文部科学省　2016年度私立大学研究ブランディング事業　選定プロジェクト
「災害・環境変動監視を目的としたグローカル・モニタリング・システムの構築による安全・安心な社会への貢献」

第3回
グローカル・モニタリングに関する
国際ワークショップ

3rd International workshop on Glocal Monitoring

GLOCAL
MONITORING
PROJECT

日時：2020年1月10日（金）
13:00～18:00（懇親会　18:00～）
場所：東海大学高輪校舎　2号館2階2201・2202教室
〒108-8619　東京都港区高輪2-3-23

Date：Jan. 10, 2020
Time：13:00～18:00　Reception：18:00～
Place：Tokai university, Takanawa Campus
Building 2, 2F room 2201,2202
2-3-23 Takanawa, Minato-ku, Tokyo 108-8619

東海大学総合研究機構
TOKAI UNIVERSITY GENERAL RESEARCH ORGANIZATION

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Outline

In the end of 2016, Tokai University has started the five-year' project call "Constructing glocal monitoring system for safe and secure society". This is a kind of branding project of Tokai University supported by the Ministry of Education, Culture, Sports, Science and Technology (MEXT). The main idea of the project is to connect global monitoring system using satellite observation with local monitoring system using SNS for disasters and environmental changes. To do this, international cooperation is necessary including satellite data exchange. After four years, we are organizing the International Workshop on Glocal Monitoring to present the progress of the project and discuss about the future expansion of Glocal Monitoring activity Your kind understanding and contribution to Glocal Monitoring would be most appreciated.

東海大学では、平成２８年度に研究プロジェクト「災害・環境変動監視を目的としたグローカル・モニタリング･システムの構築による安全・安心な社会への貢献」が文部科学省私立大学研究ブランディング事業に選定を受け、"安全・安心に貢献する東海大学"として４年間、精力的に活動を続けてきました。特に国際協力には力を入れ、各国の研究者との交流を図っています。この４年間の活動の成果のご報告と今後のさらなる国際展開を見据え、下記の通り、国際ワークショップを開催することになりました。お忙しい時期とは存じますが、ぜひご出席をいただき、忌憚の無いご意見をいただきたく、お願い申し上げます。

1st international workshop
in Japan

2nd international workshop
in Philippines

Programs

Opening (13:00-13:10)

13:00 | 13:05	Welcome Address Prof. Kiyoshi Yamada Chancellor, Tokai University	開会の挨拶 山田清志 東海大学学長
13:05 | 13:10	Address from MEXT Ms. Mutsuko Inoue Director, Ministry of Education,Culture, Sports, Science and Technology(MEXT)	ご挨拶 井上睦子 文部科学省高等教育局 私学部私学助成課長

Session 1 (13:10-14:40)

13:10 | 13:30	Progress of the Glocal Monitoring Project (20min) Prof. Kohei Cho Director, Tokai University Research & Information Center (TRIC)	グローカルモニタリングプロジェクトの進展 長　幸平 東海大学情報技術センター所長 情報理工学部教授
13:30 | 13:50	The role and importance of SNS for Information Sharing During Disasters (20min) Prof. Osamu Uchida Professor, Department of Human & Information Science, Tokai University	災害時の情報共有においてSNSが果たす役割と重要性 内田　理 東海大学情報理工学部教授
13:50 | 14:15	Mapping of an inundation range and depth estimated from SNS at the time of flood disaster (25min) Mr. Hiroaki Maeda Director of Geographical Survey Div., Geographic Dept., Geospatial Information Authority of Japan	水害発生時のSNS情報から推定した浸水範囲と浸水深の地図化 前田比呂明 国土地理院応用地理部地理調査課長
14:15 | 14:40	Development of Time Shift Monitor for damaged area investigation (25min) Dr. Toshiaki Sato, PASCO Cooperation	被災地域の調査を目的としたタイムシフトモニターの開発 佐藤俊明 (株) パスコ経営戦略本部総合研所 所長

Coffee Break (14:40-15:00)

Session 2 (15:00-16:15)

15:00 | 15:25
Near real time update and distribution of VIIRS temporal profiles of surface lighting: preliminary testing (25min)
Dr. Christopher D. Elvidge
Director, Earth Observation Group Payne Institute for Public Policy, Colorado School of Mines, USA

15:25 | 15:50
Multi-temporal and Multi-Level Monitoring of Land Deformation and Infrastructures (25min)
Prof. Fuan Tsai
Director, Center for Space and Remote Sensing Research, National Central University, Taiwan

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15:50 | 16:15
Progress, challenges and opportunities for multiperspective observation platforms and approachesfor resource and environmental monitoring (25min)
Prof. Enrico Paringit
Professor, University of the Philippines, Philippines

Coffee Break (16:15-16:35)

Session 3 (16:35-17:50)

16:35 | 17:00
Monitoring on regional and local scale by Radar Remote Sensing (25min)
Prof. Uwe Soergel
Director, Institute Photogrammetry (IFP), Faculty of Aerospace Engineering and Geodesy, University of Stuttgart, Germany

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17:00 | 17:25
Monitoring aerosol optical property and surface solar radiation in east Asia using Himawari-8 satellite measurement (25min)
Prof. Husi Letu
Professor, Institute of Remote Sensing and Digital Earth (RADI), Chinese Academy of Science, China

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17:25 | 17:50
Integrated management of various health data using IT technology and approach of the health promotion (25min)
Prof. Naoaki Ishii
Professor, Department of Health Management, Tokai University

IT技術を活用した種々の健康データの統合管理と健康推進の取り組み
石井直明
東海大学健康学部教授

Closing remarks(17:50-18:00)

Closing Address
Prof. Shigeru Yamaguchi
Executive Director, Head Office of International Affairs, Tokai University

閉会の挨拶
山口　滋
東海大学グローバル推進本部部長

Reception(18:30-20:00)

CV & Abstract

Progress of the Glocal Monitoring Project
グローカルモニタリングプロジェクトの進展

Kohei Cho,
Director, Tokai University Research & Information Center (TRIC)
長　幸平
東海大学情報技術センター所長　情報理工学部教授

Abstract：
In 2016, Tokai University initiated a project call “Constructing glocal monitoring system for safe and secure society”. “Glocal” is the cointed word of “global” and “local”. The main concept of the project is to connect the global monitoring system using satellite observation with the local monitoring system using SNS for monitoring disasters and environmental changes. The project was approved by the Ministry of Education, Culture, Sports, Science and Technology(MEXT) of Japan as one of the Research Branding Project of Private Universities in Japan. Tokai University is receiving MODIS, VIIRS and AVHRR data at it's ground stations one in Shonan Campus and another in Kyushu Campus. The data are automatically processed and archived in near real time. On the other hand, the authors have been operating Disaster Information Tweeting System(DITS) for disaster information collection. The authors are constructing the Glocal Monitoring System by connecting the satellite data system with DITS. The concept of Glocal Monitoring is expanding. The authors have organized a number of international symposiums and workshops with international partners from China, Philippines, China Taipei, US and some other countries. The progress of the Glocal Monitoring Project will be introduced in this talk.

概要：
東海大学では、平成28年度に研究プロジェクト「災害・環境変動監視を目的としたグローカル・モニタリング・システムの構築による安全・安心な社会への貢献」を立ち上げ、文部科学省が推進する平成28年度「私立大学研究ブランディング事業」に選定された。本プロジェクトは、衛星観測等によるグローバルな情報と、地域住民等からソーシャルメディアを介して発信されるローカルな情報等を有機的に結び付けることによる、災害・環境変動監視を目的としたグローカル・モニタリング・システムの構築を目指すものである。
東海大学では、これまでに、湘南キャンパスおよび九州キャンパスにある衛星受信システムを使って、Terra、Aqua、NPP等の地球観測衛星のデータを受信・処理し、海氷、海洋、大気、災害等の即時監視に利用できる体制を構築している。また、ツイッターを利用して災害情報を発信するシステムDITSおよびその情報を地図上に表示するシステムDIMSを運用している。本プロジェクトでは、これらのシステムを統合し、例えば、地域住民がスマートフォンで自分の被災状況を発信すると、監視システムの衛星画像上にその位置や被災状況が表示されると共に、自動的に周辺地域の衛星画像が切り出され、その住民のスマートフォン上に時系列で表示されるような仕組みの構築を進め、国際社会および地域社会の安全・安心に寄与することを目指している。
　東海大学ではグローカル・モニタリングの概念を世界に発信しており、国際的な協力体制の構築を進めている。これまでに、中国科学院やフィリピン大学で研究協力協定を締結すると共に、各国で国際ワークショップ、特別セッション等を開催し、議論を深めている。今回は、これまでのプロジェクトの進捗状況について報告する。

Prof. Kohei Cho

Professor, Department of Human & Information Science
Director, Research Promotion Division, Tokai University
Director, Tokai University Research & Information Center (TRIC)

長　幸平
東海大学情報理工学部　教授
情報技術センター所長、宇宙情報センター長、
研究推進部長、創造科学技術研究機構長を兼務

He graduated Department of Applied Physics at the Tokyo University of Science in 1979 and finished his master course on remote sensing at Chiba University in 1981. After working ten years at the Remote Sensing Technology Center of Japan (RESTEC) as a remote sensing scientist, he joint Tokai University, He has been the General Secretary of the Asian Association on Remote Sensing (AARS) since 2009, He has published more than 100 papers on remote sensing in national & international journals and proceedings. He is also co-author of 15 books on remote sensing and image processing. His scientific interest includes but not limited to sea ice monitoring using passive microwave sensors, disaster monitoring from space, and e-Learning. He is currently the Principle Investigator of AMSR2 sensor team of JAXA.

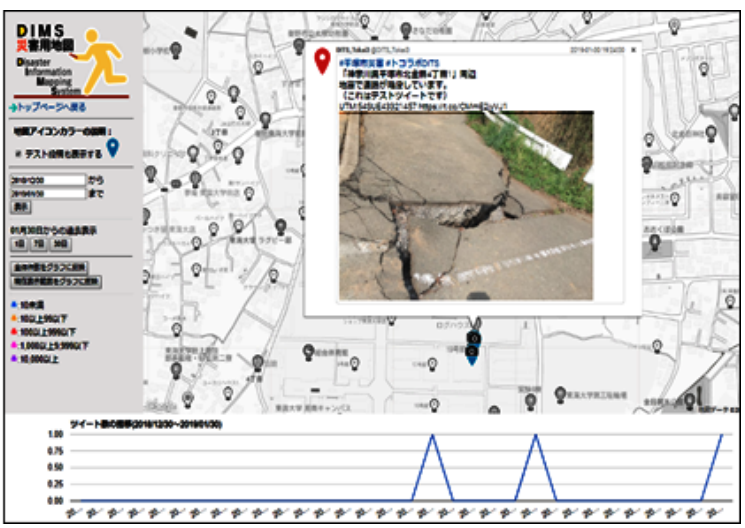
1979年東京理科大学理学部応用物理学科卒業，1981年千葉大学大学院修士課程修了，工学博士。リモートセンシング技術センター研究員を経て、1992年に東海大学に奉職。現在に至る。
アジアリモートセンシング協会（AARS）事務総長。日本写真測量学会副会長。
衛星を使って地球環境を観測するリモートセンシングの専門家。広域環境変動監視、海氷観測の研究に従事。
共著に、画像解析ハンドブック、図解リモートセンシング、基礎からわかるリモートセンシング等。
2009年Boon Indramabarya Medal受賞。2012年Samuel Gamble Award受賞。

The role and importance of SNS for Information Sharing During isasters
災害時の情報共有においてSNSが果たす役割と重要性

Osamu Uchida
Professor, Department of Human & Information Science, Tokai University
内田　理
東海大学情報理工学部教授

Abstract:
It is crucial to collect, transmit, and share disaster-related information quickly and accurately to minimize damage in the event of a disaster. From this point of view, using social media during disasters is getting a lot more attention lately. In recent years, the number of administrative agencies utilizing or considering to use social media for transmission and collection of disaster-related information has been increasing. The number of social media posts has increased explosively at the time of a disaster, then it has been pointed out that necessary information is buried, and rumor and inaccurate information spread rapidly and widely. Examples of the use of social media during disasters and related research trends will be described in this presentation. Moreover, this presentation will introduce several of the results of studies on the utilization of Twitter at the time of disaster conducted by our research group.

概要：
災害時に被害を最小限に食い止めるためには、迅速，かつ的確な災害関連情報の収集、発信、共有が重要であり、そのような観点から災害時のソーシャルメディア利用に注目が集まっている．近年では、災害関連情報の発信や収集にソーシャルメディアを利用している、もしくは利用を検討している行政機関も増えている．一方で、災害時にはソーシャルメディアの投稿数は爆発的に増加するため、必要な情報が埋もれてしまったり、デマや不正確な情報が広く拡散してしまうなどの問題点も指摘されている．本発表では、災害時のソーシャルメディア利用事例や関連する研究の動向を述べたのち、我々の研究グループが実施している災害時Twitter利活用に関する研究の一部を紹介する．



Osamu Uchida
Professor, Department of Human & Information Science, Tokai University

内田　理
東海大学情報理工学部教授

Osamu Uchida received the B.E degree from Meiji University, Japan, in 1995, the M. Info. Sci. degree from Japan Advanced Institute of Science and Technology in 1997, and the Ph.D. degree from the University of Electro-Communications, Japan, in 2000. From 2000 to 2002, he was a research associate at Kanagawa Institute of Technology, Japan. He joined Tokai University, Japan, in 2002, and since 2016, he has been a professor at the Department of Human and Information Science, Tokai University. His research interests include information and communication technologies for disaster management, Internet technology, and image processing. He received a prize for his contribution to the activities of the IIEEJ (The Institute of Image Electronics Engineers of Japan) in 2012. Since 2012, he has been a vice editor in chief of the IIEEJ.

1995年明治大学理工学部電子通信工学科卒．1997年北陸先端科学技術大学院大学情報科学研究科博士前期課程了．2000年電気通信大学大学院情報システム学研究科博士後期課程了．博士（工学）．同年、神奈川工科大学情報ネットワーク工学科助手．2002年東海大学電子情報学部情報科学科講師．2016年より同大学情報理工学部情報科学科教授．防災・減災のための情報通信技術、インターネット、画像処理などの研究に従事．2012年画像電子学会学会活動貢献賞受賞．2012年より画像電子学会編集副委員長．

Mapping of an inundation range and depth estimated from SNS at the time of flood disaster

水害発生時のSNS情報から推定した浸水範囲と浸水深の地図化

Mr. Hiroaki Maeda
Director of Geographical Survey Div., Geographic Dept.,
Geospatial Information Authority of Japan
前田比呂明
国土地理院応用地理部地理調査課長

概要:：
国土地理院では災害時の初動対応として，航空機から撮影した空中写真を用いて，浸水範囲を示した浸水現況図を作成し，排水作業等を行う関係機関へ提供するとともに，国土地理院のホームページで公開を行っている．排水作業に資するためには，発災直後から早期にこれらの地図を作成する必要がある．しかし，発災直後の状況によっては，夜間や悪天候などにより，空中写真の撮影までに時間がかかる場合がある．また，浸水状況の把握には，浸水範囲だけでなく浸水深の情報も有用となる．そこで，排水作業等の災害時の初動対応のため，迅速に浸水現況図を提供することを目的として，一般の方がSNS上に投稿した写真等と，既存の航空レーザ測量による標高データ（5 m DEM）を用いて，浸水範囲と浸水深の空間分布を示した「浸水推定図」を作成して関係機関へ提供するとともに，国土地理院のホームページで公開した．本報告では「浸水推定図」の浸水範囲と浸水深の推定手法について報告する．

Mr. Hiroaki Maeda
Director of Geographical Survey Div., Geographic Dept.,
Geospatial Information Authority of Japan

前田比呂明
国土地理院応用地理部地理調査課長

昭和58年4月国土地理院入省
平成26年4月中国地方測量部防災情報管理官
平成27年4月関東地方測量部防災課長
平成29年4月総務部建設専門官
平成31年4月応用地理部地理調査課長（現職）

Development of Time Shift Monitor for damaged area investigation
被災地域の調査を目的としたタイムシフトモニターの開発

Toshiaki Sato,
PASCO Cooperation
佐藤俊明
(株) パスコ経営戦略本部総合研所 所長

概要：
2011年3月11日の東日本大震災で甚大な被害を被った地域では、約9年経た現在でも復興作業を行っているところがあるのが現状である。このような状況の中、我々は2012年から現在まで、宮城県の高校生や大学生らとともに、復興作業による被災地環境変遷の現地調査・解析などを行ってきている。この現地調査を行う際、これまで地図や衛星などを含む大量な資料を抱えながら調査を行ってきた。そのため、調査が煩雑となり、作業や資料整理のための時間増加が生じていた。そこで、GNSSや電子コンパスなどのセンサーを搭載したモバイル端末上で動作する現地調査ツールをいくつか試作し、これを用いることによって作業の効率化を試みてきた。本発表では、この取り組みに関して紹介する。

Toshiaki Sato,
PASCO Cooperation

佐藤俊明
(株) パスコ 経営戦略本部総合研所 所長
東京工業大学環境社会理工学院特任准教授兼務

1994年3月東京工業大学大学院総合理工学研究科社会開発工学専攻終了
1998年11月（株）パスコ入社
2007年3月東京大学論文博士取得（博士（工学））
2019年4月（株）パスコ経営戦略本部総合研究所所長
空間解析手法、計測処理解析手法などの研究開発

Near real time update and distribution of VIIRS temporal profiles of surface lighting: preliminary testing

Christopher D. Elvidge[1]*, Kimberly Baugh[2], Mikhail Zhizhin[2,3], Feng-Chi Hsu[2], Tilottama Ghosh[2], Jay Taneja[4], and Morgan Bazilian[5]

[1] Earth Observation Group, Payne Institute for Public Policy, Colorado School of Mines
[2] Cooperative Institute for Research in the Environmental Sciences, University of Colorado, Boulder
[3] Russian Space Research Institute, Moscow
[4] Electrical and Computer Engineering, University of Massachusetts – Amherst; jtenaja@umass.edu
[5] Payne Institute, Colorado School of Mines; mbazilian@mines.edu
*Correspondence: celvidge@mines.edu

Abstract:
Disruptions in electricity power service can range from reductions in available voltage to complete loss of service. Such events are common in many developing economies, where power generation and delivery infrastructure are often insufficient to meet demand and operational challenges are common. Power disruptions are also common in conflict zones, where power generation and distribution networks are frequently targeted and there is a reduced capability to restore the services. Yet despite the potentially large impacts of such outages on economic development and human health, poor data availability has meant that relatively little known about the spatial and temporal patterns of electric power reliability. According to the International Energy Agency's 2006 report "Lights Labour Lost" electric lighting accounts for 19% of global electric power consumption. It is well known that the radiant emissions of electric lighting can be observed from space. Such observations can be used to sample the status of electric power supplies in cities and towns worldwide. A number of studies have documented the use of such data in the detection of power outages from natural and manmade disaster, along with recovery tracking. Over the past year, the Earth Observation Group (EOG) has been developing software tools to construct and analyze extended temporal profiles of surface lighting radiances from the nightly day/night band observations collected by the NASA / NOAA Visible Infrared Imaging Radiometer Suite (VIIRS). The nightly temporal increments make it possible to pinpoint the date and nature of power disruption and recovery events. These details are lost in monthly and annual nighttime lights products. The next step in these developments is to update the temporal profiles with last night's data and to distribute these to stakeholders engaged in humanitarian assistance and infrastructure repair. The presentation will cover results to date from an automatic temporal profile update and distribution system. While this system is still in a testing phase, it is designed to be expanded to cover vast areas in a wall-to-wall fashion.

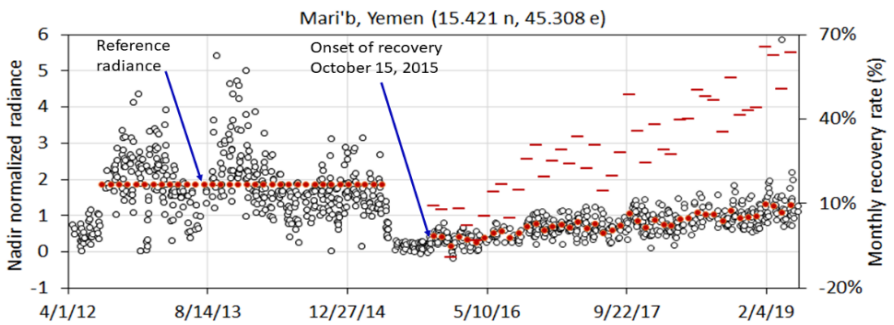


Figure 1. Monthly recovery rate for a location in Mari'b, Yemen which experienced a 148 day power outage starting May 20, 2015. The recovery rates are calculated as the (monthly average – detection limit) / (reference radiance – detection limit). The rates are calculated with a local detection limit of 0.3 nW/cm^{2}sr^{-1} established during the outage period. Recovery rates started near 10% and gradually rose to over 60% recovery n forty months.

Christopher D. Elvidge
Director, Earth Observation Group Payne Institute for Public Policy,
Colorado School of Mines, USA

Dr. Chris Elvidge pioneered the development of global DMSP satellite observed nighttime lights in the mid-1990's. His recent research has focused on nighttime VIIRS data, which collects low light imaging data in the day/night band plus four daytime NIR and SWIR spectral bands. Elvidge's team has three global product lines from VIIRS: nighttime lights (VNL), boat detections (VBD), and nightfire (VNF).

Multi-temporal and Multi-Level Monitoring of Land Deformation and Infrastructures

Fuan Tsai
Director, Center for Space and Remote Sensing Research,
National Central University, Taiwan

Abstract:
Many regions in Taiwan suffer from land subsidence primarily due to unrestricted ground water pumping to support the development in agriculture and industry during the past decades. In addition, infrastructures such as electricity transmission towers, bridges, highways, railways and dams etc. constructed decades ago, are reaching the recession of their life cycle and requires intensive maintenance and monitoring in order to extend the life of the structures and also to ensure public safety. The situation is further aggravated by the fact that Taiwan is located in the west Pacific region of typhoon path and the converge of three tectonic plates. The natural hazards and environmental factors such as earthquakes, typhoons, heavy rainfalls, land subsidence, soil liquefaction and materials deterioration all may cause serious damages to the already fragile infrastructures. Therefore, it is necessary to monitor the land deformation and civil engineering infrastructures constantly and vigilantly.
To this end, a systematic approach for the long-term monitoring of the land deformation with satellite-based Synthetic Aperture Radar (SAR) data is developed. The system employs Persistent Scatterers Interferometric SAR (PSInSAR) technology with multi-temporal Sentinel-1 data to monitor the land deformation of entire Taiwan. The collected PSInSAR results are committed into a database and a geospatial analysis platform is used to constantly screen potential hazardous sites and infrastructures on a watch list. Once an alarm is triggered, rigorous analyses with high resolution data are performed to obtain more detailed and complete understanding of the sites or targets. The analyses are calibrated and the results are cross-validated with an island-wide GPS observation network for quality assurance. Preliminary results derived from the developed system indicate that the system is an effective platform for multi-temporal and multi-level monitoring of land deformation and infrastructures.

Keyword: Multi-temporal Monitoring, Interferometric Synthetic Aperture Radar (InSAR), Persistent Scatterer InSAR (PSInSAR), Land Subsidence, Ground Deformation, Geospatial System and Platform

Fuan Tsai
Director, Center for Space and Remote Sensing Research(CSRSR),
National Central University, Taiwan

Fuan Tsai received his M.S. and Ph.D. degrees in Civil and Environmental Engineering from Cornell University, Ithaca NY, USA in 1996 and 2000, respectively. He was with Los Alamos National Laboratory, Los Alamos NM, USA from 1996 to 1998 and from 2000 to 2002. Dr. Tsai joined the faculty of the Center for Space and Remote Sensing Research (CSRSR) and the Department of Civil Engineering, National Central University, Taiwan in 2002, where he is currently a Professor. Starting from 2018, he also serves as the Director of CSRSR. Prof. Tsai teaches several undergraduate and graduate courses. His research interests include image analysis, environmental monitoring, digital city modeling, and 3D geo-spatial analysis. Dr. Tsai has authored and co-authored more than 250 journal and conference papers. He has received several awards from domestic and international societies and institutes. He and his students also won dozens of best paper awards and competitions from international journals and conferences.

Professional Societies:
- Chinese (Taipei) Society of Photogrammetry and Remote Sensing
- Chinese (Taipei) Institute of Civil and Hydraulic Engineering
- IEEE Geosciences and Remote Sensing
- SPIE
- American Geophysical Union
- European Geosciences Union

Awards:
CSPRS Medal, Chinese (Taipei) Society of Photogrammetry and Remote Sensing, 2019.
Excellence in Research Award, National Central University, 2019.
Excellence in Research Award, National Central University, 2018.
Best Paper Award: Journal of Photogrammetry and Remote Sensing, 2017.
Excellence in Teaching Award, College of Engineering, National Central University, 2016.
Best Paper Award: Journal of Photogrammetry and Remote Sensing, 2015.
Best Paper Award: Journal of Photogrammetry and Remote Sensing, 2014.
JSPRS Best Paper Award: 30th Asian Conference on Remote Sensing, 2009.
Excellent Young Scholar Research Grant Award, National Science Council, 2007—2010.
Excellence in Teaching Award: College of Engineering, National Central University, 2006.

Progress, challenges and opportunities for multiperspective observation platforms and approaches for resource and environmental monitoring

Enrico Paringit
Professor, University of the Philippines, Philippines

Abstract:
Use of satellite imagery for observing the progress of environmental conservation and rehabilitation programs has been developed and demonstrated for the case of the Philippines. Particularly, the use of time series optical (Landsat, Sentinel 2) and radar (Sentinel 1a, 1b) satellite imagery to monitor the progress of planting activities in the Philippine forests in an effort to curb environmental degradation and rejuvenate conditions of production and protection forests. A unique feature of the project is to couple data on government budget, in order to understand and analyze relationship between success of efforts against resources allocated. A web platform has been established to view the analysis for each project site where planting and various interventions were introduced. To fully mainstream and integrate develops systems, processes and products to relevant government agency has been identified as part of the next key steps. An offshoot is to develop specific interface to suit the perspective and purpose of the agency in charge of resource assessment and planning as well as for capturing systematically the input of citizens and concerned groups or organizations to invite greater participation.

Enrico Paringit
Professor, University of the Philippines, Philippines

Dr. Enrico Paringit has a BS Geodetic Engineering Degree in 1997 and MS in Remote Sensing in 1999 and Doctor of Engineering degree in Tokyo Institute of Technology (Tokyotech) in 2003, he received a two-year Postdoctoral Fellowship from the Japan Society for the Promotions of Science (JSPS).
He is a Professor at the Department of Geodetic Engineering at the University of the Philippines-Diliman wherein he had produced numerous publications focusing on remote sensing applications in disaster risk reduction and management, and environment assessment and monitoring. In 2019, he assumed the position as the Executive Director of the Philippine Council for Industry, Energy and Emerging Technology Research and Development or PCIEERD, one of the sectoral planning councils of the Department of Science and Technology (DOST). The Council oversees 21 sectors under the industry, energy, and emerging technologies including those that are related to disasters, hazards.

Key qualifications:
Research Project/Program Leader for the following research in remote sensing (highlighted made use of Copernicus Sentinel 1a or 2 imagery):

1. Program Leader, Digital Imaging for Monitoring and Evaluation (DIME, A DOST-GIA Project, 2018 Onwards.
    a) Project Leader, Mapping and Assessment of Planting Projects and Activities by Analysis of Timeseries Sentinel 1A and Sentinel 1B and Sentinel 2a and b Data.
2. Project Leader, MAPalay, Mapping and Assessment of Philippine Rice Growing by Time-series Analysis of Copernicus Sentinel 1A, Department of Agriculture – Bureau of Agricultural Research (DA-BAR), October 2017 to April 2018.
3. Project Leader, Sensor Calibration and Validation Component, DIWATA Phil-Microsat-1, A DOST Grant-in-Aid Program (completed December 2016).
4. Program Leader, Hazards Mapping of the Philippines Using LiDAR (Phil-LIDAR-1, (January 2014 to December 2017), A DOST Grant-in-Aid Program.
5. Project Leader, Forest Resource Extraction (FREXLs), as part of the Resource Assessment of the Philippines (Phil-LIDAR-2), (January 2014 to December 2017), A DOST Grant-in-Aid Program.
6. Project Co-Leader, Satellite-based Monitoring of Typhoon-Affected areas in Visayas (SMARTER Visayas) using recent Sentinel 1a, DOST GIA Research and Development Project (completed).

Monitoring on regional and local scale by Radar Remote Sensing

Uwe Soergel,
Director, Institute Photogrammetry (IFP),
Faculty of Aerospace Engineering and Geodesy,
University of Stuttgart, Germany

Abstract:
In this talk, we cover various applications of monitoring scenes of different spatial extent by means of Radar Remote Sensing.

In the first part, the topic of flood detection is covered for the example of the Tohoku tsunami disaster in 2011. Due to the side-looking sensor principle, the signal is usually reflected away from sensor in case of areas covered by water, which are smooth compared to the radar signal wavelength of SAR in the order of centimeters. Hence, such areas look very dark in SAR imagery. By comparison of pre- and post-event images of German TerraSAR-X satellite we were able to detect affected ares quite well.

In the second part, we turn to monitoring of surface deformation by interferometric time series analysis of SAR satellite data. For such application the coherent nature of SAR data is prerequisite: subtile changes in line-of-sight distance between sensor and Earth surfaces induces a phase shift of the signal collected at repeated satellite cycles. The image of phase differences is called interferogram. In case we use just two images, we talk about Differential Interferometry (DInSAR), which may however suffer from atmospheric changes or temporal signal de-correlation. Those issues can be mitigated by Persistent Scatterer Interferometry (PSI), which relies on identification of temporal stable objects in stacks of SAR images. We demonstrate this technique by several examples of sites in Germany, where different geophysical processes cause surface deformation either of local or regional size.

PSI result of inner city of Stuttgart, Germany: Subsidence (blue) occurs where tunnels (indicated by red lines) have been built for new subsurface railway tracks

Uwe Soergel,
Director, Institute Photogrammetry (IFP), Faculty of Aerospace Engineering and Geodesy, University of Stuttgart, Germany

Uwe Soergel chairs the Institute for Photogrammetry at University of Stuttgart, Germany. He received the Diplomingenieur (M.Sc.) degree in electrical engineering from University of Erlangen-Nuremberg, Germany, in 1997. From fall 1997 to the end of 2005, he was a research associate with the Institute for Optronics and Pattern Recognition (FOM) located in Ettlingen (Germany), which was part of FGAN, a former German research establishment focusing on defense-related studies. At that time, he dealt mainly with pattern recognition of man-made objects from remote sensing imagery, with emphasis on SAR data. In parallel, he earned a PhD in electrical engineering and computer science from the Leibniz Universität Hannover, Germany, in 2003. Prior to his current position starting from 2006 he was first Assistant Professor and later Associate Professor for Radar Remote Sensing and for Radar Remote Sensing and Active Systems, respectively, at Leibniz Universität Hannover. From October 2013 until end of March 2016 he was Full Professor for Remote Sensing and Image Analysis at Technische Universität Darmstadt, Germany.

Monitoring aerosol optical property and surface solar radiation in east Asia using Himawari-8 satellite measurement

Husi Letu[a,b], Takashi Y. Nakajima[b]

[a] Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences (CAS), China
[b] Research and Information Center (TRIC), Tokai University, Japan

Abstract:
Surface solar radiation (SSR) is a key parameter of the climate system and also the main source of energy on the Earth. The SSR distribution is also important information for solar power generation and photovoltaic power design. The Advanced Himawari Imager (AHI) on board the Himawari-8 (H-8), a new generation geostationary satellite, receives the high spatial, temporal and spectral signals, which provides an opportunity to estimate spatial distribution of cloud, aerosol and SSR accurately.
Optical properties of clouds and heavy aerosol retrieved from satellite measurements are the most important parameters on calculating the surface solar radiation (SSR). In this study, a look-up table (LUT)-based algorithm is proposed based on the AHI measurements to calculate all-sky SSR with higher spatial and temporal resolutions (5km spatial resolution and 10-minute temporal resolution). For clear sky, the aerosol optical depth (AOD) is retrieved from AHI data and further used in the SSR algorithm. For cloudy sky, CAPCOM algorithm (Nakajima and Nakajima 1995) is used to retrieve both water and ice cloud optical properties. A radiative transfer model (RTM) together with the Voronoi ICS model are used to build the LUT of SSR estimation. With the input of the estimated cloud and aerosol optical parameters, the SSR is estimated through the LUT algorithm.

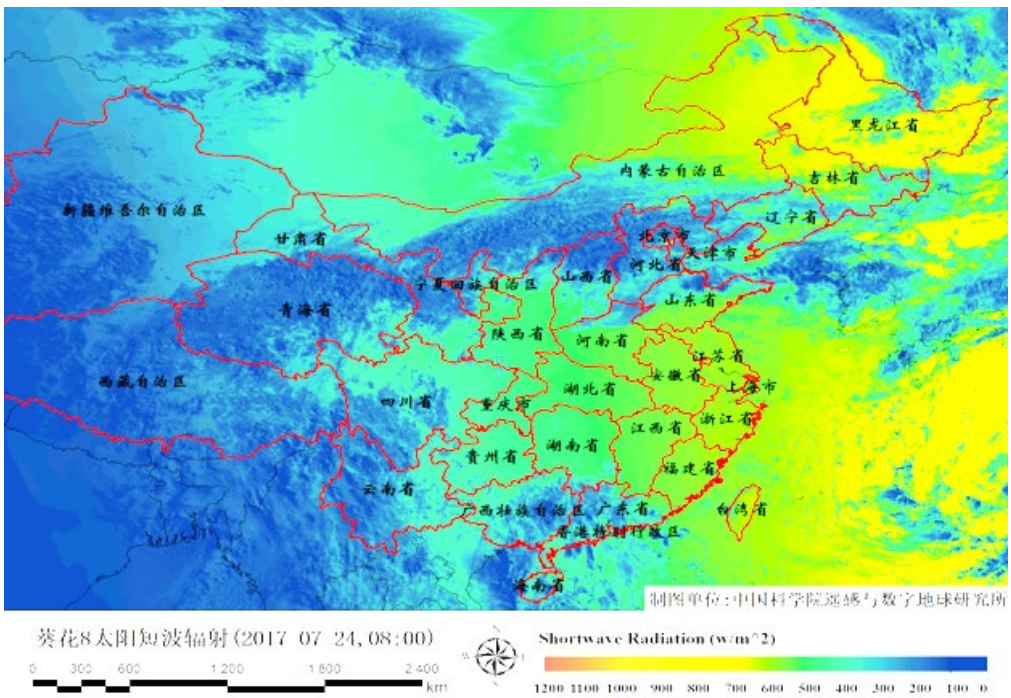


Fig1. Surface solar radiation derived from Himawari-8 geostationary satellite data (2017/7/24)

Husi Letu
Institute of Remote Sensing and Digital Earth, Chinese Academy of Sciences (CAS), China

Husi Letu, received the B.S. and M.S. degrees in geography from Inner Mongolia Normal University, Hohhot, China, in 1999 and 2002, and the Ph.D. degree in geosciences and remote sensing from Center for Environmental Remote Sensing (CEReS), Chiba University, Chiba, Japan, in 2010. He worked in the Research and Information Center, Tokai University. He has been working on the algorithm development and validation of the ice cloud product for JAXA's GCOM-C and Himawari-8 satellite missions.
He is currently a professor in State Key Laboratory of Remote Sensing Science, Institute of Remote Sensing and Digital Earth Chinese Academy of Sciences (CAS). His research interests include atmospheric radiative transfer simulation, light scattering calculation, cloud remote sensing, and ice cloud property retrievals.

Education:

2004 – 2010	Ph.D. in Earth Science, Chiba University, Japan
1999 – 2002	M.S. in Geography, Inner Mongolia Normal University, China
1995 – 2009	B.S. in Geography, Inner Mongolia Normal University, China

Employment:
2015/09 to now, Aerospace Information Research Institute (AIR), Chinese Academy of Sciences, China (Professor).
2010/04 - 2015/08, Research and information center, Tokai University, Japan (Post doctor, Special researcher).

Specialized research fields:
Light scattering calculation and Remote Sensing inversion technique of ice cloud particles, study of radiative transfer theory;
Cloud microphysical property simulation and cloud-aerosol interactions;
Calibration of satellite sensors, optimization of band design, evaluation of sensor noise;
Remote sensing application: estimation of surface solar radiation;

Integrated management of various health data using IT technology and approach of the health promotion

IT技術を活用した種々の健康データの統合管理と健康推進の取り組み

Naoaki Ishii
Professor, Department of Health Management, Tokai University
石井直明
東海大学　健康学部教授

概要：

高齢化や近年の食生活を含む社会環境の変化が生活習慣病発症のリスクの上昇を招いていることから、「健康」が注目されるようになってきた。これまで数多くの健康法が世の中に出現しているが、それにより体にどのような変化が起き、その結果、健康度がどうなったかを知ることが重要となる。

健康度を知るには、生活習慣病に関わる生体シグナルを捉えることが重要であり、この生体シグナルのデータが、生活習慣病に大きな影響を与える食事や運動の適格な助言・指導に参考になる。生体シグナルの中で体重や筋肉量・脂肪量などの体組成や骨密度のように、長い期間かけてゆっくりと変化するものは、体組成計や骨密度計を使い数カ月に１度の測定で済む。一方、脈拍や血圧など日々刻々と変化する生体シグナルは、リアルタイムで測定する必要があるため、スマート・ウォッチのようなウェアラブル末端による計測が必要となる（血圧に関しては常時測定する技術がまだない）。これらの計測データを総合的に調べることで、健康度をより正確に知ることができる。

東海大学では、ICカードを使い個人登録してもらい、これらの生体シグナルのデータをクラウド上で保存し、スマホやPCから見ることができるソフト、THINKss (Tokai Health Intelligence and Knowledge support system)を開発した。このソフトは、これらのデータや体温の他に食事の写真や、その日の体調や気分、スマート・ウオッチが計測した歩数や睡眠時間を記録し、閲覧できるようになっている。学生本人やその親がいつでもどこでもデータを見ることができることから、本人のみならず、遠方の親が子供の健康度を把握できるようになっている。今のところ、データをクラウド上に自動保存できるのは体組成計のみであるが、将来はすべての測定器機からのデータ保存を自動化する予定であり、THINKssを医療情報も含めた健康と医療のデータを統合したシステムに進化させたい。

脳・心臓の血管障害の発症リスクが高くなる高血圧や高脂質血症を持つ人や、糖尿病や腎臓病などですでに投薬・治療を受けている人が災害にあった場合、その場所や状況を特定・把握し、すばやく対処することが重要となる。そこで、長幸平教授が開発した、場所の特定が容易となるグローカル・モニタリング・システムと健康・医療データが集約されたTHINKssを融合すれば、より安心・安全な社会の実現に貢献できると考える。

Naoaki Ishii
Professor, Department of Health Management, Tokai University

石井直明
東海大学　健康学部教授

Educational background:
Tokai University B.S. Atomic Energy, 1974

Professional Background:
Research fellow, Tokai University School of Medicine 1975-1986
Assistant Professor, Tokai University School of Medicine 1986-1995
Post Doctoral Fellow Roche Institute of Molecular Biology in USA 1986-1988
Associate Professor, Tokai University School of Medicine 1995-2004
Professor, Tokai University School of Medicine 2004~2017
Division Head, Division of Basic Medical Science and 2005~2017
Molecular Medicine, Tokai University School of Medicine
Director, Life Care Center,
Tokai University Graduate School of Medicine 2005~2017
Professor, Research Institute of Sports Medical Science, Tokai University 2017
Professor, Department of Health Management,
Undergraduate School of Health Studies, Tokai University 2018～

Specialty:
Molecular Gerontology, Molecular Life Science, Health Science, Anti-Aging Medicine

I have been studying about aging mechanism as a gerontologist for 40 years more, and have proved from method of molecular genetics that oxidative stress from mitochondria is related with aging (Nature, 1998). Ten years ago, we made a comprehensive medical examination center (a clinic center for anti-aging) for human health in one of our hospitals in Tokyo (Health Evaluation and Promotion, 2015). Everybody knows that both nutrition and exercise are most important keywords for our health and so there are many inputs such as special food or excise in the world. But there are a few outputs (scientific and medical evidences). My recent research is to make personal program of optimal nutrition and exercise based on medical evidences for their health in Japan.

Memo

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