Abstracts of

JSPS Core-to-Core Program

"Interim Symposium: Achievements and Prospects for the Network of Long-term Research Field Stations in Asian Forests"

March 3-5, 2018

The University of Tokyo, Tokyo, Japan

Organized by:
The University of Tokyo Forests
Graduate School of Agricultural and Life Sciences
The University of Tokyo

Under the project of:
"Developing a network of long-term research field stations to monitor environmental changes and ecosystem responses in Asian forests" JSPS Core-to-Core Program, B. Asia-Africa Science Platforms

The University of Tokyo Forests
Graduate School of Agricultural and Life Sciences
The University of Tokyo

JAPAN SOCIETY FOR THE PROMOTION OF SCIENCE
日本学術振興会

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Abstracts of JSPS Core-to-Core Program “Interim Symposium: Achievements and Prospects for the Network of Long-term Research Field Stations in Asian Forests”, March 3-5, 2018, Tokyo, Japan

This Symposium is held under the project of: “Developing a network of long-term research field stations to monitor environmental changes and ecosystem responses in Asian forests”, JSPS Core-to-Core Program, B. Asia-Africa Science Platforms
(Website; http://www.uf.a.u-tokyo.ac.jp/c2c/english/index.html)

Edited by Organizing Committee of the JSPS Core-to-Core Program Interim Symposium
Published in March 2018 by The University of Tokyo Forests, Graduate School of Agricultural and Life Sciences, The University of Tokyo, Yayoi 1-1-1, Bunkyo, Tokyo 113-8657, JAPAN

Printed in Japan by Printpac Corporation, Kyoto

Organizing Committee

Naoto KAMATA, Professor, The University of Tokyo Hokkaido Forest (Project Leader)
Koichiro KURAJI, Professor, Executive Office, The University of Tokyo Forests
Toshiaki OWARI, Associate Professor, The University of Tokyo Hokkaido Forest (Chair)
Susumu GOTO, Associate Professor, Edu. & Res. Center, The University of Tokyo Forests
Naoki YASUMURA, Lecturer, The University of Tokyo Tanashi Forest

Welcome from the Dean of Graduate School of Agricultural and Life Sciences, The University of Tokyo

It is my pleasure that I welcome you all to our faculty to join the “Interim Symposium: Achievements and Prospects for the Network of Long-term Research Field Stations in Asian Forests”.

The Graduate School of Agricultural and Life Sciences, the University of Tokyo has led the research on agriculture, forestry and fisheries in Japan through 143 years of education. Numerous research findings have been published and excellent graduates have been sent out in the society. We are very proud of our contribution to the development of the fields of sciences and industries, furthermore, to the improvement of human life in the world. Many of these achievements have been produced in education and research fields of the Graduate School of Agricultural and Life Sciences.

In recent years, climate change such as global warming has become increasingly evident and observable, with extreme climatic events frequently threatening human life and property. Global climate change is significantly affecting the primary industries, which depend on the natural environment, and its impact is expected to increase in the future. Humankind is facing the major challenges of securing stable food supplies and conserving the global environment. Agricultural science will play an increasingly important role in implementing technical and social measures toward this end. Hence, there is a strong need to elucidate the various functions of organisms, and to make the best use of the findings for society in the future.

The 3-yr project “Developing a network of long-term research field stations to monitor environmental changes and ecosystem responses in Asian forests” funded by JSPS is now at the end of the second year. I heard that The University of Tokyo Forest was planning to apply for the second term (FY2019-FY2021) of the project by including new members from Asia. I hope this symposium will be successful and fruitful for the future collaboration of this group.

Takeshi Tange

Takeshi TANGE
Dean of Graduate School of Agricultural and Life Sciences
The University of Tokyo

Welcome from the Director of The University of Tokyo Forests

It is a great honor to invite you all to attend the "Interim Symposium: Achievements and Prospects for the Network of Long-term Research Field Stations in Asian Forests" held in the main campus of The University of Tokyo. This project is funded by Japan Society for the Promotion of Science (JSPS) and has started since FY2016 (April 2016). Two symposia and two workshops have been held in four countries: Japan, Malaysia, Korea, and Taiwan. The next workshop is planned to be hosted by Taiwan in June 2018 and the final symposium will be hosted by Korea in October 2018 as the 8th Symposium of Asian University Forests Consortium.

The University of Tokyo Forests have been used by a great number of students and researchers as education and research stations for 124 years from the establishment of the University of Tokyo Chiba Forest (UTCBF) in 1894, where one of optional excursions is planned. The UTCBF has managed conifer plantations and accumulated tree growth data for longer than 120 years. Another optional excursion will be held in Ecohydrology Research Institute (ERI). The ERI was established to study the rehabilitation of forests in denuded lands. They have a long-term monitoring data of hydrology in relation to forest recovery.

This project is aiming to establish an international network on long-term monitoring. This is globally important especially to better understand the process of climate change that is attributed to human activity. This interim symposium might have an important role in figuring out our future strategy and in applying funding for the second phase to continue our collaboration. I am sure that this symposium provides a firm platform for further international collaboration between our university forests and yours in the future.

Katsumi Togashi

Katsumi TOGASHI
Director of the University of Tokyo Forests

Welcome from Prof. Naoto KAMATA: A Project Leader of JSPS Core-to-Core Program

I am Naoto Kamata, a project leader of the Japan Society for the Promotion of Science (JSPS) Core-to-Core Program and a Director of The University of Tokyo Hokkaido Forest (UTHF). This is my great honor to host the "Interim Symposium: Achievements and Prospects for the Network of Long-term Research Field Stations in Asian Forests" here at the main campus of The University of Tokyo, Japan under a sponsorship by the JSPS. As a project leader, I welcome all of the participants to the main campus of The University of Tokyo.

The JSPS Core-to-Core Project "Developing a network of long-term research field stations to monitor environmental changes and ecosystem responses in Asian forests" started since April 2016 and will continue until March 2018. Our project is at the end of the second year. To date, we have started several new collaborations to contribute to this field of science. However, honestly, three years seem so short that we cannot expect not so many outputs (journal papers) within the three years. Therefore, we decided to continue this collaboration by applying for the second term of the same project. We are also thinking a possibility to include new members from other universities in Asian countries: National University of Singapore, Gadjah Mada University, University of Sri Jayewardenepura, and Hainan University. This symposium will provide us a good opportunity to discuss our future figures.

Each university has long-term data on climate, hydrology, LTER study plots, and plantations. These basic data are valuable treasures not only for science but also for human beings. In this project, I would like encourage you and your students to expand your research internationally by using this network. I hope that this interim symposium will act as a stepping stone for future collaboration among all participants and their faculties. I also hope your will have a fruitful time here in Japan.

鎌田 直人

Naoto KAMATA

Project Leader of the Japan Society for the Promotion of Science (JSPS) Core-to-Core Program
Director, The University of Tokyo Hokkaido Forest

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*Not all authors of papers, but only presenters are listed in the following tables.

*Please refer to the following abbreviated names for affiliation.

UTokyo: The University of Tokyo
GSALS: Graduate School of Agricultural and Life Sciences
UTF: The University of Tokyo Forests
ERI: Ecohydrology Research Institute
UTCBF: The University of Tokyo Chiba Forest
SNU: Seoul National University
NTU: National Taiwan University
KU: Kasetsart University
UMS: Universiti Malaysia Sabah
GMU: Gadjah Mada University
NUS: National University of Singapore
USJP: University of Sri Jayewardenepura

March 3 (Sat)
9:00-17:00 Symposium
Venue: Lecture Room, Angel Research Building, Yayoi Auditorium Annex

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March 4 (Sun)
9:00-12:00 Business Meeting
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9:00-9:10	**Opening Address**
9:10-10:20	Session 1
10:20-10:40	**Tea Break**
10:40-11:50	Session 2
11:50-12:00	**Closing Remarks**
12:00-13:30	**Lunch**
13:30-	**Departure to ERI or UTCBF**

March 5 (Mon)
Research Group Field Visit
Venue: ERI (RG1), UTCBF (RG2 & RG3)

List of Participants

Title	Name	Position	Affiliation	Email	Country
Prof.	Takeshi Tange	Dean	The University of Tokyo	tange@fr.a.u-tokyo.ac.jp	Japan
Prof.	Katsumi Togashi	Director	The University of Tokyo	togashi@fr.a.u-tokyo.ac.jp	Japan
Prof.	Kenji Fukuda	Professor	The University of Tokyo	fukuda@fr.a.u-tokyo.ac.jp	Japan
Prof.	Naoto Kamata	Professor	The University of Tokyo	kamatan@uf.a.u-tokyo.ac.jp	Japan
Prof.	Koichiro Kuraji	Professor	The University of Tokyo	kuraji_koichiro@uf.a.u-tokyo.ac.jp	Japan
Dr.	Toshiaki Owari	Associate Professor	The University of Tokyo	owari@uf.a.u-tokyo.ac.jp	Japan
Dr.	Susumu Goto	Associate Professor	The University of Tokyo	gotos@uf.a.u-tokyo.ac.jp	Japan
Dr.	Naoki Yasumura	Lecturer	The University of Tokyo	anson@uf.a.u-tokyo.ac.jp	Japan
Dr.	Keisuke Toyama	Assistant Professor	The University of Tokyo	toyama@uf.a.u-tokyo.ac.jp	Japan
Dr.	Dai Fukui	Assistant Professor	The University of Tokyo	fukuidai@uf.a.u-tokyo.ac.jp	Japan
Dr.	Satoshi Suzuki	Assistant Professor	The University of Tokyo	s-suzuki@uf.a.u-tokyo.ac.jp	Japan
Dr.	Shuhei Takemoto	Assistant Professor	The University of Tokyo	ts35@uf.a.u-tokyo.ac.jp	Japan

Dr.	Nobuaki Tanaka	Assistant Professor	The University of Tokyo	tanaka@uf.a.u-tokyo.ac.jp	Japan
Dr.	Yusuke Mizuuchi	Assistant Professor	The University of Tokyo	mizuuchi@uf.a.u-tokyo.ac.jp	Japan
Dr.	Naoko Miura	Assistant Professor	The University of Tokyo	miura@uf.a.u-tokyo.ac.jp	Japan
Prof.	Sangjun Im	Director	Seoul National University	junie@snu.ac.kr	Korea
Mr.	Song Eu	DC Student	Seoul National University	dkarj@snu.ac.kr	Korea
Mr.	Seung-Jai Lee	Technical staff	Seoul National University	lsj83@snu.ac.kr	Korea
Prof.	Biing-Tzuang Guan	Professor	National Taiwan University	btguan@ntu.edu.tw	Taiwan
Dr.	Kobsak Wanthongchai	Assistant Professor	Kasetsart University	fforksw@ku.ac.th	Thailand
Prof.	Mui How Phua	Professor	University Malaysia Sabah	pmh@ums.edu.my	Malaysia
Dr.	Sri Rahayu	Lecturer	Gadjah Mada University	tatarahayu@yahoo.com	Indonesia
Dr.	Massimo Lupascu	Assistant Professor	National University of Singapore	mlupascu@nus.edu.sg	Singapore
Prof.	Balangoda Muhandiramlage Priyadarshe Singhakumara	Professor	University of Sri Jayewardenepura	balangodasingha@gmail.com	Sri Lanka

Symposium

Introduction of the JSPS Project and Long-term Monitoring and Inventory Data at The University of Tokyo Forests

Naoto KAMATA[1]

[1]The University of Tokyo Hokkaido Forest, Graduate School of Agricultural and Life Sciences, The University of Tokyo, JAPAN, kamatan@uf.a.u-tokyo.ac.jp

Abstract

Under changing environments, long-term monitoring and inventory data are important to detect temporal changes in environments and ecosystems. The University of Tokyo Forests (UTF) has adopted the research exchange project entitled “Developing a network of long-term research field stations to monitor environmental changes and ecosystem responses in Asian forests” for the JSPS Core-to-Core Program. This project is implemented in collaboration with core institutions in five countries (Japan, Korea, Taiwan, Thailand, and Malaysia). It aims to promote the development of long-term research field stations for stable and continuous monitoring, and to establish a multilateral research cooperation network between core institutions through close collaboration. The UTF has accumulated long-term ecological and meteorological data that are available for our forest management and researches: LTER plots, other stand plots, meteorological and hydrological data, bird community, plant and vertebrate inventory, and others. I will present two fruitful outcomes that were obtained from our long-term data.

Interim Report by Research Group (RG) 1: Water and Climate

Koichiro KURAJI[1], Nobuaki TANAKA[2], Sangjun IM[3], Yen-Jen LAI[4], Chatchai TANTASIRIN[5], Nilobol ARANYABHAGA[6], Maznah MAHALI[7], Luiza MAJUAKIM[8], Wilter Azwal MALANDI[7] & Fera CLEOPHAS[7]

[1]Executive Office, The University of Tokyo Forests, Graduate School of Agricultural and Life Sciences, The University of Tokyo, JAPAN, kuraji@uf.a.u-tokyo.ac.jp

[2]Ecohydrology Research Institute, The University of Tokyo Forests, Graduate School of Agricultural and Life Sciences, The University of Tokyo, JAPAN, tanaka@uf.a.u-tokyo.ac.jp

[3]Department of Forest Sciences & University Forests, Seoul National University, KOREA, junie@snu.ac.kr

[4]Experimental Forest, National Taiwan University, TAIWAN, alanlai@ntu.edu.tw

[5]Facluty of Forestry, Kasetsart University, THAILAND, fforcct@ku.ac.th

[6]Office of the National Water Resources, Office of the Prime Minister, THAILAND, pann_san@hotmail.com

[7]Faculty of Science and Natural Resources, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, MALAYSIA, marzross@gmail.com, wilaz@ums.edu.my, fhenocleo@yahoo.com

[8]Institute for Tropical Biology & Conservation, Universiti Malaysia Sabah, MALAYSIA, majuakim@ums.edu.my

Abstract

Since the kick-off symposium in Furano, Hokkaido, Japan in Oct. 2016, we tried to start some collaborative researches and established some open database to share long term data of water and climate. These researches include “Hydrological data for comparative study of hydrological response along with forest recovery in Korea and Japan” (by Im and Kuraji), “Current climatic classification of Asian forests and its future projection” (by Lai, Tanaka, Im, Chatchai and Fera), “Long-term changes of energy and water cycling in two forest sites in northern Thailand” (by Chatchai and Tanaka), “Impact of climate change on rainfall variability in Mae Chaem Watershed and Whole Mountainous Area in the Upper Chao Phraya River Basin” (by Nilobol and Kuraji) and “Hydrological Monitoring in Mount Alab and Inobong, Crocker Range Park, Sabah” (by Maznah and Kuraji). The database include “List of major hydrological/meteorological field stations (Meta Data) across five universities”, “Meteorological data, Hydrological data, Rainwater Quality data and Stream Water Quality data of the University of Tokyo Forests” (http://www.uf.a.u-tokyo.ac.jp/c2c/english/rg1/rg1.html), and “Weather Report for three(3) Substation at Crocker Range Park” (http://www.sabahparks.org.my/index.php/permanent-research-plot).

Progress Report and Future Scope of RG2 (Ecosystem)

Naoto KAMATA[1], Biing T. GUAN[2], Fang-Hua CHU[2], Maria Lourdes T. LARDIZABAL[3], Sunisa SANGUANSUB[4], Teerapong SAUWAPHAK[5], Sawai BURANAPANICHPAN[5], Kyu-Suk KANG[6], Susumu GOTO[7] & Shuhei TAKEMOTO[8]

[1]The University of Tokyo Hokkaido Forest, Graduate School of Agricultural and Life Sciences, The University of Tokyo, JAPAN, kamatan@uf.a.u-tokyo.ac.jp
[2]School of Forestry & Resource Conservation, National Taiwan University, Taiwan, ROC, btguan@ntu.edu.tw, fhchu@ntu.edu.tw
[3]Faculty of Science and Natural Resources, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, MALAYSIA, mlourdes@ums.edu.my
[4]Faculty of Agriculture at Kamphaeng Saen, Kasetsart University, THAILAND, agrssss@ku.ac.th
[5]Faculty of Agriculture, Chiang Mai University, THAILAND, agitswph@gmail.com, sawai.b@cmu.ac.th
[6]College of Agriculture and Life Sciences, Seoul National University, KOREA, kangks84@snu.ac.kr
[7]Education and Research Center, The University of Tokyo Forests, JAPAN, gotos@uf.a.u-tokyo.ac.jp
[8]The University of Tokyo Tanashi Forest, JAPAN, ts35@uf.a.u-tokyo.ac.jp

Abstract

During the 1st symposium in Japan, Guan showed a strong interest in a long-term plant phenology data obtained by The University of Tokyo Hokkaido Forest. Kamata has been struggling to merge the segmented data into a single dataset. Now we are ready to start analysing. Kamata has also started a collaboration with Lardizabal on bark and ambrosia beetles in Malaysia by the same protocol as in Japan and Thailand, which was conducted by Sanguansub, Saowaphak, and Buranapanichpan. Kang proposed a collaboration with Chu and Goto on phylogenetic analysis and reciprocal transplant experiment of *Chamaecyparis* spp. in East Asia. During Thai symposium, Takemoto proposed an international joint research to search for alternative type specimens (epitypes) of *Rosellinia* fungi. One important issue of RG2 is a long-term ecological research (LTER). Some of our groups have maintained their LTER plots well so that hopefully new collaborations on LTER plots will start on this project.

Collaborative Research Activities within Asian University Forests: Interim Report by Research Group 3 (Management)

Toshiaki OWARI[1], Keisuke TOYAMA[2], Yusuke MIZUUCHI[3], Takuya HIROSHIMA[4] & Haruo SAITO[5]

[1]The University of Tokyo Hokkaido Forest, JAPAN, owari@uf.a.u-tokyo.ac.jp
[2]The University of Tokyo Chiba Forest, JAPAN, toyama@uf.a.u-tokyo.ac.jp
[3]Ecohydrology Research Institute, The University of Tokyo Forests, JAPAN, mizuuchi@uf.a.u-tokyo.ac.jp
[4]Ecohydrology Research Institute, The University of Tokyo Forests, JAPAN, hiroshim@uf.a.u-tokyo.ac.jp
[5]Fuji Iyashinomori Woodland Study Center, The University of Tokyo Forests, JAPAN, haruo_s@uf.a.u-tokyo.ac.jp

Abstract

Among three Research Groups (RGs) under the ongoing JSPS Core-to-Core Program, RG3 deals with anthropogenic interventions in Asian forests, long-term geospatial and management data, and ecosystem services associated with social, economic and cultural values. International collaborative research activities have been promoted by core universities in five Asian countries (Japan, Korea, Taiwan, Thailand, and Malaysia). The first RG3 meeting was organized in October 2016 at the 7th International Symposium of the Asian University Forests Consortium in Furano, Japan, where we discussed potential research topics for further collaboration. We then listed major long-term experimental plots across five core universities. At the International Workshop held in March 2017 in Kota Kinabalu, Malaysia, we mainly exchanged our knowledge on long-term forest carbon storage. In May 2017, SNU - UTokyo Joint Workshop took place in Seoul, Korea, where we explored research collaboration on the long-term growth of plantation forests. The main topic of RG3 Session at the International Symposium in November 2017 in Bangkok, Thailand, was “Relationship between university forests and local society/community”. We then agreed a tentative plan for publication entitled “University forests in Asia: history, current states, and prospects in future”.

Challenges and Prospects of Seoul National University Forests, Korea

Sangjun IM[1], Song EU[2] & Sung-Jae LEE[3]

[1]Department of Forest Sciences & University Forests, Seoul National University, KOREA, junie@snu.ac.kr
[2]Program in Forest Environmental Science, College of Agriculture & Life sciences, Seoul National University, KOREA, dkarj@snu.ac.kr
[3]University Forests, Seoul National University, KOREA, lsj83@snu.ac.kr

Abstract

Seoul National University Forests (SNUFs) was established in 1913 for promoting education and research capacities in Korea. SNUFs has a 17,116 ha in size with three regional UFs throughout the country. The mission of SNUFs is to support the education and research activities on designated forests. About 6,800 students have annually visited the UFs for field practices and data collection. Meteorological data have periodically monitored with 9 AWS systems. A total of 880 permanent plots (20m x 50m) were operated in Nambu UFs to investigate vegetation change of natural forest, and figure out the structure of forest community under climate change since 1998. Hydrological data also collected on four watersheds in Mt. Baekwoon, and one site in Taehwsan UF. Specially, atmospheric observation towers are installed in Taehwasan UF since 2010. It was jointly operated by the National Institute of Environmental Research to observe carbon dioxide fluxes in forest areas. Diverse research programs have been conducted to build research capacity under the research grants of Korea Forest Service. It includes forest influences, forest management, biodiversity, and ecosystem services. SNUFs have contributed to enhancing forest values and capacity development in education and research sectors. Of cause, intense collaboration between Asian UFs is still needed to jump the UFs' ability toward new direction, leading to the future in education, research, and ecosystem service under climate changes

Acknowledgement: This study was carried out with the support of ´R&D Program for Forest Science Technology (Project No. 2014109C10-1820-AA01) provided by Korea Forest Service (Korea Forestry Promotion Institute).

Long-term Discharge Analysis using Master Recession Curve on a Small Forest Watershed, Seoul National University Forests

Song EU[1] & Sangjun IM[2,3]

[1]Program in Forest Environmental Science, College of Agriculture and Life Sciences, Seoul National University, KOREA,
dkarj@snu.ac.kr
[2]Department of Forest Sciences, College of Agriculture and Life Sciences, Seoul National University, KOREA,
[3]University Forests, Seoul National University, KOREA, junie@snu.ac.kr

Abstract

Forest watershed is the major source of water supply over the world, and thus sustainable forest management is the key factor to control water quality and quantity in forest environment. Specially, forest may influence on streamflow in dried season by hydrological processes occurred in canopy, soil, and floor litter. In order to clearly understand the hydrologic function, the role of forests on streamflow can be investigated based on long-term monitoring data. In this study, hydrological technique such as the master recession curve method was to employed to analyze the long-term variation of streamflow in Chusan experimental forest of Seoul National University Forests. As discharge data, streamflow discharge derived weir measurement from 2000 to 2016 were used. Master recession curve analysis was conducted using RECESS program, developed by USGS in 1998. As results, RECESS program calculated recession constant and regression model of stream flow regardless of non-continuous discharge data. Recession constant have been changed along time, and this tendency seems to reflect the dynamic change of forest land covers.

Acknowledgement: This study was carried out with the support of ´R&D Program for Forest Science Technology (Project No. 2014109C10-1820-AA01) provided by Korea Forest Service (Korea Forestry Promotion Institute).

NTU Experimental Forest: A Brief Introduction and Collaboration Opportunities

Biing T. GUAN[1] & Yen-Ren LAI[2]

[1]School of Forestry & Resource Conservation, National Taiwan University, TAIWAN, btguan@ntu.edu.tw

[2]Experimental Forest, National Taiwan University, TAIWAN, alanlai@ntu.edu.tw

Abstract

Located in central Taiwan, with an elevation from 290 to 3,952 m and an area *ca.* 1% of Taiwan, National Taiwan University Experimental Forest (NTU EXPF) is long in history and rich in natural resources. In our presentation, we will briefly introduce NTU EXPF, including its history, environment, and natural resources. We will also address NTU EXPF research activities in forestry, wildlife conservation, biomaterial utilizations, and social dimensions. Possible research collaborations under JSPS C2C program include establishing a climate classification map of Asian university forests using Worldclim Database (RG1), analyzing the University of Tokyo Hokkaido Forest long-term phenological observations to understand the influences of natural climate variability and assess the impacts of recent warming on various tree phenophase developments (RG2), comparing sugi growths, stand dynamics, responses to various management regimes, and CO_2 sequestration capabilities in different parts of Asia.

Activities and Future Collaboration in Forestry Research and Training Stations, Kasetsart University, Thailand

Kobsak WANTHONGCHAI[1]

[1]Vice Dean for Research and Human Resource, Faculty of Forestry, Kasetsart University, THAILAND, fforksw@ku.ac.th

Abstract

Faculty of Forestry, Kasetsart University (KUFF) owns 7 Forestry Research and Training Stations (FRTS), covering all region of the country. The main purposes of each FRTS is for training student, facilitating research projects, transferring forestry-based knowledge via training to the communities, demonstrating and earning income from forest plantation and facilities. Long-term ecological and hydrological study plots in FRTSs, ranging from 1 to 16 ha plots of deciduous and evergreen tropical ecosystems, have been conducted and periodically monitored. KUFF welcomes scientists to explore more aspects of tropical forest ecosystem. Moreover, long-term evaluating and monitoring tropical ecosystem values, services, from forest management operations and silvicultural practices and impacts for certified forest plantations (i.e. teak, eucalyptus, and acacia) also are those of interesting points for collaboration. Setting up the post-mining permanent plots at PNg-FRTS to evaluate the successfulness of different rehabilitation methods is very interesting. Innovative technologies for long-term forest ecosystem researches is our challenges, and waiting to explore the collaboration. In addition, Highland forest restoration is the main point of national agenda that KUFF are seeking collaborations from partners, although target area are outside the KUFF university forest.

Aboveground Biomass Changes in Tropical Montane Forests of Sabah, Malaysia

Mui-How PHUA[1]

[1]Faculty of Science and Natural Resources (Forestry Complex), Universiti Malaysia Sabah, MALAYSIA, pmh@ums.edu.my

Abstract

Tropical rainforests play an important role in global carbon cycling. Monitoring the carbon stock changes is crucial in the Reducing Emissions from Deforestation and forest Degradation *plus* (REDD+) mechanism. Several forestry research activities in Sabah are directly related to REDD+. This paper examined aboveground biomass (AGB) changes in a montane forest of Sabah using Shuttle Radar Topographic Mission Digital Elevation Model (SRTM DEM) and airborne laser scanning (ALS) data acquired in 2000 and 2012. The results show that the best model was derived from 1 m resolution ALS mean CHM (R^2 = 0.68, RMSE% = 29.87%). Likewise, the AGB 2000 map produced with 1 m resolution SRTM mean CHM was the best among to other resampled resolutions (R^2 = 0.53, RMSE% = 29.13%). Based on the 2000 and 2012 AGB maps, an AGB change map was obtained, where AGB increase was caused by natural regeneration while AGB decrease was affected by anthropogenic activities. This study showed ALS coupled with historical DEM can assist in monitoring tropical forest AGB changes.

Long Term Monitoring of Ecological Succession and Biodiversity for Enhancing Restoration and Improving Forest Health Status on the Volcanic Ecosystem of Mount Merapi Indonesia

Sri RAHAYU[1]

[1]Faculty of Forestry, Universitas Gadjah Mada, INDONESIA, tatarahayu@yahoo.com

Abstract

This presentation addresses an important gap in the scientific understanding of forest restoration options and implications in volcanic tropical montane ecosystems. The discussion will cover on the natural succession and indigenous tree planting in degraded ecosystems adjacent to a protected area on Java, with a focus on insects pests, pathogens and other indicators of forest health. Mount Merapi is one of the most active volcanoes in Indonesia, that powerfully erupted in 2010. Only a few species that able to grow after the eruption. *Acacia decurrens* were growth invasively regarding to the natural succession, while *Falcataria mollucana* the indigenous tree species were planted intensively for rehabilitation. Long term monitoring since 2013 up to now showed that *A.decurrens* growth better than its normal conditions although suffered by various health problems such as gummosis by *Ceratocystis* sp.. Hence, gall rust disease by *Uromycladium falcatarium* and stem borer are becoming destructive on *F.moluccana*.

Key words: Mount eruption, monitoring, succession, restoration, pathogen, insects pest

Asian Forest Network: the NUS Contribution

Massimo LUPASCU[1], Daniel FRIESS[2], Alan ZIEGLER[3] & Edward EL WEBB[4]

[1]Department of Geography, National University of Singapore, SINGAPORE, mlupascu@nus.edu.sg
[2]Department of Geography, National University of Singapore, SINGAPORE, dan.friess@nus.edu.sg
[3]Department of Geography, National University of Singapore, SINGAPORE, adz@nus.edu.sg
[3]Department of Geography, National University of Singapore, SINGAPORE, ted.webb@nus.edu.sg

Abstract

The National University of Singapore, one of the leading universities in Asia, is located in the heart of South-East Asia. Unfortunately, this part of the world has some of the highest deforestation rates due to mining, oil-palm plantation expansion, illegal logging and unchecked economic development.

Our faculty researchers are trying to tackle some important issues related to deforestation in some of the most endangered forests in SE-Asia. Some are exploring the impact of fires and land-use change on carbon dynamics in tropical peatland forests. Others use the perspective of ecosystem services to investigate changes to mangrove forests and how best to protect them. Yet others focus on research designed to support the conservation of floral diversity in natural and human-managed systems, while others investigate ecohydrological variables in different forest catchments in Singapore and Thailand.

With such a diverse set of skills and expertise NUS is looking forward to contribute to the Asian-forest network.

Forestry Education and Research at the Department of Forestry & Environmental Science, University of Sri Jayewardenepura, Sri Lanka

Balangoda M.P. SINGHAKUMARA[1] & G.G.T. CHANDRATILAKE[1]

[1]Department of Forestry & Environmental Science, University of Sri Jayewardenepura, Gangodawila, Nugegoda, SRI LANKA, balangodasingha@gmail.com

Abstract

The forestry education at University of Sri Jayewardenepura has a history of more than 35 years. It's Department of Forestry and Environmental Science (DFES) offers both undergraduate and postgraduate courses in forestry and environmental science. The department manages a 40 ha in Forest Reserve (YFR) at Yagirala since 1984, with facilities for field research. The department provides consultancy services and establishes university- industry partnerships through the Center for Sustainability (CFS) which commenced in 2012. Research on ecophysiology and ecology of Sri Lankan rain forest trees is conducted at Sinharaja World Heritage Site in collaboration with the Yale School of Forestry & Environmental Studies, USA, since 1990 and published over twenty research papers on the ecology of Sri Lanka's rainforests in peer-reviewed international journals. Data collection and monitoring facility for watershed-scale field experiments, research and training in forest hydrology and erosion control engineering is also being planned at YFR.