球的かつ多大な努力が必要とされますが、その結果として温暖化への適応策が必要な地域は減少することが示されました。本研究は、文部科学省気候変動リスク情報創生プログラム (2012-2017 年度) の成果集^[7]に掲載されました。

今後は、手法に改良を加えながら、より多くの気候モデルデータに適用することで、予測精度の高度化と不確実性の低減に取り組むたいと考えています。

tration Pathways (RCPs) scenarios on the basis of the present climate projections of MRI-AGCM3.2H, which is an Atmospheric General Circulation Model with 60-km grid developed by the Japanese Meteorological Research Institute. The 4 GHG concentration trajectories are adopted for IPCC 5th Assessment Report, named as RCP2.6, RCP4.5, RCP6.0, and RCP8.5 depending on the mitigation measures. The number in each name is after a possible range of radiative forcing values in the year 2100 relative to pre-industrial values in W/m^2 , respectively. RCP2.6 is assumed 2K global warming from the pre-industrial levels with implemented mitigation plans of GHG emissions, while RCP8.5 is a business-as-usual scenario without any mitigations.

Figure 1 demonstrates the shift of the cSPI median of future climate projections on the basis of the present climate for RCP8.5, 6.0, 4.5 and 2.6 from top to bottom. The median shift indicates how severe the normal condition of future climates is compared to the dryness and wetness criteria in the present climate. As a result, a larger shift of the comparative SPI median is observed in both dry and wet conditions for less mitigation of GHG emission due to larger global warming RCPs (Figure 1). For these RCPs, more frequent drought and flood are expected in future climates demanding robust adaptation plans to minimize water-related disasters in these regions. In addition, this result indicates the importance of reducing GHG emission globally and was placed in the results collection of the Program for Risk Information on Climate Change (FY 2012-2017)^[7]. Therefore, the comparative approach allows us to improve the meteorological drought assessment, especially for huge ensemble data of future climate projections, and will be further advanced in the future studies

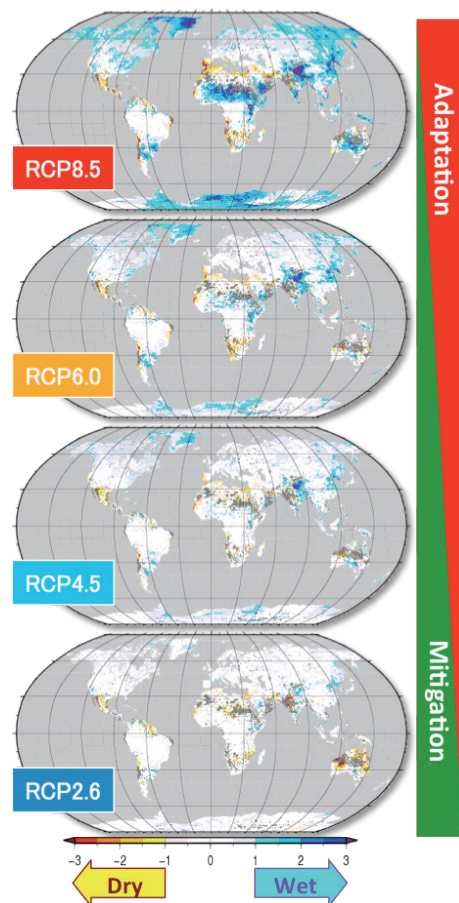


Figure 1. Median values of the comparative SPI (cSPI) computed over inland on 12-month timescale with MRI-AGCM3.2H outputs of 2075-2099 future climate for 4 Representative Concentration Pathways (RCP) such as RCP2.6, 4.5, 6.0 and 8.5 on the basis of the present climate 1979-2003 projection. Low accuracy of the cSPI computation is indicated by the dark gray color.

図 1: 現在気候を基準とした異なる温暖化シナリオの将来気候の 12 ヶ月スケールの比較 SPI の中央値の分布。濃灰色は解析の信頼性が低い地域を示す。

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Development of Learning Support Materials for Hydrology and Hydraulics using CommonMP

CommonMP を用いた水文・水理学学習支援教材の開発

Yoshito Kikumori, Senior researcher
 菊森 佳幹 主任研究員

The Common Modeling Platform for water-material circulation analysis (CommonMP)¹⁾ is a platform for calculation modulus (element models) to simulate water and material circulation in a river basin by using multiple element models, each capable of reproducing the various processes of basin-level water and material transfer. Researchers and experts from various fields related to water and material circulation have been cooperatively improving the platform by providing element models created based on their respective expertise to be incorporated into this platform, so that a better simulation environment will be developed for analyzing water and material circulation in a river basin. The improvement of a simulation environment through collective efforts is one of the key objectives of this project.

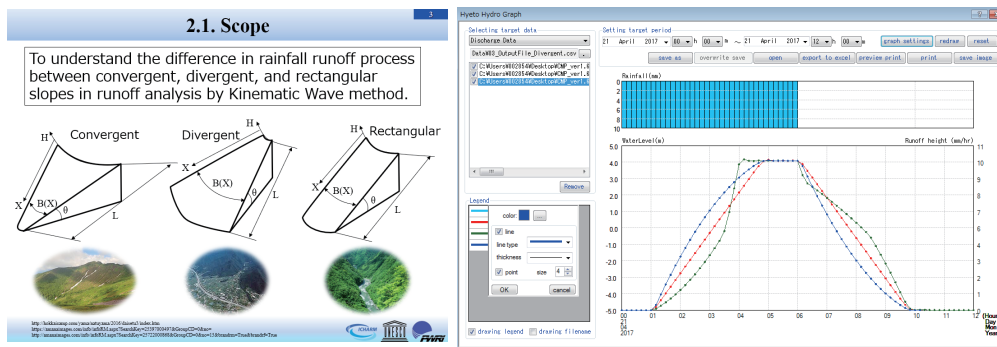
The CommonMP Development Project started in 2007, led by the National Institute for Land and Infrastructure Management (NILIM). I was with NILIM at that time and involved in the project from the beginning. In 2016, I was transferred to ICHARM but am still part of the project as a member of the CommonMP Promotion Committee and the Technical Subcommittee, mainly helping enhance the applicability and user-friendliness of CommonMP and promote its dissemination, as well as giving advice for improving its main unit. In this article, I will introduce part of my recent work on the development of learning support materials for hydrology and hydraulics using CommonMP.

Training is one of the three pillars of ICHARM's activities besides research and networking, and CommonMP can contribute significantly to this aspect. I have developed learning support materials to help beginner learners understand the behaviors and principles of hydrologic and hydraulic models incorporated into CommonMP. The materials are prepared for learners to learn: (1) the influence of hill slope shapes on runoff characteristics (kinematic wave model); (2) the difference in characteristics of flood wave propagation in the open-channel unsteady flow among different governing equations (kinematic wave, diffusion wave and dynamic wave); and (3) the relationship between the longitudinal distribution of cross-sectional channel shapes and the longitudinal water surface level (one dimensional non-uniform flow model). With the support materials, learners are able to study such hydrologic and hydraulic phenomena by executing simulation projects on CommonMP. For example, they can learn the influence of cross-sectional channel shapes on longitudinal water-level distribution by editing the channel shape interactively, which helps learners understand the behaviors and principals of hydrologic and hydraulic models intuitively. We are planning to release the materials for general users soon.

CommonMP (Common Modeling Platform for water-material circulation analysis)²⁾ とは、河川流域内の様々な水・物質移動の過程を再現するモジュール(要素モデル)を組み合わせて河川流域全体の水・物質循環をシミュレーションすることができる要素モデルのためのプラットフォームである。このソフトウェアは、水・物質循環に関する様々な分野の研究者や専門家がそれぞれの得意分野の要素モデルを提供することにより、互いに協力して流域の水・物質循環解析できる環境を整備することを開発目的の一つとしている。CommonMPの開発は、国土技術政策総合研究所を中心として2007年から始まっており、当時国総研に在籍した筆者は、当初から本開発プロジェクトに携わっていた。2016年に国総研から ICHARM に異動してからは、CommonMP プロジェクト推進委員会幹事、技術部会委員として、CommonMP の本体改良について助言するとともに、主に利用環境を整備し、普及促進に貢献することに注力している。本稿では、最近筆者が取り組んでいる水文・水理学学習支援教材の開発について紹介する。

ICHARM の活動の3本柱の一つとして「研修」があり、本件はこれに資するものである。筆者は、水理・水文学の初学者が水理・水文モデルの動作・原理をスムーズに理解できるように、①斜面形状の流出特性に与える影響(キネマチックウェーブモデル)、②開水路不定流モデル(キネマチック、ディフュージョン、ダイナミック)の違いによる洪水波の伝播特性の差異、③水路断面形状の縦断変化と縦断水面形の関係(一次元不等流モデル)を学習できるように、CommonMP を用いた教材を開発した。これらの教材は、学習者が CommonMP 上で演算プロジェクトを動かしながら動作・原理を理解できるように配慮しているところが特徴である。これらの教材を使うと、例えば、水路断面を編集しながら、インタラクティブにその河道縦断水位に与える影響を確認ことができ、その水理・水文モデルの動作・原理の直感的な理解に資する。これらの教材については、まもなく公開する予定である。

ICHARM では全世界から研修生を招いて様々な研修を実施している。その研修の中で、彼らが自国の河川流域のモデリングを行っている。これらは、貴重なデータであり、これらを CommonMP の演算プロジェクトのフォーマットで保存・管理す



An Example of Learning Support Material (Influence on Runoff Characteristics of Hill Slope Shape) 研究支援教材の一例(斜面形状の流出特性への影響)

れば、誰もが比較的自由にその演算プロジェクトを実行できるようになり、当該流域に関する知見が広まる事が期待できる。このような環境を整備していくことが筆者が取り組むべき課題と認識している。

ICHARM invites trainees from all over the world to attend training courses, some of which require them to build simulation models of the river basins of their own country by themselves. The simulation models they build make a valuable dataset to enhance CommonMP's simulation project, if stored and managed properly in a form suitable to CommonMP. Then it will be possible for everyone to execute simulation projects relatively freely and learn a lot about different basins of the world. The next step should be to establish a system for proper management of the valuable dataset in an effort to promote a wider use of CommonMP.

- 1) <http://framework.nilim.go.jp/en/index.html>
- 2) <http://framework.nilim.go.jp/>



Estimation of flood damage in the upper Citarum River basin, Indonesia インドネシア国チタルム川上流における洪水被害の推計

Hitoshi Umino, Senior researcher
海野 仁 主任研究員

過去に生じた洪水被害を適切に把握し評価することは、今後の河川改修事業を進めるにあたり極めて重要です。インドネシア国では、2008年に国家防災庁が設立され、水害をはじめとする災害情報の蓄積に努めています。ここでは、チタルム川上流を例に、被害データの蓄積について紹介します。さらに、被害単価を活用した洪水被害の推計手法について提案します。

チタルム川は、西ジャワ州バンドン県を水源に、ジャワ海に注ぐ流域面積 6,617km² の河川です (図-1)。同河川では、バンドン盆地東端の狭窄部の上流側で洪水氾濫が頻発し、国家防災庁のデータベース DIBI によると、2016年3月だけで4件の浸水被害が報告されています。しかしながら、洪水氾濫に伴い被害額は推計されていません。一方、この流域では、2010年にJICAにより洪水対策調査が実施され、表-1のように家屋・事業所・農作物などの被害単価が示されています。

ここで、今後のデータ整備を3ケース提案し、既存の被害単価を活用した被害額の推計について検討し

Appropriate grasping and assessment of flood damage that occurred in the past is extremely important in promoting future river improvement projects. In Indonesia, the National Disaster Management Agency was established in 2008, and they are striving to accumulate disaster information including flood damage. I introduce the accumulation of damage data in the Upper Citarum River Basin as an example. In addition, I propose estimation method of flood damage utilizing the unit flood damage.

The Citarum River, with a catchment area of 6,617 km² is pouring into the Java Sea from Bandung Regency, West Java Province (Figure 1). In the Citarum, flood frequently occurs upstream of the narrowed part of the eastern end of the Bandung Basin. According to the National Disaster Management Agency database DIBI, four events of flood damage have been reported only in March 2016. However, the damage amount has not been estimated. On the other hand, flood countermeasure



Fig-1 Citarum and adjacent river basin¹⁾

survey was conducted by JICA in 2010 in this area, and the unit price of damage such as houses, offices, agricultural crops etc. was presented (Table 1).

I propose three cases of future data development and consider the estimation of damage amount utilizing the existing unit price of damage.

(Case 1) About flooding in the future, inundation area and inundation depth will be identified. Also sample survey of affected houses will be conducted to accumulate data on building damage rates. Furthermore, regarding the crops, the relationship between flooding depth, flooding period and damage rate will be investigated.

(Case 2) In addition to Case 1 correspondence, sample survey of home and office will be conducted and cost of emergency measures will be taken.

(Case 3) In addition to Case 2 correspondence, accumulate the damage amount of public civil engineering facilities and utilities.

Table 2 summarizes the damage items that can be grasped when the above correspondence is taken. Here, we refer to the composition of Kinugawa River flood damage amount in Joso City, Ibaraki Prefecture in Japan, September 2015 (Figure 2). Of the flood damage amount of Joso City, the proportion of damaged amount of general assets etc. is very high as 95%, so that grasp of damage of general assets etc. is the key to grasping the whole flood damage. Although the conditions differ between Kinugawa River and Citarum River, if it is taken Case 1 in the Citarum River, it is expected that many flood damage can be estimated.

Here I proposed the estimation of flood damage for the upper Citarum River basin in Indonesia. In the future, I will conduct a sample survey of affected houses, accumulate data on the building damage rate according to the depth of flooding, and I would like to estimate the flood damage amount.

ます。

(ケース1) 今後の洪水について浸水区域・浸水深を特定します。また、被災家屋のサンプル調査を行い、建物被害率のデータを蓄積します。さらに、農作物について、浸水深、浸水期間と被害率との関係を整理します。

(ケース2) ケース1の対応に加え、家庭と事業所のサンプル調査を実施し、応急対策費を捕捉します。

(ケース3) ケース2の対応に加え、公共土木施設と公益事業の被害額を積み上げます。

以上の対応を取った場合に把握できる被害項目を表-2にまとめました。ここで、2015年9月の鬼怒川の洪水による茨城県常総市の水害被害額の構成を参照します(図-2)。常総市の水害被害額のうち、一般資産等被害額の割合は95%と非常に高く、一般資産等被害の把握が洪水被害の全容把握のカギとなります。鬼怒川とチタルム川では条件は異なるものの、仮に、チタルム川でケース1の対応をとった場合、洪水被害の多くが捕捉できると期待されず。

ここでは、インドネシア国のチタルム川上流を対象とした、洪水被害の推計について提案しました。今後は、被災家屋のサンプル調査を行い、浸水深に応じた建物被害率のデータを蓄積のうえ、洪水被害額を試算したいと考えます。

Table-1 Unit flood damage in upper Citarum Basin³⁾

Evaluation Item	Damage price per unit* [10 ⁶ Rp.]
Building price per one house	75
Domestic properties per household	38
Building price per one office	1,605
Depreciable assets per one office	6,420
Inventory per one office	1,003
Employee leave compensation for one workplace per day	30
Building price per one public facilities	100
Depreciable assets per one public facilities	50
Damage for agricultural crops per one ha.	8

*price in 2010 1USD=9,017Rp.
1JPY=99.20Rp.

Table-2 Grasped damage items

Damage category	Case 1	Case 2	Case 3
House damage	○	○	○
Damage to household items	○	○	○
Damage to office assets	○	○	○
Damage to assets of farmers and fishermen	○	○	○
Damage of business stops at offices	○	○	○
Cost of emergency measures at home	—	○	○
Cost of emergency measures at office	—	○	○
Damage to crops	○	○	○
Damage to public works facilities	—	—	○
Damage to utilities	—	—	○

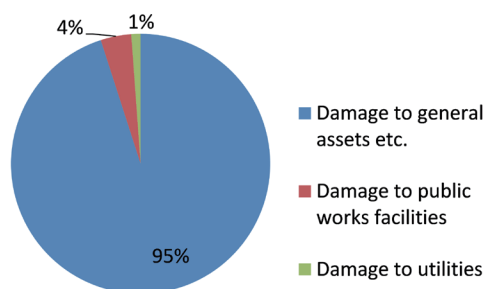


Fig-2 Construction of flood damage amount in Joso City²⁾

1) Gov. of Indonesia: Rencana Pengelolaan Sumber Daya Air Wilayah Sungai Citarum. pp.4, 2016

2) MLIT Statistics of Flood Damages in 2015

3) JICA: The Preparatory Survey for Upper Citarum Basin Tributaries Flood Management Project in Indonesia, Appendix 7-1, pp.1-6, 2010

Field Survey

Second Field Survey in the Sittaung River of Myanmar to Investigate Riverbank and Coastal Erosion / 第2回ミャンマー国シッタウン川現地調査

ICHARMは、ミャンマー国シッタウン川河口域における河岸浸食や砂州の変動などの流砂問題に関する予備調査の一環として、2018年2月16~18日に東京大学、ミャンマー水資源・河川システム整備庁(DWIR)と協力して、河岸・海岸侵食の調査を行いました。この調査は今回で2回目となり、1回目は昨年10月29~30日に行われています。今回の調査には、ICHARMから江頭研究・研修指導監、萬矢主任研究員、Shrestha主任研究員、郭専門研究員、小関研究員(土木研究所 水工研究グループ)が参加しました。

第2回調査は、海嘯や潮汐流の影響を受ける海岸地域の現状把握とシッタウン川の河床・河岸材料と流況を把握することを目的として行いました。調査第1日目は、海嘯、潮汐流、海岸侵食についてMamauk村付近で調査を実施し(図2)、その結果、一回の潮汐現象で海岸が約10m侵食されること、この侵食には潮汐流が重要な役割を果たしていることがわかりました。第2・3日の調査ではSittaung橋・Madauk橋間のシッタウン川河道において、河床・河岸材料を採取するとともに、ADCPを用いて流速、流量、河川の横断形状などを調べました(図3)。材料採取では、粒径、材料特性の分析に必要な49試料(河床材料44、河岸材料5)を得ました。海嘯、潮汐流に関する調査は数値モデル開発に不可欠であり、河床材料の採取は、対象地域について上流域界付近の土砂供給条件設定に欠かすことができません。今回の調査から得られる結果は、洪水、潮汐流、砂州の挙動、河岸・海岸侵食過程の数値分析を行う上で大変有益であると考えられます。

2月19日、ICHARMの調査団はヤンゴンでDWIRとの会議に臨み、現地調査の状況、2017年10月の調査から得られた現時点での結果、スケジュールを含めた今後の研究計画について報告を行いました。会議では、この他、現地調査でも使用した河床材料採取のための用具がICHARMからDWIRに贈呈されました。図4に示した写真は会議参加者の集合写真と用具贈呈の様子です。DWIRからは、ICHARMに対して、今回を含めこれまで実施された調査に対する謝意が示され、さらに、今後の研究に必要な水位などデータ提供でも協力していただけることになりました。

ICHARM has been conducting a preliminary study on sediment transport issues such as bank erosion, sand bar behaviors, etc. in the estuary of the Sittaung River of Myanmar. In this context, ICHARM conducted the second field survey to investigate riverbank and coastal erosion on February 16-18, 2018, in collaboration with the

University of Tokyo and the Directorate of Water Resources and Improvement of River Systems (DWIR) of Myanmar. The first field survey was conducted on October 29-30, 2017. A team of ICHARM researchers, comprised of Research and Training Advisor Shinji Egashira, Senior Researcher Atsuhiro Yorozuya, Senior Researcher Badri Shrestha, Research Specialist Youngjoo Kwak, and Researcher Hiroshi Koseki (Hydraulic Engineering Research Group, PWRI), joined this second field survey.

The main objectives of the second survey were to investigate the situation of the bank area exposed to tidal bores and currents as well as to survey bed and bank materials and flow conditions in the reach of the Sittaung River. On the first day, the team observed tidal bores, tidal currents and bank erosion near Mamauk village (Fig. 2). The observation in Mamauk confirmed that a bank erosion of about 10m can take place in one tidal event and that tidal currents play an important role in bank erosion. On the second and third days, field surveys were conducted to collect bed and bank materials and to measure flow velocity, flow discharge and cross sectional shape using an Acoustic Doppler Current Profiler (ADCP) in the river section between Sittaung Bridge and Madauk Bridge (Fig. 3). Forty-nine sediment samples (44 sediment samples from the river bed and 5 samples from the bank) were collected for analysis of grain size and material properties. Inspection of tidal bores and currents is helpful to develop a numerical model, and bed material survey in the reach is indispensable to specify sediment supply conditions at the upper boundary of our target region. The findings of the field survey will be useful for numerical analyses of flood and tidal currents, sandbar behavior, and bank erosion process.

On February 19, the ICHARM research team had a meeting with DWIR in Yangon, reporting field survey activities, preliminary results obtained by the research activities from October 2017, and explaining a future research plan with a draft schedule. In the meeting, a bed material sampling tool used during the field survey was presented to DWIR by ICHARM. The photos in Fig. 4 show the participants in the meeting with DWIR and the hand-over of the tool to DWIR. DWIR appreciated ICHARM for the research activities on sediment erosion and deposition in the estuary of the Sittaung River and the field surveys. DWIR agreed to provide ICHARM with data required for further study, such as water levels.

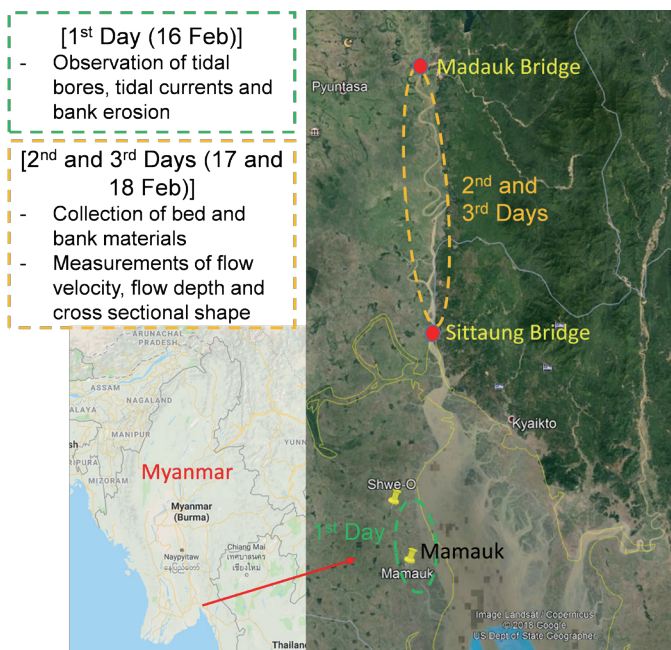


Fig. 1 Field survey area conducted in February 2018

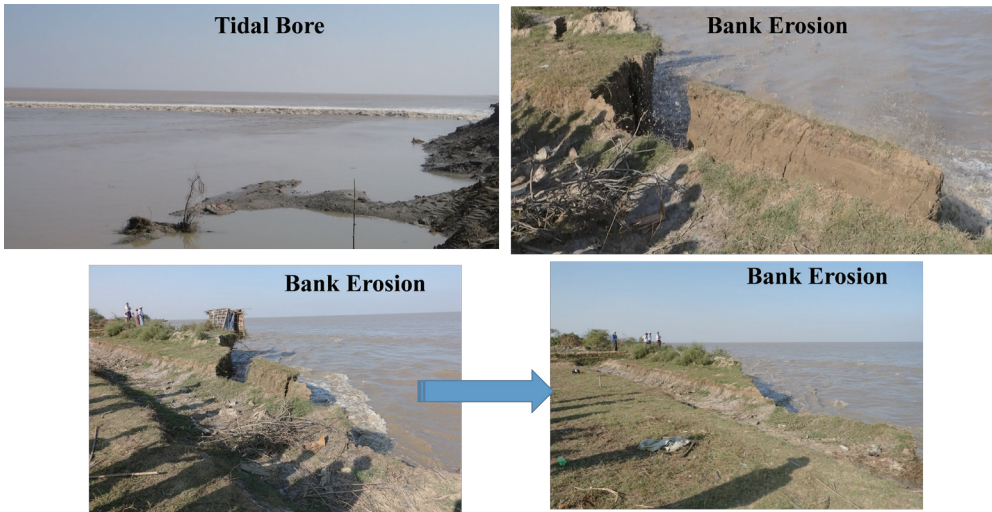


Fig. 2 Observation of tidal bores, tidal currents and bank erosion



Fig. 3 Collection of bank material (left) and measurement of flow depth and velocity by ADCP (right)



Fig. 4 Group photo of the meeting with DWIR on 19 February (left) and hand over of bed material sampling tool to DWIR (right)

(Written by Badri Bhakta Shrestha)

Information Networking

The 50th Annual Session of Typhoon Committee in Hanoi / 台風委員会(TC)第50回総会、ハノイ



The 50th Annual Session of the Typhoon Committee (TC) and the Technical Conference were held from February 25 to March 3, 2018, in Hanoi, Vietnam. About 150 participants gathered from 13 nations and territories (Japan, the United States, Korea, China, Hong Kong, Singapore, Macau, Malaysia, the Philippines, Vietnam, Thailand, Laos, and Cambodia) and two international organizations (WMO^{*1}, ESCAP^{*2}). ICHARM sent Chief Researcher Yoshio Tokunaga and Senior Researcher Takafumi Shinya to join Professor Yuichi Ono of IRIDeS^{*3} of Tohoku University and other experts from the Japan Meteorological Agency and the Ministry of Land, Infrastructure, Transport and Tourism of Japan. Mr. Hideomi

2018年2月25日～3月3日、ベトナム・ハノイにおいて台風委員会(TC)第50回総会及び技術会議(TECO)が開催され、13の国と領域(日本、米国、韓国、中国、香港、シンガポール、マカオ、マレーシア、フィリピン、ベトナム、タイ、ラオス、カンボジア)と2つの国際機関(WMO、ESCAP)他から約150名が参加しました。日本からは気象庁、国土交通省、東北大学IRIDeS小野裕一教授、そしてICCHARMから徳永上席研究員、新屋主任研究員が参

加しました。加えて今回は、50回目の節目として過去にTCで活躍された方々を招いてのトークセッション (Old Friends Sharing) も開催され、水文部会から推薦された大井英臣氏 (現・つくば市国際交流員) も参加されました。

総会は専門家による技術報告、気象、水文、防災部会の活動及び予算計画の説明、その他台風委員会の運営に関して協議が行われ、最終日に最終報告としてとりまとめのうえ、参加者により承認されました。また、総会終盤にはベトナム水文気象予報センターの見学を行いました。

今回の会合を通じ、ICHARMに関係するものとして以下の成果が得られました。

1) 水文部会においてICHARMと国土交通省が共同して行う、地域強化のためのフラッシュフラッド情報プロジェクトの活動内容と、その予算が承認されました。

2) 各部会の議長制度の改革について関係各国と調整を図り、現行の議長・副議長体制から、それぞれの部会において共同議長制度を可能とするような規約の改正を行う方針が承認されました。

3) 第7回水文部会会合の日本での実施について承認が得られたほか、実施時期や場所、日程等についてメンバー国や台風委員会事務局と意見交換を行いました。

今後の台風委員会の主な予定としては、5月に韓国ウルサンにおいて運営諮問部会及び防災部会、9～10月頃に日本において第7回水文部会、11月5～8日にタイ王国チェンマイにおいて第13回統合ワークショップ、来年2月頃中国において第51回総会が開催されることとなっています。

Oi, who now works for Tsukuba City in Ibaraki Prefecture, Japan, to promote international exchange, was also with them. He was invited by TC's Working Group of Hydrology (WGH) to participate in "Old Friends Sharing," a talk session held to celebrate TC's 50th meeting, as one of those who made a significant contribution to TC in the past.

The annual session consisted of technical reports by experts and presentations on activities and budget plans by the Working Groups of Meteorology, Hydrology and Disaster Risk Reduction, as well as discussions on TC's management issues. All these were compiled in the final report presented on the last day of the session and approved by the participants. They also took a tour to the National Centre for Hydro-Meteorological Forecasting of Vietnam.

Among the outcomes of the session, the following are particularly related to ICHARM:

1. The session approved the action and budget plans for a joint project, Flash Flood Risk Information for Local Resilience, led by WGH in collaboration with ICHARM and the Ministry of Land, Infrastructure, Transport and Tourism of Japan.
2. Improvement of the election system for the chairperson of each working group was discussed with member countries. The session agreed to introduce new rules which will allow each working group to adopt a co-chair system instead of the current chair and vice-chair system
3. The session agreed that WGH will hold the 7th meeting in Japan. The member countries and the TC secretariat discussed the meeting date, venue, schedule and other details.

In the coming months, TC plans to hold the Steering Committee and the Working Group of Disaster Risk Reduction in Ulsan, Korea, in May, the 7th meeting of WGH in Japan in September or October, the 13th Integrated Workshop in Chiang Mai, Thailand, on November 5-8, and the 51st Annual Session in China around February 2019.



Mr. Tokunaga reported the WGH activity



Mr. Oi in Old Friends Sharing



Group photo of TC 50 participants

*1 WMO: World Meteorological Organization

*2 ESCAP: United Nations Economic and Social Commission for Asia and the Pacific

*3 IRIDeS: International Research Institute for Disaster Science

(Written by Takafumi Shinya)

Meeting with the Philippine organization and field survey / フィリピン関係機関との会議と現地視察

On March 10-13, 2018, ICHARM held a research meeting and conducted field investigation on flood risk assessment with local researchers of the University of the Philippines Los Baños (UPLB) to further promote an ongoing project led by the International Flood Initiative (IFI) in the Philippines. A team of five ICHARM researchers led by Director Toshio Koike visited the study site in the Philippines with Professor Koki Honma*¹ and Associate Professor Muneta Yokomatsu*². Professor Felino P. Lansigan, Associate Professor Patricia Ann J. Sanchez, and Researcher Virgilio T. Villanci, Research Associate Ms. Jessa O. Aquino, Research Associate Ms. Catherine B. Gigantone and Ms. Heidi Mendoza attended from UPLB.



Investigation team at UPLB

The field investigation was conducted on the 12th in a flood-prone area that is part of the Candaba Swamp located in the Pampanga River basin. Interviews were carried out by asking local residents questions about past flood damage and the area's current agricultural practice. The research meeting was held on the following day, in which the Japanese researchers explained research on a flood risk assessment approach coupled with various models of flood inundation analysis, crop growth, and local economy, while the UPLB researchers provided the Japanese counterparts with information on Water Center, UPLB's new research center completed in December 2017, and research projects presently in progress.

The investigation team also had meetings with several agencies of the Philippine and local governments, including the Department of Public Works and Highways (DPWH), the Philippine Atmospheric Geophysical and Astronomical Services Administration (PAGASA), the National Economic and Development Authority (NEDA), the Philippine Statistics Authority (PSA), and Calumpit municipality of Bulacan Province in the Pampanga River basin, to share information on ongoing activities at municipal and national levels and exchange views and ideas in general.

ICHARM will continue conducting research on the development of a water-related disaster damage assessment model in close cooperation with UPLB and other local and national agencies.

ICHARMは、フィリピンにおけるIFI活動の一層の推進のための準備として、2018年3月10~13日にかけて、フィリピン大学ロスバニョス校 (University of the Philippines Los Baños) の研究者とともに、洪水リスク評価に関する研究会議及び現地調査を行いました。日本側メンバーとしては、小池センター長をはじめとする ICHARM メンバー 6 名、東北大学大学院農学研究所作物学研究室の本間香貴教授、京都大学防災研究所の横松宗太准教授が参加し、洪水氾濫解析モデル・農作物成長モデル・地域経済モデルを連結させた洪水リスク評価手法に関するこれまで研究成果を紹介しました。ロスバニョス校からは Felino P. Lansigan 教授、Patricia Ann J. Sanchez 准教授、Virgilio T. Villancio 研究員、Jessa O. Aquino 助手、Catherine B. Gigantone 助手、Heidi Mendoza 氏が参加し、2017年12月に学内に新たに設立された Water Center の紹介や、既存の研究プロジェクト等についての紹介を行いました。3月12日に行った研究会議の前日には、パンパンガ川流域のカンダバ湿原内の洪水常襲地域での現地調査を行い、洪水被害や農業の現状に関して住民へのインタビューなども行いました。

本活動以外にも、公共事業道路省 (Department of Public Works and Highways: DPWH) 及びフィリピン大気地球物理天文局 (Philippine Atmospheric Geophysical and Astronomical Services Administration: PAGASA)、フィリピン国家経済開発庁 (National Economic and Development Authority: NEDA)、フィリピン統計局 (Philippine Statistics Authority: PSA)、パンパンガ川流域のブラカン州カルンピット市との打合せも行い、活動の進捗状況の報告や意見交換を行いました。

今後も、フィリピン大学ロスバニョス校や関係機関と互いに協力しながら水災害影響評価モデルの開発に関する研究活動を進めていく予定です。



Interview with residents near the Candaba Swamp



Meeting with Mr. Emil K. Sadain (second from left) at DPWH



Meeting at Calumpit Municipality

*1 Professor Koki Honma, Graduate School of Agricultural Science, Tohoku University

*2 Associate Professor Muneta Yokomatsu, Disaster Prevention Research Institute, Kyoto University

(Written by Miho Ohara)

Participation in the 8th World Water Forum / 第8回世界水フォーラムへの参画

世界水フォーラム (World Water Forum: WWF) は、国際 NGO の世界水会議 (World Water Council: WWC) によって3年一度、主催され、世界の水関係者が一堂に会し、地球上の水問題解決に向けた議論や展示を行う世界最大級の国際会議です。WWF では、すべての人が参加できるフォーラムと各国政府機関からの閣僚会議、水に関するエキシビジョンによって主に構成されています。WWF は、1997年3月にモロッコ・マラケシュで第1回フォーラムが開催されたのを皮切りに、これまで7回開催されています。このたびは2018年3月17日から23日まで、ブラジル・ブラジリアで第8回世界水フォーラム (WWF8) が開催されました。

WWF8 では、3月19日午前に開会式が開催され、ブラジル・テメル大統領や日本の皇太子殿下を始めとする14カ国の国家元首級が参加しました。3月23日の閉会式までに合計300以上のセッションが開催され、“Sharing Water” (水の共有) というテーマの下、世界172カ国より12万名以上が参加する盛大な国際イベントとなりました。ICHARM から小池センター長と池田上席研究員が参加し、特別セッションで発表を行うとともに、参加者との交流・意見交換等を行いました。以下にその活動について報告します。

(1) 特別セッション「ハイレベルパネル・水と災害」

3月19日午後、HELP (水と災害ハイレベルパネル) の主催による特別セッション「ハイレベルパネル・水と災害」が開催されました。本セッションでは、HELP のハン・スンズ議長がチェアを務め、日本の皇太子殿下からは「繁栄・平和・幸福のための水」と題した基調講演が行われました。講演では日本の歴史的な水管理に関する知恵と経験、またブラジルのセラードでの農業開発による顕著な効果について紹介されました。また何世代にもわたるたゆまぬ努力と独創の結果としての優良事例や経験から学ぶことが人々の繁栄、平和、幸福につながると指摘された上で、水に関する行動を起こすことの必要性が強調されました。

また、ハンガリーの Janos Ader 大統領、ミャンマーの U Ohn Win 天然資源・環境保全大臣から Keynote Speech が行われるなど、世界のハイレベル意思決定者が参加する極めて発信力の高いセッションとなりました。本セッションの最後には、ICHARM 小池センター長から「Alliance of Alliances on Disaster Risk Reduction Researches (災害リスク軽減のための研究連携体による連携)」など、水と災害に関する地球規模での行動を進めることが発表されました。

The World Water Forum (WWF) is convened every three years by the World Water Council (WWC), an international NGO. It is one of the largest international events in which experts in water-related fields gather from all over the world and discuss and exhibit global water issues to find solutions. WWF is composed mainly of a forum in which anyone can participate, a ministerial conference attended by governmental organizations, and an exhibition on water issues.

WWF has been held seven times since the first forum in Marrakesh, Morocco, and the latest one, WWF8, took place in Brasilia, Brazil, on March 17-23, 2018.

WWF8 started with the opening ceremony on the morning of March 19 with the presence of 14 heads of state, including Brazilian President Michel Temer and His Imperial Highness the Crown Prince of Japan. The forum offered more than 300 sessions in total before it ended with the closing ceremony on March 23. Under the over-arching theme of “Sharing Water,” over 120,000 attendees gathered from 172 countries.

From ICHARM, Director Toshio Koike and Chief Researcher Tetsuya Ikeda participated, giving presentations at special sessions and exchanging views and opinions with other participants. The following reports some of their activities at the forum.

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Keynote lecture by H.I.H. the Crown Prince of Japan



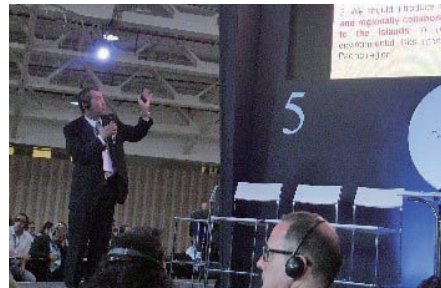
Presentation by Director Koike

(2) Activities on the Asia Pacific Regional Process

Having hosted a session at the 3rd Asia-Pacific Water Summit (3rd APWS) last December as one of the Asia Pacific Regional Process meetings, ICHARM also participated proactively in Asia Pacific Regional Process meetings held during WWF8.

On the morning of March 20, a session of the Asia Pacific Regional Process, "Climate change, disasters and water related adaptation in the Asia Pacific," was held. Chief Researcher Ikeda delivered a presentation on "Climate change impact assessment on water and disasters – Case studies of Asian river basins," providing the outputs of research projects and other activities that ICHARM has implemented to support the establishment of the Platform on Water and Disasters under the IFI framework, in which the audience showed particularly strong interest.

On the afternoon of March 21, Director Koike joined another session of the Asia Pacific Regional Process Synthesis Session on "Upscale innovation for a water-secure Asia and the Pacific" and discussed as a panelist how to implement the "Yangon Declaration," adopted at the 3rd APWS. The panelists introduced the changes across the vast Asia Pacific region and in each sub-region, and then discussed possible planning and implementation under the insufficient data, approaches to the disparities in economy and urban size, and solutions for unexpected results associated with application of new technologies. The panel emphasized the importance of dialogue for promoting integrated approaches and knowledge sharing.



Presentation by Chief Researcher Ikeda

(3) Special session "From 7th to the 8th World Water Forum: Three years of Implementation Roadmap"

On the afternoon of March 21, a special session, "From 7th to the 8th World Water Forum: Three years of Implementation Roadmap," was held. ICHARM played an especially important role as "Champion" (the principal coordinator) for the theme session entitled "Adapting to Change: Monitoring risk and uncertainty for resilience and disaster preparedness," which was one of the main thematic processes at the 7th World Water Forum (WWF7). ICHARM contributed a great deal to organizing the session and wrapping up discussions successfully.

In this session, 15 Champions reported the overall progress in carrying out the Implementation Roadmap during the three years from WWF7 in 2015 to WWF8 and proposed policy recommendations for the High-Level Political Forum 2018, which will be held July 2018. At the panel discussion, the future plans were discussed especially on concrete actions toward the 9th World Water Forum in 2021.

As a representative of ICHARM, Chief Researcher Ikeda reported the activities of ICHARM and the Core Group Members, and their endeavors were highly evaluated. WWF, a triennial global event, is an extremely significant opportunity for countries to confirm the three-year progress in implementing globally-agreed actions and promote further actions by reflecting opinions and ideas from participants.

The next World Water Forum (WWF9) will meet in Dakar, Senegal, in 2021 under the theme of "Water Security," returning to the African continent, where the forum took place for the first time in Morocco in 1997. ICHARM will positively participate in the WWF9 process. By doing so, it is hoping to share the outputs of its activities with many other countries and organizations and contribute more to the worldwide reduction of water-related disaster damage.

(2) アジア太平洋地域プロセスに係る取り組み

ICHARM では、昨年 12 月の第 3 回アジア太平洋水サミットでセッションを主催しました。このサミットは、WWF8 でのアジア太平洋地域プロセス会合の一つと位置付けられており、ICHARM としても WWF8 におけるアジア太平洋地域プロセス会合に主体的に参画しました。

3 月 20 日午前にはアジア太平洋地域プロセスのセッション「アジア太平洋地域での気候変動・災害・水に関する適応」が開催されました。ここで池田上席研究員から「水と災害に関する気候変動による影響評価ーアジアの河川流域でのケーススタディ」と題して、ICHARM の研究成果や IFI による水と災害プラットフォーム構築支援について発表を行い、聴衆から高い関心が寄せられました。

また、3 月 21 日午後には開催されたアジア太平洋地域プロセス統合セッション「アジア太平洋地域における水の確保に向けたイノベーションのアップスケーリング」に、ICHARM から小池センター長がパネリストとして参加して、第 3 回アジア太平洋水サミットで採択された『ヤンゴン宣言』の実施戦略が議論されました。パネルでは最初にアジア太平洋域全般の変化や各地域での特徴が紹介され、必ずしもデータが十分とは言えない中での取り組みや、経済や都市の規模による格差の問題、新技術適用とその結果起こる予期せぬ事態への対応等が議論され、統合的なアプローチを実現するための対話の推進や、知識の共有が強調されました。

(3) 特別セッション「第 7 回から第 8 回世界水フォーラムまで：Implementation Roadmap の 3 年間」

3 月 21 日午後には特別セッション「第 7 回から第 8 回世界水フォーラムまで：Implementation Roadmap の 3 年間」が開催されました。第 7 回世界水フォーラム (WWF7) の中でも主要な Thematic Process の一つである、Adapting to change: Monitoring risk and uncertainty for resilience and disaster preparedness について、ICHARM はその取りまとめ役である Champion の役割を果たし、セッションの運営、議論の取りまとめに大いに貢献しました。

本セッションでは、15 の Champion から 2015 年の WWF7 から WWF8 までの 3 年間にわたる活動成果報告と、今年 7 月に開催されるハイレベル・ポリティカルフォーラム 2018 に向けた提言が発表されました。そして、今後の展開、特に 2021 年の第 9 回世界水フォーラムに向けた取り組みについてパネルディスカッションが行われました。ICHARM の代表として、池田上席研究員は ICHARM 及び WWF7 の参加機関による活動について報告を行い、それらの取り組みに対して高い評価を受けることとなりました。世

界水フォーラムは3年に1度開催される世界的なイベントであり、こうした節目の機会を活かして、3年ごとの活動の進捗を報告し、参加者からの意見やアイデアを踏まえつつ、一層の活動の推進を図っていくことは極めて有意義であると考えられます。

次の第9回世界水フォーラムは、“Water Security”（水の安全保障）というテーマの下で、2021年にセネガル・ダカールで開催される予定です。1997年に第1回世界水フォーラムがモロッコで開催されてから、再びアフリカ大陸で開催されることとなります。ICHARMでは、このようなフォーラムへの積極的な参加を通じて、活動成果の普及や活動を通じて世界での水関連災害による被害軽減に取り組んでいきたいと思っています。

(※) 関連サイト：

世界水会議：<http://www.worldwatercouncil.org/>

第8回世界水フォーラム：<http://www.worldwaterforum8.org/>

For further information on WWF8, visit the following sites at:

World Water Council: <http://www.worldwatercouncil.org/>

8th World Water Forum: <http://www.worldwaterforum8.org/>

(Written by Tetsuya Ikeda)

International Flood Initiative (IFI)

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。

本号では、インドネシア、フィリピン、スリランカでの活動について報告します。

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 on Indonesia, the Philippines and Sri Lanka.

Establishment of IFI Platform in Indonesia and discussion on "TOUGOU" Research Project / IFI プラットフォームの構築と統合プログラムの協議、インドネシア

2018年1月15日～18日にかけてインドネシア政府の関係機関を歴訪し、2017年度から始まった「統合的気候モデル高度化研究プログラム」(以下、「統合プロ」)の実施、および国際洪水イニシアティブ (IFI) による洪水管理のプラットフォームの構築について、方針や連携体制を協議しました。

ICHARM research team visited government agencies of Indonesia on January 15-18 to explain the details of the Integrated Research Program for Advancing Climate Models (TOUGOU), launched in 2017 by the Japanese government, and discuss the concept and coordination system of the platform on water and disaster, which is a disaster risk reduction project led by the International Flood Initiative (IFI).

The TOUGOU project, planned on the achievements of the Program for Risk Information on Climate Change (SOUSEI), conducted from 2012 to 2016, is a five-year

research project from 2017 to 2021 funded by the Ministry of Education, Culture, Sports, Science and Technology of Japan. It studies climate change-induced hazards and other related issues and aims to assist effective adaptation measures by providing the research outcomes acquired by using advanced climate models.

In this project, ICHARM is assigned to conduct water-related disaster risk analysis for a river basin in Java Island of Indonesia. We will also analyze the needs and capacity of the study area for planning adaptation measures and provide assistance in the implementation of planned measures. Through all these tasks, we are expected to develop a prototype for implementing adaptation measures in a specific river basin.

The visit to Indonesia this time was to initiate discussions regarding the tasks with its government agencies from the early stage of the project. Their early involvement will help the process of building consensus on the selection of a target river basin and facilitate the sense of ownership of the project among local engineers.

Such participation of local engineers in the TOUGOU project can be a good experience when they have to lead the development of a platform on water and disaster, promoted by IFI. In this context, our team encouraged different agencies, including PUPR*¹ in charge of river management, BMKG*² and BNPB*³ to participate in the TOUGOU project and strengthen inter-organizational coordination.

In this visit, our team received positive responses from all agencies we visited to ICHARM's proposal on the TOUGOU project and the plan of the platform on water and disaster. They agreed to continue communicating closely with one another for successful implementation of the projects.

Based on the agreement made with the local agencies through this visit, ICHARM will continue striving for the establishment of a strong coordination system with support from local experts of JICA. We will also work on the collection, organization and sharing of data needed to carry out the TOUGOU project, analyze climate change-induced risks, and plan adaptation measures in close cooperation with local stakeholders, as well as facilitate more discussions towards the development of the platform on water and disaster.

統合プロは、2012～2016年度に実施された「気候変動リスク情報創生プログラム」の成果を発展的に継承しながら、気候変動がもたらすハザードの研究等に取り組み、具体的な適応計画に気候モデルの知見を反映することを目的とする、2021年度までの5ヶ年で実施される文部科学省のプログラムです。

この中で ICHARM は、インドネシア（以下、「イ国」）ジャワ島の河川流域を対象の一つとして水災害リスク解析を実施するとともに、対象地域の現況に応じた気候変動適応策ニーズ・能力の把握や現地実装支援を実施し、これらを通じて気候変動適応策実装のためのプロトタイプを開発することとしています。

今回の訪問では、対象流域を選定する初期段階からイ国側のコンセンサスを得、今後の研究過程においてもイ国側の技術者が主体的に参画する体制となるよう心掛けながら、統合プロの実施方針を協議しました。

また、統合プロでの活動自体が、IFIが目指すプラットフォームの構築におけるデモンストレーションにもなりうることから、河川管理を担う公共事業・国民住宅省（PUPR）に加え、気象気候・地球物理庁（BMKG）や国家防災庁（BNPB）にも主体的な参加や相互の連携強化を提案しました。

今回訪問した各政府機関では、ICARM が提案した統合プロの実施方針、関係機関の連携強化によるプラットフォームの構築についていずれも好意的に受け止められ、相互のコミュニケーションを密にして引き続き議論していくことで同意することが出来ました。

今後、現地に駐在する JICA 専門家の協力も得ながら連絡調整の体制を確立し、統合プロの実施に必要なデータの収集・整理・共有を図り、気候変動リスクの評価、適応策の検討を協働で進めるとともに、プラットフォームの構築に向けて協議を続けていくこととしています。



With Dr. Ir. M. Basoeki,
Minister of Ministry of Public Works and Housing (PUPR)

R&D Center for Water Resources (PUSAIR)



National Disaster Management Authority (BNPB)

Meteorological, Climatological,
and Geophysical Agency (BMKG)

*1 PUPR: Ministry of Public Works and Housing

*2 BMKG: Meteorological, Climatological, and Geophysical Agency

*3 BNPB: National Disaster Management Authority

(Written by Takafumi Shinya)

Meeting with the core organizations of the IFI Platform in the Philippines / フィリピンにおける IFI プラットフォームの主要機関との個別会議

2018年2月7日から9日にかけて ICHARM の徳永 上席研究員と宮本 研究員がフィリピンを訪れ、フィリピンにおける IFI プラットフォームの主要機関であるフィリピン公共事業道路省 (DPWH)、フィリピン大気地球物理天文局 (PAGASA) と個別会議を開催しました。2月7日には DPWH において JICA 名久井 専門家の協力を得て Emil K. Sadain 次官と会議を行うことができました。会議ではフィリピンにおける IFI プラットフォームの共同議長でもある Emil K. Sadain 次官にこれまでの活動と進捗を報告し、今後の具体的な担当となる DPWH の実務者の決定に至りました。Emil K. Sadain 次官との会議後には DPWH の実務担当者とも打ち合わせを行い、今後のデータアップロード等の具体的な工程について議論しました。2月8日の午前には、Emil K. Sadain 次官のオフィスと ICHARM を電話会議システムで繋ぐことで小池センター長らと電話会議を行い、IFI による今後の国際社会への貢献の方向性について議論することができました。2月8日の午後からは、PAGASA 本部を訪れ、Vicente B. Malano 長官らと IFI プラットフォームの今後の進め方、気候変動プログラム TOUGOU への協力、研究助成応募への参加等に関して幅広く議論することができました。2月9日には、DPWH の Patrick B. Gatan 部長と会議を実施し、IFI プラットフォームへの具体的な取り組みや研究助成応募に関して議論しました。

以上の活動を通じて、フィリピンにおける IFI プラットフォームの主要機関の活動体制や今後の具体的な取り組み内容を明確にすることができ、各省庁間の協力に基づいた水と災害に関するプラットフォームの活動をより一層加速させることが期待されます。

On February 7-9, 2018, Chief Researcher Yoshio Tokunaga and Researcher Mamoru Miyamoto visited the Department of Public Works and Highways (DPWH) and the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), the two core organizations of the International Flood Initiative (IFI) Platform in the Philippines. Thanks to great help from JICA Expert Takafumi Nakui, they were able to have a meeting with Undersecretary of DPWH Emil K. Sadain on February 7. In the meeting with the undersecretary, who is also the co-chair of the IFI Platform, the ICHARM researchers reported on the progress in the IFI Platform project with recent activities, and together assigned an official to the focal point at DPWH for further efforts in the project. After the meeting, they had a productive meeting with the focal point at DPWH on the detailed schedule of future activities such as data uploading and the next plenary meeting.

On the morning of February 8, a teleconference was held between Undersecretary Sadain and other researchers of ICHARM including Director Toshio Koike, and they discussed the direction of further contribution of IFI to the international network. In the afternoon, Tokunaga and Miyamoto visited the office of PAGASA and had discussions with PAGASA's officials including Administrator Vicnete B. Malano on a wide variety of topics such as future plans of the IFI Platform, the introduction of the TOUGOU Program, and a request for cooperation on the proposal of a new research grant. On February 9, the two researchers met with Project Director Patrick B. Gatan of DPWH and had talks on the specific activities of the IFI Platform and the proposal of a new research grant.

The series of meetings with the Philippine counterparts were very productive and beneficial in clarifying the institutional framework among the participating organizations and specifying future activities of the IFI Platform in the Philippines. We are hoping that all these efforts will further accelerate the Platform project through the interagency cooperation.



Members of the meeting at DPWH Undersecretary's office on February 7

DPWH: Department of Public Works and Highways

PAGASA: Philippine Atmospheric, Geophysical and Astronomical Services Administration

(Written by Mamoru Miyamoto)

2nd Plenary Session for the Platform on Water Resilience and Disasters held in Sri Lanka / スリランカで「第2回・水のレジリエンスと災害プラットフォームに関する会議」を開催

2017年5月下旬にスリランカ国で発生した甚大な洪水被害を受け、その復旧を支援するため、日本政府から国際緊急援助隊が派遣され、ICHARM も研究員を派遣することで協力を行いました。

ICHARM では、衛星観測雨量データや降雨流出モデル等による気象・

When a severe flood disaster occurred in Sri Lanka in late May 2017, the government of Japan dispatched the Japan Disaster Relief (JDR) Expert Team to Sri Lanka to assist in flood recovery efforts. ICHARM also supported the country by sending its staff as one of the JDR experts.

Since ICHARM conducts research on climate and flood forecasting and inundation analysis using satellite monitoring precipitation data and a rainfall-runoff model,

it can contribute a great deal to support Sri Lanka's effort. ICHARM is planning to continue providing information useful for flood management in Sri Lanka based on research outputs that it has achieved to date, and offer training and capacity development programs for local experts to learn proper utilization of information provided.

ICHARM has been participating in various projects in collaboration with other organizations. Among them are JAXA-led projects: Precipitation Measurement Mission (PMM) and Space Applications for Environmental (SAFE). Under these projects, 16 ground rain gauges were installed over the Kalu River basin from February 2014 until January 2018. ICHARM helps provide accurate real-time precipitation data by combining ground observation rainfall data and satellite observation precipitation data of GSMaP, and implement the capacity development for its utilization.

In addition, as the secretariat of the International Flood Initiative (IFI), ICHARM is assisting countries suffering from serious flood disasters in establishing a platform on water resilience and disasters in collaboration with flood management relevant organizations in each country.

On August 24, 2017, as part of these supporting efforts, the "Plenary Session for the Platform on Water and Disasters" was held in Colombo, Sri Lanka, for the first time. On March 28, 2018, the stakeholders including ICHARM met again at the "Plenary Session for the Platform on Water Resilience and Disasters," which was slightly renamed subsequent to the first meeting.

The following reports these activities in detail.

(1) Technical cooperation through JAXA-SAFE

A stakeholder meeting for reporting the SAFE project outcomes for the Sri Lanka project, entitled "Developing and Implementing an Operational Prototype for Advanced Flood Forecasting, Early Warning, and Data Sharing System in the Kalu Ganga Basin, Sri Lanka," was held on March 26, 2018, in Colombo, Sri Lanka. More than 30 Sri Lankan participants attended this meeting from the Irrigation Department, the Disaster Management Center (DMC), other government offices, the Ceylon Electrical Board, and regional engineering institutions. JAXA, RESTEC and the Japan Space Forum also participated as the secretariat of the project, while Senior Researcher Mohamed Rasmy and Research Specialist Katsunori Tamakawa participated from ICHARM.



Meeting participants. The secretary of the Ministry of Irrigation and Water Resources and the acting director general of the Irrigation Department co-chaired the meeting.

After the welcome addresses by Eng. N. A. Sisira Kumara, the secretary of the Ministry of Irrigation and Water Resources and Eng. K. Sivapalasundaram, the acting director general (ADG) of the Irrigation Department, several presentations followed: "Introduction to SAFE Sri Lanka Project" by Eng. S.P.C. Sugeeshwara, "ICHARM's collaboration with Irrigation Department" by Dr. Mohamed Rasmy, "Achievements of the Project (Outcomes)" by Eng. Thilini, and "Data sharing system, the current situation and future" by Mr. Dammika Karangoda. Then, all participants joined discussions.

A summary of the discussions is as follows:

- The secretary, the ADG, and other participants greatly appreciated the support from JAXA and ICHARM and were highly grateful for the development of the flood early warning system under this project which is crucially needed for the effective flood management of the Kalu River basin.

洪水予測や氾濫解析等の研究を行っており、これまでの研究成果を活用することによって、同国における洪水対策に資する情報提供を行うとともに、その活用のための研修や人材育成等を行うこととしています。

また、ICHARM では、宇宙航空研究開発機構 (JAXA) による降雨観測ミッション (PMM) や環境監視プロジェクト (SAFE) に参画してきました。こうした JAXA のプロジェクトによって、2014 年 2 月から 2018 年 1 月までに Kalu 川流域を対象として 16 基の地上降雨観測計が設置され、ICHARM によって地上観測降雨データと衛星観測雨量データ (GSMaP) を組み合わせ、より精度の高い雨量データのリアルタイムでの提供支援を行うとともに、その活用についての人材育成を行っています。

さらに、ICHARM は国際洪水イニシアティブ (IFI) の事務局として、水と災害に関するプラットフォームの構築を支援しており、2017 年 8 月 24 日にスリランカ・コロンボで「水と災害プラットフォームに関する会議」を開催し、それに引き続き、2018 年 3 月 28 日には第 2 回目となる「水のレジリエンスと災害プラットフォームに関する会議」を開催しました。

ここでは、これらの活動について報告します。

(1) JAXA-SAFE を通じた技術支援

ICHARM は、APRSAF (アジア太平洋地域宇宙機関会議) が進める「SAFE (宇宙技術による環境監視)」イニシアティブの枠組みのもとで、スリランカかんがい局での「Developing and Implementing an Operational Prototype for Advanced Flood Forecasting, Early Warning, and Data Sharing System in the Kalu Ganga Basin, Sri Lanka」プロジェクトに、技術アドバイザーとして参加してきました。このプロジェクトは 2018 年 3 月に終了し、同年 3 月 26 日にコロンボのかんがい水資源省で開催された SAFE ステークホルダー会合で最終報告が行われました。この会合には、スリランカ側からかんがい局、災害管理センター、セイロン電力委員会、地域技術機関等、約 30 名のステークホルダーが参加し、また SAFE 事務局である JAXA、RESTEC、日本宇宙フォーラムのほか、技術アドバイザーとして ICHARM から Rasmy 主任研究員、玉川専門研究員が参加しました。

N. A. Sisira Kumara かんがい水資源省長官、K. Sivapalasundaram かんがい局長代理による歓迎の挨拶の後、かんがい局の Sugeeshwara 氏より SAFE Sri Lanka プロジェクトの概要、ICHARM の Rasmy 主任研究員より ICHARM とかんがい局との協働、またかんがい局の Thilini 氏、Karangoda 氏より、それぞれ降雨流出モデルの開発や観測データ・洪水予測情報共有のためのシステム開発の現状と今後の予定について報告



Report by Senior Researcher Rasmy

されました。

これらの報告に対し、かんがい水資源省長官、かんがい局長代理、また、スリランカ側の参加者からカル川流域における洪水早期警戒システム開発への JAXA と ICHARM の貢献に対して感謝の意が示されるとともに、引き続き技術支援を行っていたきたいとの要望が出されました。また、このシステムではかんがい局が設置した雨量計のみを使用していますが、NBRO や気象局が所有する 100 地点を越える雨量データとの連携の必要性が提案されました。さらには、このシステムは洪水早期警戒だけでなく、雨期・乾期における水力発電にも特に有用であるとの意見や、このシステムを用いた地方でのハザードマップ作成への期待、また、洪水氾濫域を精度よく推定するために詳細なデジタル標高モデル (DEM) の利用が測量局から提案されるなど、活発な議論が展開されました。

(2) 「第 2 回・水のレジリエンスと災害プラットフォームに関する会議」の開催

2017 年 8 月 24 日に開催された会議に引き続き、2018 年 3 月 28 日には第 2 回目となる「水のレジリエンスと災害プラットフォームに関する会議」がコロンボのかんがい局で開催されました。

会議には、スリランカの Gamini Wijith Wijayamuni Zoysa かんがい水資源大臣に参加いただくとともに、S. Moharanarajah かんがい局長、国家建築研究所の Asiri Karunawardena 所長をはじめ、かんがい局や国家建築研究所 (NBRO)、災害管理センター (DMC) などから約 30 名が出席しました。また、ICHARM からは小池センター長、池田上席研究員、Rasmy 主任研究員、Shrestha 主任研究員、宮本研究員、牛山専門研究員、山崎専門研究員、玉川専門研究員の 8 名が出席しました。

会議の冒頭、小池センター長から、今年 3 月に国連・世界銀行が共同で発表した水に関するハイレベルパネルの最終報告書の中で、現在、スリランカで取り組まれているように、「水のレジリエンスと災害に関するプラットフォーム」が記されていることが紹介されました。Zoysa 大臣からは、河川の流域単位での洪水対策や水資源管理の重要性を述べるとともに、ICHARM による支援に対して感謝の意が述べられ、今後の更なる協力への期待が表明されました。また、Moharanarajah 局長からは、スリランカでは洪水だけでなく、渇水にも見舞われるなど、水災害に対して脆弱であり、特に洪水についてはここ数年、多大な人的・経済的被害が生じており、水災害に関係する各機関が集まるプラットフォームによって課題の解決につながるの期待が表明されました。

続いて、アジア開発銀行研究所の吉野直行所長から「災害の地域経済に対する実証的分析」と題した特別講義が行われ、地域での GDP データを用いた 2000 年の日本での洪水

- The Irrigation Department requested ICHARM to continue providing technical support.
- Archiving and using more dense precipitation data for forecasting was proposed by participants (because the Metrological Department and NBRO have data collected from more than 100 stations, the participants proposed collaboration with these organizations.)
- Participants suggested that this system would be useful for effective water power generation during the wet and dry seasons.
- Hazard map creation for local areas using this system was proposed.
- To obtain inundation data from this system more effectively, the use of finer resolution Digital Elevation Model (DEM) from the Survey Department was proposed by participants.

(2) 2nd Plenary Session for the Platform on Water Resilience and Disasters

In succession to the first Plenary Session on August 24, 2017, the second “Plenary Session for the Platform on Water Resilience and Disasters” was held on March 28, 2018, at the Irrigation Department in Colombo.

The session was attended by about 30 Sri Lankan participants from the Irrigation Department, the National Building Research Organization (NBRO), and DMC, including honourable guests such as Hon. Minister Gamini Wijith Wijayamuni Zoysa, the ministry of the Irrigation and Water Resources Management, Eng. S. Moharanarajah, the director general of the Irrigation Department, and Dr. Asiri Karunawardena, the director general of NBRO. Eight researchers participated from ICHARM: Director Toshio Koike, Chief Researcher Tetsuya Ikeda, Senior Researcher Rasmy, Senior Researcher Badri Shrestha, Researcher Mamoru Miyamoto, Research Specialist Tomoki Ushiyama, Research Specialist Yusuke Yamazaki, and Research Specialist Katsunori Tamakawa.



Director Koike (left) with Hon. Minister Wijayamuni Zoysa (right) and DG of Irrigation, Eng. S. Moharanarajah (center)

At the opening, ICHARM Director Toshio Koike introduced the outcome document of the High-Level Panel on Water, which was jointly released by the United Nations and the World Bank in March 2018, particularly highlighting the Platform of Water Resilience and Disasters, an ongoing project undertaken in Sri Lanka. Hon. Minister Wijayamuni Zoysa emphasized the importance of flood control and water resources management at the river basin level. He also expressed his gratitude to ICHARM for the support, and addressed his expectations for further cooperation. The director general of the Irrigation Department Eng. S. Moharanarajah pointed out that Sri Lanka is vulnerable to water-related disasters such as floods and droughts and thus has been frequently suffering from serious human and economic losses in recent years. He expected that the platform will help the country to solve such problems by gathering the efforts of national organizations concerned with water-related disasters. Subsequently, Prof. Naoyuki Yoshino, the dean of the Asian Development Bank Institute, gave a special lecture entitled “An Empirical Analysis of Disasters on Regional Economy”. In his lecture, he introduced a case study of the 2000 flood disaster in Japan by the use of regional GDP data. After that, ICHARM researchers presented research outputs that ICHARM had achieved on climate change research, ensemble rainfall prediction, flood forecasting, contingency planning, and data management. The Sri Lankan counterparts, representing the Irrigation Department, NBRO and DMC, expressed their expectations on the platform and their future plans for disaster risk reduction.

The participants joined the discussions in the latter half of the session. Many useful opinions were expressed, including a suggestion that professional organizations

that are specialized in economy and statistics should be invited to the platform. Important decisions were also made. All the participants agreed on the proposed data sharing guidelines, the assignment of the coordinators of the platform, and the nomination of the focal point from each organization for smooth coordination of future activities led by the platform. At the end of the session, Dr. Asiri Karunawardena made a closing remark by emphasizing the importance of flood damage mitigation through the concerted effort of the platform.

As the flood season is approaching in Sri Lanka, ICHARM will continue its supports by providing useful information for flood management in Sri Lanka.

The documents and presentation materials of the session are available online at: http://www.icharm.pwri.go.jp/special_topic/sri_lanka_session_20180405_en.html



Group photo with the session participants

(Written by Tetsuya Ikeda)

に関するケーススタディについて紹介されました。また、ICHARMの各研究員からは、気候変動やアンサンブル降雨予測、洪水予測、危機管理計画、データ管理など、これまでの研究成果について発表がなされるとともに、スリランカ側からはかんがい局、NBRO、DMCの代表者からプラットフォームに関する期待や今後の予定について発表がなされました。

そして、後半の討議において、プラットフォームに経済や統計に関する専門機関の参画を求める意見が出されるとともに、データの共有に関するガイドラインについて合意が図られました。さらに、今後の活動展開を図っていくために、プラットフォームの調整役や各機関の連絡窓口を設置することが決定されました。会議の最後には、Karunawardena 所長から閉会の挨拶として、プラットフォームの活動を通じて洪水による被害の軽減の重要性が強調されました。

スリランカでは再び、洪水期を迎えようとしており、ICHARMでは洪水対策に有用な情報の提供等を通じて、引き続き同国の洪水対策を支援していくこととしております。会議資料については、以下のサイトをご参照願います。

http://www.icharm.pwri.go.jp/special_topic/sri_lanka_session_20180405_en.html
http://www.icharm.pwri.go.jp/special_topic/sri_lanka_session_20180405_ja.html

■ Training & Education

Educational Program Updates / 修士課程研修 活動報告

The ICHARM master's course is a one-year program from October to September. Students mainly attend lectures in the first six months and work on their individual studies in the second six months.

In January, two practical exercise classes, "Computer Programming" and "Practice on Open Channel Hydraulics" started. The students also attended a training workshop, "Project Cycle Management," from January 9 to 11, and a hydraulic exercise class conducted at an outdoor experimental facility located in a suburb of Tsukuba city on the 15.

On February 4-5, the students joined a field trip arranged by GRIPS and enjoyed Japanese culture, historical buildings and a mechanical products factory. In the same month, two classes, "Control Measures for Landslide & Debris Flow" and "Socio-economic and Environmental Aspects of Sustainability-oriented Flood Management," started. The first of the five presentation meetings was held on February 8, in which each student spoke about a plan for their individual study and asked for advice from ICHARM researchers.

From February 27 to March 2, the students visited Kochi city and Hidaka village in Kochi prefecture, Ishii town in Tokushima prefecture, and Kobe city in Hyogo prefecture. On the first day, they were Hidaka village to see the Nagoya chinka-bashi ("sink-bridge") crossing the Niyodo River near the village. This bridge is a unique compromise to achieve a balance between benefit and cost. The bridge was built to provide the small, riverside community with a short cut to the national road across

2017年10月に始まった修士コースは、10月から2018年3月の6ヶ月は主に講義が行われ、4月から8月にかけては論文執筆に取り組みます。

1月からは実習科目「Computer Programming」、「Practice on Open Channel Hydraulics」が開始されました。また、1月9日から11日にかけては、「Project Cycle Management」の講習が、1月15日にはつくば市郊外の屋外実験施設を借りて水理学実習が行われました。2月に入ると、まず、4日から5日にかけて、政策研究大学院大学が主催した研修旅行に参加し日本文化を堪能しました。その後、「Control Measures for Landslide & Debris Flow」、「Socio-economic and Environmental Aspects of Sustainability-oriented Flood Management」の講義も開始されました。8日には、年間5回予定されているプレゼンテーションのうちの第1回目が実施され、ICHARM指導教官及び研究員からアドバイスを受けました。

2月27日から3月2日にかけては、高知県高知市及び日高村、徳島

県石井町並びに兵庫県神戸市を訪問しました。まず、初日は、高知県日高村で仁淀川に架かる名越屋沈下橋を見学しました。小規模集落が対岸の国道を利用するために架けられた橋梁で、建設費用を抑えるために低い位置に架橋されているため、増水すると橋梁自体が水面下に沈みます。平常時のみ橋梁を利用出来れば良いと割り切られて設置された橋梁で、利便性と建設費用の調和のユニークな例を学びました。次に、同じく日高村から仁淀川に掘られた日下放水路の取水口を見学しました。2月28日には、午前高知工科大学を訪問して「Development of Decision making System for Water Resource Policy Climate Change in Shikoku Area」というテーマで那須清吾教授の講義を受けました。午後からは高知市が管理する種崎津波避難タワーを訪問して、南海トラフ地震に対する被害軽減の取り組みについて説明を受けました。その後、高知市内を一望できる五台山に移動し、高知県庁職員から浦戸湾における津波の三重防護に関する事業の説明を受けました。

3月1日には、午前中に早明浦ダムを見学し、その後、午後から徳島県石井町の石井防災ステーションで水防工法の実習を受けました。まず、吉野川の概要説明を受け、月輪工法、シート張等の水防工法を見学した後、水防活動に不可欠なロープワークの実習を受けました。

最終日の3月2日には、神戸市「人と防災未来センター」を訪問し、近畿地方に基大な被害を及ぼした阪神淡路大震災に関する被災状況とその後の復興活動を学びました。

3月には、講義科目の終了に伴う試験が多く実施され、その後、4月からは本格的に研究・論文執筆に取り組むこととなります。

お忙しい中、現地訪問のご対応を頂いた山本邦一先生、徳島河川国道事務所の皆様及び高知県危機管理部及び土木部の皆様には大変お世話になりました。ここにお礼申し上げます。

the Niyodo River. It is built, however, to cross the river at a lower height than usual for cost reduction. The bridge is in service most of the time as the river water is usually at the normal level, but out of service during a flood, when it goes underwater, which happens not very often. After that, we visited the floodwater intake gate of the Kusaka diversion tunnel for flood control of Niyodo River in Hidaka village, where the students took a close look at facilities and other flood control measures in place.

On the second day, they visited the Kochi University of Technology, and attended a lecture on "Development of Decision-making System for Water Resource Policy Climate Change in Shikoku Area" by Prof. Seigo Nasu. In the afternoon, they looked around tsunami protection measures. That area is expected to be hit by Nankai Trough Earthquake. They first visited a tsunami evacuation tower built near the coast, and then moved to Mt. Godai's observation platform where an officer of Kochi prefecture explained the triple protection for the downtown of Kochi city against tsunamis.



The central area of Kochi city from Mt. Godai observation platform

On the third day, after visiting the Sameura dam, the students went to Ishii Disaster Prevention Station in Ishii Town. They first received a brief lecture on the Yoshino River, one of the nation's most famous rivers, and then learned several measures that are used in flood fighting efforts in Japan. In particular, they had a chance to see the ringing sand boil method in place thanks to the staff of the local office. They also learned how to use things they can find around them in the event of a disaster, such as using ropes in rescue efforts and creating a stretcher out of everyday clothes, blankets, and vinyl sheets and sandbags used in flood fighting.



Exercise on rope work at Ishii Disaster Prevention Station

On the last day, the students visited the Disaster Reduction and Human Renovation Institute in Kobe, Hyogo prefecture, to learn the Great Hanshin-Awaji Earthquake including damage, restoration and reconstruction. Looking at movies, photos and other exhibits, the students were shocked with the tremendous damage it caused to the Kobe area. And they learned the importance of cooperation among local residents.

All lectures end in March, and the students will focus on individual study including writing a master's thesis from April.

This year's field study was also fruitful owing to the cooperation of Mr. Kuniichi Yamamoto, the Tokushima River and Highway Office of MLIT, and the Departments of Crisis Management and Civil Engineering of Kochi Prefecture.

(Written by Takashi Shirai)

Others

Annual Hanami lunch / お花見ランチ

土木研究所幹部と ICHARM で勉学する博士・修士コース学生(計 19 名)との交流を目的とし

On April 2, 2018, a cherry blossom viewing luncheon was held under big sakura trees on PWRI premises. ICHARM holds this seasonal mini-outing for international students in its educational program to mingle with people at PWRI.

The event took place on a nice spring day with a good crowd of researchers, assistants and students including the director of ICHARM and the president and other executives of PWRI. S. L. Mohamed Aliyar, the additional director general of Irrigation Department of Sri Lanka who happened to be visiting ICHARM, also joined this gathering.

After Director Koike welcomed everybody, the luncheon started. The participants enjoyed eating a lunch box while talking with friends and colleagues, listening to a beautiful piece of music on the flute by a student from India, and singing a sakura song together. In the end, a student from Bangladesh made a brief thank-you speech, and the outing ended.

The staff who organized the event were happy that people had a good time at *ohanami*, a traditional Japanese event in spring.

た花見会を 2018 年 4 月 2 日のお昼休みに行いました。

当日は、好天に恵まれ、小池センター長を始め、土木研究所西川理事長、他の幹部の方々にも参加していただきました。また、当日、打ち合わせのため ICHARM を訪問されておりましたスリランカかんがい局の S.L. Mohamed Aliyar 氏 (Additional Director General of Irrigation Department) にも特別にご参加いただき、盛大に行われました。

桜の下、小池センター長からの挨拶、お弁当を食べながらの談笑、インドからの修士学生によるフルート演奏に続き、参加者の合唱、バングラデシュからの修士学生による謝辞等が行われ、楽しい時間を過ごすことが出来ました。

外国からの参加者も日本の伝統であるお花見を十二分に満喫していただけたと思います。



(Written by Shigeyuki Senda)

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

New ICHARM Members

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



Yoshiyuki Imamura / 今村 能之
Director for Special Research / 特別研究監

Japan

I am delighted to rejoin ICHARM as the third time appointment and see its development.
I have been associated with ICHARM since its establishment and even before, and am excited to contribute to its further development.



Yousuke Tomizawa / 富澤 洋介

Senior Researcher / 主任研究員

Japan

It's my first time to work at ICHARM and PWRI. Until ten years ago, I had conducted researches on water resources and dam operations at NILIM for five years. I'm glad to restart my research life here in ICHARM. In addition of my research background, I believe 10 year-experience of administrative position can contribute ICHARM activities.



Hirosato Yoshino / 吉野 広郷

Senior Researcher / 主任研究員

Japan

I am very so pleased to be a member of ICHARM from this April. This is the first time for me to work in Tsukuba area. Before coming here, I was working in MLIT and MAFF headquarters for seven years. I hope these experiences would be useful here. I would like to make my best efforts. Best regards.



Takafumi Mochizuki / 望月 貴文

Senior Researcher / 主任研究員

Japan

I returned to Tsukuba for the first time in five years. Last time I was here, I was with a research team studying river environment improvement. Research at ICHARM will be different from what I was doing then, but I'm excited to take on a new challenge.



Hiroaki Shirai / 白井 宏明

Senior Researcher / 主任研究員

Japan

This is the first time for me to work in ICHARM. I am honored to work in this research institute. My research interests include analyzing the economic impact of infrastructure related to water hazards. I would like to contribute in various fields of ICHARM.



Osamu Maruyama / 丸山 修

Deputy Head of General Affairs Division / 副参事

Japan

Hi! I just start working from 2nd Apr. Before coming here, I had been working at embassy of Japan in Israel for 3 years as a tourism attache to promote inbound tourism to Japan. Now I study English for Licensed guide-interpreter. So I'm so happy to work to speak with you. So please feel free to talk to me anytime. I will do my best to become your help as fast as possible. Thank you.



Tomoki Nakamura / 中村 友紀

Administer / 主事

Japan

I am happy to work with all of you here. I've just started working at ICHARM since this April. Before coming to ICHARM, I was at Accounts department. I hope I'll get used to things at ICHARM soon. By the way I like reading books and Karaoke, so please tell me your recommended books. In the end, since the same surname Nakamura are working at ICHARM, so please call me Tomoki !

Leaving ICHARM

- **Takafumi Shinya** : Senior Researcher
Director, Asuwagawa dam construction office, Kinki Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism
- **Hironori Inomata** : Senior Researcher
Head, Planning and Research Administration Department, Public Works Research Institute (PWRI)
- **Akemi Saito** : Deputy Head of General Affairs Division
Deputy Head of General Affairs Division, Compliance Management Office, Public Works Research Institute (PWRI)
- **Takashi Shirai** : Senior Staff
Hokkaido Regional Development Bureau, Ministry of Land, Infrastructure, Transport and Tourism
- **Akira Hasegawa** : Research Specialist
Project Researcher, Center for Climate System Research, University of Tokyo
- **Liu Tong** : Research Specialist

- **新屋 孝文** 主任研究員
国土交通省 近畿地方整備局
足羽川ダム工事事務所長
- **猪股 広典** 主任研究員
国立研究開発法人 土木研究所
企画部参事
- **齊藤 明美** 副参事
国立研究開発法人 土木研究所
適正業務推進室 副参事 (併) 総務部総務課
- **白井 隆** 主査
国土交通省 北海道開発局 開発監理部
人事課付 (併) 北海道局 参事官付
- **長谷川 聡** 専門研究員
東京大学 大気海洋研究所 特任研究員
- **リュウ トン** 専門研究員

ICHARM will renew the website soon

ICHARM ホームページ リニューアルのお知らせ

ICHARM is getting ready to launch the new website very soon in mid-May.

The new website will be filled with more contents than before, especially with those covering research, and, what's more, it will be far more smartphone-friendly. As we have been, we will keep updating the pages frequently, too.

We will let you know by email when it's officially up.

ICHARM では、5月中旬に、ICHARM ホームページのリニューアルを予定しています。

研究関連のコンテンツを充実させるとともに、スマートフォンで読みやすくなるようにする予定で、公開後も随時新たな情報を更新していきます。

公開された際は追ってニュースレター・メール・リスト等でもお知らせします。

Comments from visiting researchers

交流研究員 感想文

ICHARM accepted 4 visiting researchers: Dr. Maheswor Shrestha from Nepal, Mr. Seenipellage Chaminda Sugeeshwara from Sri Lanka, Ms. Wadu Thantrige Thilini Manodhya de Silva from Sri Lanka and Mr. Dhammia Nishantha Karangoda from Sri Lanka as visiting researchers.

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



Maheswor Shrestha

Water Resource Division, Water and Energy Commission Secretariat (WECS), Nepal

Visiting research period: February 19 - March 4, 2018

It's my pleasure to participate the Foreign Guest Researchers Invitation Program of PWRI to attend the research meetings on distributed hydrologic modeling at ICHARM, Tsukuba. Continuous support from ICHARM staff; Ms. Okawa made my stay calm and easier at Tsukuba.

I participated this program mainly to initiate a collaborative platform to build an integrated distributed hydrologic model (Water and Energy Budget based Distributed Hydrologic Model - 4 component) with snow and glacier melt modules. I think my stay at ICHARM fulfilled the objective of my visit and invitation program too. I had a chance to share my knowledge on snow and glacier melt modeling works with Mr. Naseer, Dr. Tsutsui and Dr. Rasmy from ICHARM and two interns; Mr. Abdul Moiz and Mr. Liu Chang from the University of Tokyo. I would like to thank Prof. Koike and Mr. Ito for the invitation. I hope such collaborative research efforts would be extended in future too. Finally, the thing I liked the most is the serenity of Tsukuba.



Seenipellage Chaminda Sugeeshwara

Irrigation Department, Sri Lanka

Visiting research period: February 26 - March 9, 2018

I got the opportunity to come to ICHARM with two other fellow members of my organization (Irrigation Department, Sri Lanka) for two weeks for developing a flood forecasting model and a message dissemination system for Kalu River basin in Sri Lanka. This was done under the hosting and supervision of ICHARM. I am so impressed by visiting again to the institute that I was graduated in M.Sc. in Water Related Disaster Management in 2010. I felt really like I have met my very close relative after a long time. ICHARM staff under the leadership of Prof. Toshio Koike have guided us very well to achieve the task. Therefore I am honored by paying my gratitude to all the ICHARM staff. I want to pay my heartfelt gratitude to Dr. Mohamed Rasmy, Senior Researcher for always guiding directing and teaching us despite his very busy schedule in ICHARM. Finally I want to say that once again I have witnessed the great hospitality of Japanese people.

I am very much sure ICHARM to be the leading world research center for all the water hazard mitigation and management very soon.



Wadu Thantrige Thilini
Manodhya de Silva

Irrigation Department, Sri Lanka

Visiting research period: February 26 - March 9, 2018

It was a great pleasure to be with ICHARM for two weeks. I really enjoyed those two weeks as my very first visit to ICHARM and also to Japan. Though it was a short period, I learned a lot and gained a lot of valuable experiences. This training session was a great opportunity to develop my carrier and also to enhance my knowledge.

The objective of this training was to develop a flood forecasting system for Kalu river, Sri Lanka using Rainfall and Runoff Inundation (RRI) model. Under this I have improved my knowledge of some software such as RRI, gnuplot and working with linux terminal/terminal emulators. I would like to express my special gratitude to Rasmy sensei who guided me towards the successful completion of model despite his very busy schedule.

Finally I would like to give a big thank to all members of ICHARM and students for their kind support and cooperation with me during the training period.



Dhammia Nishantha Karangoda

Irrigation Department, Sri Lanka

Visiting research period: February 26 - March 9, 2018

On behalf of the Department of Irrigation, Sri Lanka, I would like to thank all members of ICHARM for giving me this great opportunity to me a develop a comprehensive website for flood forecasting in kalu river basin. Especially, I would like to express my gratitude to Director of ICHARM Koike, Deputy Director Sawano, Associate professor Dr. Rasmy, Secretary and all other support staff in ICHARM.

This short visit we already develop a model for flood forecasting in Kalu river as a testing and will expand into other rivers in Sri Lanka. With in this well organize research in ICHARM, my academic knowledge could improve better than before. I was also able to learn Rainfall and Runoff Inundation (RRI) model.

In addition everyone kindly helped me to adjust in Tsukuba. I was impressed by their sincere help. This research at ICAHRM led me to improve myself.

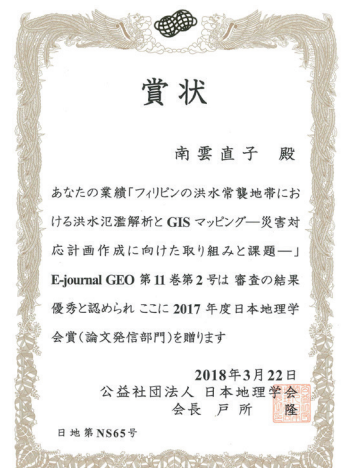
Awards / 受賞リスト

* January - March 2018

- January 31, Mohamed Rasmy Abdul Wahid, awarded a letter of appreciation by Foreign Minister of Japan for disaster response efforts in Sri Lanka



- 3月22日、2017年度日本地理学会賞(論文発信部門)受賞、南雲直子、大原美保、バドリ バクタ シュレスト、澤野久弥、フィリピンの洪水常襲地帯における洪水氾濫解析とGISマッピング—災害対応計画作成に向けた取り組みと課題—



Business Trips / 海外出張リスト

* January - March 2018

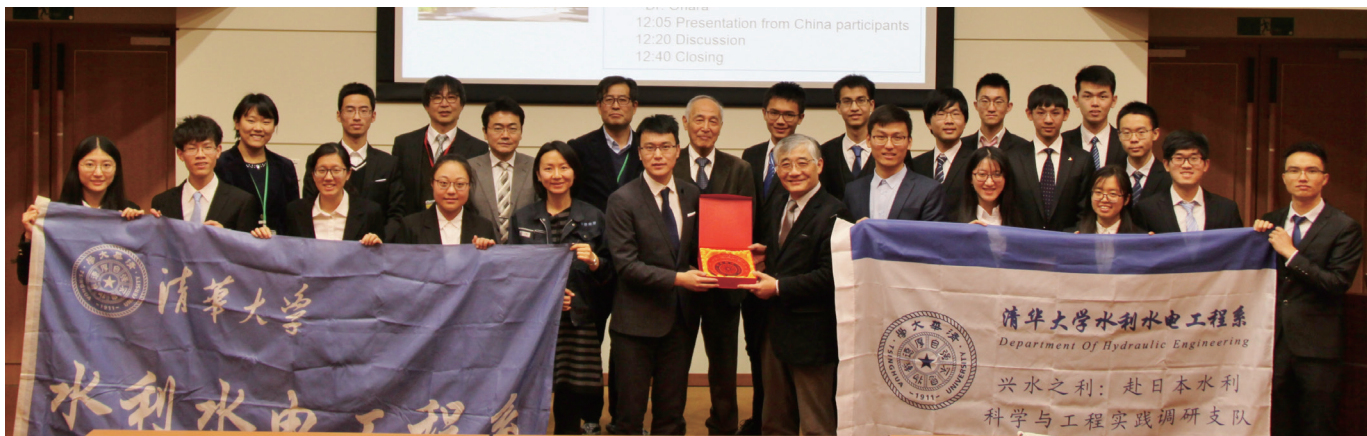
- January 10-13, Jakarta in Indonesia, Mohamed Rasmy Abdul Wahid, to participate in the 7th Global Precipitation Mission (GPM) Asia Workshop and deliver an oral presentation on "GSMap applications for water related disasters in Sri Lanka"
- January 14-19, Colombo and Anuradhapura in Sri Lanka, Mohamed Rasmy Abdul Wahid and Katsunori Tamagawa, to install real-time data transfer system for the rain observations in Malwathu river basin, Sri Lanka
- January 14-19, Indonesia, Hisaya Sawano, Takafumi Shinya, Badri Bhakta Shrestha and Yoshito Kikumori, research on "TOUGOU" program activity plan and establishment of IFI National Platform
- February 4-9, Melbourne in Australia, Tomoki Ushiyama, to participate in the HEPEX Workshop
- February 6-10, Manila in Philippines, Yoshio Tokunaga and Mamoru Miyamoto, preparation for Typhoon Committee project and meeting with DPWH for IFI activities
- February 15-20, Bago in Myanmar, Shinji Egashira, Atsuhiko Yorozuya, Badri Bhakta Shrestha, Hiroshi Koseki (PWRI Researcher) and Young-Joo KWAK, field Survey at Sittang River in Bago, Myanmar
- February 22-25, Washington D.C. in U. S. A., Toshio Koike, to attend the World Bank HQ event "Tech 4 Bosai"
- February 25-March 4, Hanoi in Viet Nam, Yoshio Tokunaga and Takafumi Shinya, to participate in Typhoon Committee Technical Conference (TECO) And 50th Annual Session of Typhoon Committee

- March 10-14, Manila, Candaba and Calumpit in the Philippines, Toshio Koike, Miho Ohara, Mamoru Miyamoto and Naoko Nagumo, (1) meeting with Researchers from University of Philippines Los Baños (2) field survey at Candaba Swamp (3) meeting on water disaster impact assessment model
- March 10-17, Manila, Candaba, Calumpit and Davao in the Philippines, Yoshio Tokunaga and Hitoshi Umino, survey on easy estimation method of socio-economic impacts caused by floods in Pampanga River basin in Philippines using big data
- March 16-24, Brazil, Toshio Koike and Tetsuya Ikeda, to participate in the 8th World Water Forum (WWF8)
- March 17-22, Istanbul in Turkey, Young-Joo Kwak, to attend a Geoinformation For Disaster management(GI4DM) 2018
- March 25-31, Sri Lanka, Toshio Koike, Tetsuya Ikeda, Badri Bhakta Shrestha, Mohamed Rasmy Abdul Wahid, Mamoru Miyamoto, Tomoki Ushiyama, Katsunori Tamagawa, Yusuke Yamazaki, (1) JAXA-SAFE Project Stakeholders Meeting (2) Second Plenary Session for the Platform on Water and Disasters

Visitors / 訪問者リスト

* January - March 2018

- Visited by delegate from Department of Hydraulic Engineering, Tsinghua University, China / 中国清华大学, January 25, 2018
Purpose: to attend a symposium organized by ICHARM for introduction and academic communication
- 18 teachers and students of Department of Hydraulic Engineering, Tsinghua University, China



- Visited by the delegate from Universiti Tenaga Nasional (UNITEN), Malaysia, February 21-22, 2018
Purpose: (1) to study the Disaster Risk Reduction research in Pampanga River (2) discuss the future collaboration
- Dr. Ng Yu Jin, Senior Lecturer
- Engr. Azrul Ghazali, Senior Lecturer
- Engr. Ahmad Kamal Kadir, Lecturer
- Prof/ Ir Khairul Salleh Mohamed Sahari, Professor



- Visited by delegate from irrigation department, Sri Lanka, April 2, 2018
- S.L. Mohamed Aliyar, Additional Director General of Irrigation Department



Publications / 発表論文リスト

* January - March 2018

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

- 小池俊雄、頻発する水災害の背景と地域防災力の向上、「第3回防災・減災シンポジウム」～社会・地域・住民で水防災意識を未来に繋いでいくために～、国土交通省九州地方整備局、福岡県、久留米シティプラザ、2018年2月28日
- Young-Joo Kwak, Jonggeol Park, Wataru Takeuchi, Long-term flood detection mapping using multi-satellite data for international river basin, 26th IIS forum proceeding, 26th IIS forum, Institute of Industrial Science(IIS) U-Tokyo, Tokyo, March 5-6, 2018
- 海野仁、徳永良雄、インドネシア国チタルム川上流における洪水被害の推計に向けた提案、第45回土木学会関東支部技術研究発表会、土木学会、山梨大学、2018年3月7～8日
- 玉川勝徳、WEB-DHM作成GISシステム、DIASコミュニティフォーラム2018、DIAS事務局、御茶ノ水ソラシティカンファレンスセンター、2018年3月9日
- 原田大輔、土砂・洪水一体型モデルの開発、DIASコミュニティフォーラム2018、DIAS事務局、御茶ノ水ソラシティカンファレンスセンター、2018年3月9日
- Tsujimura M, Sakakibara K, Imaizumi Y, Gusyev M, Morgenstern U, Spatial and temporal variation of residence time of spring and groundwater in multiple watersheds, Japan and New Zealand, The 14th Australasian Environmental Isotope Conference, Wellington, March 26-28, 2018
- 李星愛、渋尾欣弘、佐貫宏、古米弘明、下水道施設内観測水位データとXRAINを用いた鶴見川流域における内水氾濫解析、第54回下水道研究発表会、日本下水道協会、東京ビックサイト、2017年8月1～3日
- Sungae LEE, Yoshihiro SHIBUO, Hiroshi SANUKI, Yoshimitsu Tajima, Shinji SATO, Long term monitoring of water level in sewer networks for validation of urban flood model, 14th IWA/IAHR International Conference on Urban Drainage, ICUD, Prague, September 10-15, 2017

2. Poster Presentation / ポスター発表

- 南雲直子、江頭進治、赤谷川流域の地形特性からみた2017年九州北部豪雨災害による被災家屋の立地、日本地理学会発表要旨集、日本地理学会、Vol.93、2018年3月
- Yoshihiro SHIBUO, Hiroshi Sanuki, Sungae LEE, Kouhei YOSHIMURA, Yoshimitsu Tajima, Development of Data Base Integrated Hydrological- and Hydraulic Modeling for River Flood- and Urban Inundation Forecast, useR!2017 Conference, useR!, Brussels, August 1-3, 2017
- 渋尾欣弘、佐貫宏、吉村耕平、李星愛、田島芳満、XRAIN、高解像度降水ナウキャスト、降水短時間予報を活用した都市流域浸水解析、水文・水資源学会2017年度研究発表会要旨集、pp. 214-215、水文・水資源学会、北見工業大学、2017年9月19～21日

3. Journal, etc / 学術雑誌 (論文誌、ジャーナル)

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None / 該当無し

5. PWRI Publication / 土研刊行物 (土研資料等)

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6. Others/ その他

None / 該当無し

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