

Annual Report 2021

Geography

Department of Geography

Graduate School and Faculty of Urban Environmental Sciences

Tokyo Metropolitan University

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1. Laboratory of Quaternary Geology and Geomorphology

1) Staff

Professor : Takehiko SUZUKI

Geomorphology, Quaternary Science, Volcanology

Associate Professor : Masaaki SHIRAI

Sedimentology, Quaternary Geology, Marine Geology

Assistant Professor : Daisuke ISHIMURA

Tectonic geomorphology, Quaternary Geology

Project Assistant Professor : Masanori MURATA

Tephrochronology, Quaternary Geology

Project Researcher : Kaori AOKI

Quaternary Science, Marine Tephrochronology, Geochronological Dating

2) Overview of Research Activities

To prospect the futuristic view of environmental changes, our laboratory investigates the history and process of surface landform/geological development during the Quaternary period. The followings are some topics of our studies.

1. Reconstruction of geomorphological/geological phenomena during the Quaternary (the last 2–3 million years) with accuracies of 10^5 – 10^1 years
2. Study on volcanic products (tephra) and explosive eruption history in and around the Japanese Islands
3. Investigation on production–transport–depositional processes of sedimentary particles
4. Study on coastal–deep marine sediment for reconstruction of natural hazard history and influence of human activity to natural environment
5. Reconstruction of earthquake recurrence interval and fault activity from earthquake/fault induced landform and sediment
6. Investigation on marine/fluvial terraces for reconstruction of landform development and crustal movement during the last 10^5 years

3) List of Research Activities in FY2021

Peer-reviewed Articles

- Claro, S.M.D., Ramos, N.T., Fernando, A.G.S., Ishimura, D. and Switzer, A.D. 2021. Sedimentological evidence of washover deposits from extreme wave events in Zamboanga del Sur, Mindanao, southern Philippines. *Marine Geology* **438**: 106535. <https://doi.org/10.1016/j.margeo.2021.106535>
- Hara, M., Yokoyama, T., Utsugawa, T., Ito, T. and Shimazu, H. 2022. Utilization and administration of riverside land along the lower Natori River, Miyagi Prefecture, northern Japan: Agricultural land use and ownership. *Regional Studies* **61**: 1-14. (in Japanese)
- Hayashizaki, R. and Suzuki, T. 2022. Optically Stimulated Luminescence Dating of Gravel Layers in the Western Musashino Uplands, Tokyo, Japan. *Geographical Review of Japan Series A* **95**: 1-17. (in Japanese with English abstract)
- Ishii, Y., Tahahashi, T., and Ito, K. 2021. Luminescence dating of cobble from Pleistocene fluvial terrace deposits of the Ara River. *Quaternary Geochronology* **67**: 101228. <https://doi.org/10.1016/j.quageo.2021.101228>
- Ishimura, D. and Ebina, Y. 2021. Historical and geological examination of the tradition at the watershed between Koyadori and Oura, Yamada town, Iwate prefecture. *Historical Earthquakes* **36**: 89-97. (in Japanese with English abstract)
- Moriwaki, H., Nagasako, T., Suzuki, T., Terayama, S., Matsukaze, J. and Oda, R. 2021. The formation of Late Pleistocene and Holocene sand dunes on Kikaijima Island, Nansei Islands. *Journal of Geography* **130**: 683-706. (in Japanese with English abstract) <https://doi.org/10.5026/jgeography.130.683>
- Murata, M., Kobayashi, M., Aoki, K., Takahashi, T., Nishizawa, F. and Suzuki, T. 2021. Tephrostratigraphy and Eruption History of Kozushima Volcano, Izu Islands, Central Japan during the Last 30,000 Years. *Journal of Geography* **130**: 379-402. (in Japanese with English abstract) <https://doi.org/10.5026/jgeography.130.379>
- Shirai, M. and Utsugawa, T. 2022. Distribution of gravel-sand on high water bed by Typhoon Hagibis (T1919) flood in the middle reaches of the Tama River, central Japan. *Journal of Sedimentary Society, Japan* **80**: 11-25. (in Japanese with English abstract)
- Yamamoto, S., Nishizawa, F., Yoshimoto, M., Miyairi, Y., Yokoyama, Y., Suga, H. and Ohkuchi, N. 2021. Dating Lake sediments using compound-specific ¹⁴C analysis of C16 fatty acid: A case study from the Mount Fuji Volcanic Region, Japan. *Geochemistry Geophysics Geosystems* **22**(5). <https://doi.org/10.1029/2020GC009544>

Other Articles

- Aoki, K. 2022. Detection of Fuji Hoei tephra produced by Mt. Fuji volcano in 1707 (Hoei)

- present in the MD01-2421 sediment core collected off the Kashima coast of east Japan. *Geographical Reports of Tokyo Metropolitan University* **57**: 55-62.
- Ishimura, D. 2022. Small surface ruptures appeared apart from the Futagawa fault. In *Learning from traces of the Kumamoto earthquake*, ed. Disaster Mitigation Laboratory, Center for Water Cycle Marine Environment and Disaster Management, Kumamoto University, 24-25. Kumamoto: Kumanichi Shuppan. (in Japanese)
- Ishimura, D. 2022. Active fault mainly showing vertical displacement, which is parallel to the Futagawa fault. In *Learning from traces of the Kumamoto earthquake*, ed. Disaster Mitigation Laboratory, Center for Water Cycle Marine Environment and Disaster Management, Kumamoto University, 84-85. Kumamoto: Kumanichi Shuppan. (in Japanese)
- Ishimura, D. 2022. Active fault outcrop appeared due to the surface failure by the 2016 Kumamoto earthquake. In *Learning from traces of the Kumamoto earthquake*, ed. Disaster Mitigation Laboratory, Center for Water Cycle Marine Environment and Disaster Management, Kumamoto University, 106-107. Kumamoto: Kumanichi Shuppan. (in Japanese)
- Kobayashi, M., Mannen, K., Yamaguchi, T. and Nagai, M. 2021. Topography and deposits related to the latest eruptive activity of Hakone volcano. *Monthly Chikyu* **510**: 138-146. (in Japanese)
- Nakazawa, T., Naya, T., Komatsubara, J., Miyachi, Y., Nonogaki, S., Nakazato, H., Suzuki, T. and Nakayama, T. 2021. Chapter 2. General geology. In *Explanatory Text of the Urban Geological Map of Central Tokyo (Special Wards Area)*, eds. Nakazawa, T., Naya, T., Komatsubara, J., Miyachi, Y., Nonogaki, S., Nakazato, H., Suzuki, T. and Nakayama, T., 5-8. Tsukuba: Geological Survey of Japan. (in Japanese)
- Shirai, M., Takaoka, S., Akasaka, I., Utsugawa, T. and Kato, S. 2022. Disturbance and consequent changes of riverbed environments by Typhoon Hagibis flood in 2019 at the middle reaches of the Tama river, central Japan. *Geographical Reports of Tokyo Metropolitan University* **57**: 39-46.
- Suzuki, T. 2021. (1) Landform of Tama: Development of Yato in Chapter 2 Environment of Tama City. In *Memorial Magazine for the 50th Foundation of the Tama City*, ed. Tama City, 18-19. Tokyo: Tama City. (in Japanese)
- Suzuki, T. 2021. Column B: Mt. Fuji eruption and volcanic ash in Hoei era, in Section 3 Artificial nature and disaster, Chapter 1 Urban development and disaster. In *History of Minato Ward Volume 2, Early Modern Period*, ed. General Affairs Division, General Affairs Department, Minato Ward, 20-30. Tokyo: Minato Ward. (in Japanese)
- Suzuki, T. 2021. Chapter 3 Kazusa Group. In *Explanatory Text of the Urban Geological Map of Central Tokyo (Special Wards Area)*, eds. Nakazawa, T., Naya, T., Komatsubara, J., Miyachi, Y., Nonogaki, S., Nakazato, H., Suzuki, T. and Nakayama, T., 9-14. Tsukuba: Geological Survey

of Japan. (in Japanese)

Suzuki, T. 2021. Section 2 Age and surrounding landform of natural sediments. In *Kounji Temple Ruins Site: Reports for Archaeological Excavation of Buried Cultural Properties Associated with Accommodation Facility Construction Business Volume 2*, eds. Great Eagle Tokyo TMK and PASCO Corporation, 158-167. Tokyo: Great Eagle Tokyo TMK and PASCO Corporation. (in Japanese)

Suzuki, T. and Nishizawa, F. 2022. Re-examination of tephra identification on the Ebaradai Uplands in the campus of the Komazawa University, central Tokyo: Hk-KIPs and On-Pm 1 Tephra. *Komazawa Journal of Geography* **58**: 63-74. (in Japanese)

Suzuki, T., Chigira, M., Matsushi, Y. and Nakayama, D. 2021. GIS Assessment of earthquake-induced landslides potential on artificial landform transformation areas in the Tama Hills covered with tephric loess, Tokyo. *Annual Report of Disaster Prevention Research Institute, Kyoto University* **64B**: 115-130. (in Japanese with English abstract)

Terayama, S. Kobayashi, M., Murata, M., Takahashi, T. and Suzuki, T., 2021. Tephrastratigraphy of pre-caldera formation in north and west parts of the Izu-Oshima volcano, Japan. *Monthly Chikyu* **510**: 147-155 (in Japanese)

Books

Suzuki, T. 2021. *Tales from topographic lands in the Japanese Islands*. Tokyo: Beret Publishing Co., Ltd. (in Japanese)

Reports

Aoki., K. 2022. The analysis of rounded pumice clasts collected from the 4th layer of soil at the Hagigaoka 7 ruin. In *Kamishihoro-cyo Hagigaoka 7 ruin, the 4th report on the investigate of buried cultural property in the Kamishihoro-cho* eds. Kamishihoro-cho Education Board, 57-58. Hokkaido. (in Japanese).

Ishimura, D. 2022. Geological examination of the tsunami tradition in Yamada town, Iwate prefecture. In *History leads to new developments in disaster science V -Research on the 1611 Keicho Oshu earthquake tsunami by integration of humanities and sciences-*: 44-49. (in Japanese)

Kobayashi, M. Murata, M. and Suzuki, T. 2022. Scoria layers from Fuji volcano and wide-area tephra stratigraphy confirmed at Oshikakubo site. *Historic Site Oshikakubo Site Excavation Survey Report-Re-excavation Survey Associated with Historic Site Maintenance Project* (Fujinomiya City Board of Education): 83-88. (in Japanese)

Nishizawa, F. 2022. The chemical composition of volcanic glass shards of a pumice artifacts in the Akasaka site, the Miura city Kanagawa Prefecture. *Miura City Excavation report* **33**:

307-315. (in Japanese)

- Shirai, M. 2022. Geomorphological and geological characteristics around the Nagasawa Archaeological Site. *Report of the 10th Excavation Survey of the Nagasawa Archaeological Site, Reports of the Tokyo Metropolitan Archaeological Center* **371**: 265-270. (in Japanese)
- Yamashita, H., Niida, S. and Nishizawa, F. 2022. Geographical and geological overview of the Iwo Islands. *Research Report of the Kanagawa Prefectural Museum, Natural History* **17**: 1-10. (in Japanese with English abstract)

Book Reviews

- Nishizawa, F. 2021. Book Review of The latest scientific perspective of volcanoes: Its origins, prevention of volcanic disasters, a large-scale eruption of Mt. Fuji by Mannen, K. *The Quaternary Research* **60**: 43-44. (in Japanese)
- Utugawa, T. 2021. Book review of Tree Story: The History of the World Written in Rings by Valerie Trouet and translated by Sano, H. *The Quaternary Research* **61**: 45-46. (in Japanese)

Miscellaneous Reports

- Kobayashi, M. 2022. Publication of Mt. Fuji Volcanic Hazard Map (revised edition) and its points. *Fujinology* **2**: 89-90. (in Japanese)
- Okuno, M., Iguchi, M., Miyoshi, M., Miura, D., Kobayashi, M., Hashimoto, T., Ohba, T. and Sato, E. and Takarada, S. 2021. Introduction of the Special Issues on “Understanding Volcanoes by Integrating Eruptive History Research and Volcano Observations”. *Bulletin of the Volcanological Society of Japan*. **66**: 65-70 (in Japanese)
- Suzuki, T. 2021. 3-1-2-1 Learning the movement of earth surface: movement of ground, uplift, subsidence, strong erosion, and sedimentation. In *School Education Support Site for Geography* eds. School Education Support Site for Geography. (in Japanese)
<https://www.chirisougou.geography-education.jp>
- Suzuki, T. 2021. 3-1-3-1 Learning how to read volcanic hazard map and its access. In *School Education Support Site for Geography* eds. School Education Support Site for Geography. (in Japanese) <https://www.chirisougou.geography-education.jp>

Presentations

- Aoki, K., Kobayashi, M., Murata, M., Suzuki, T. 2021. Tephrostratigraphy of drilled core C9010E off the Boso Peninsula: Estimated source volcano for 9th century eruption events. *Abstract of Japan Geoscience Union Meeting 2021*: SVC28-22, June, Online. (in Japanese)
- Aoki, K., Kobayashi, M., Murata, M., Suzuki, T. 2021. Estimation of source volcanoes for scoriaceous tephra intervened in drilled core C9010E off the Boso Peninsula. *Japan*

- Association for Quaternary Research, Programme and Abstracts* **51**, 12, August, Online. (in Japanese)
- Fukushima, Y. and Ishimura, D. 2021. Nature of Secondary-Ruptured Faults Revealed by InSAR and Paleoseismic Survey, FRINGE2021 Meeting, June, Online.
- Hiramine, R., Ishimura, D. and Takahashi, T. 2021. Pumice transportation process from inland to sea through rivers: A case study of the Typhoon Hagibis of 2019 along the Tone River, central Japan. *Abstracts of Japan Geoscience Union Meeting 2021*: HGM03-P04, Jun, Online. (in Japanese)
- Hiramine, R., Aoki, K. and Ishimura, D. 2021. Transportation and sedimentation processes of drift pumice at Sekinehama, in the northern part of Shimokita peninsula, Aomori prefecture. *Japan Association for Quaternary Research, Programme and Abstract* **51**: 10, August, Online. (in Japanese)
- Ishii, Y., Tahahashi, T., and Ito, K. 2021. Rock surface dating of granodiorite cobbles obtained from fluvial terrace deposits in the Chichibu Basin, central Japan. *Abstracts of Japan Geoscience Union Meeting 2021*: HQR04-P05, May, Online. (in Japanese)
- Ishimura, D. and Yamada, K. 2021. Tsunami deposits and their distribution based on dense drilling cores: a case study in Koyadori, Yamada Town, Iwate Prefecture. *Japan Association for Quaternary Research, Programme and Abstract* **51**: 25, August, Online. (in Japanese)
- Ishimura, D. and Yamada, K. 2021. Mapping of coastal boulder using Structure from Motion and machine learning: A case study of boulders in Hashiguiwa, Kushimoto Town, Wakayama Prefecture. *Proceedings of the General Meeting of the Association of Geographers* **100**: 84, September, Online. (in Japanese)
- Ishimura, D., Takahashi, N., Tsutsumi H. and Toda, S. 2021. Simultaneity between primary and distributed fault ruptures: Paleoseismic survey on the primary and distributed surface ruptures associated with the 2016 Kumamoto earthquake. *PROGRAMME and ABSTRACTS JSAF 2021 FALL MEETING and SYMPOSIUM*: 15-16, October, Toyama.
- Ishimura, D., Yamada, M., Ishizawa, T., Aoki, K. and Sato, K. 2021. Characteristics of event deposits and their distributions based on a drilling survey in Sekine-hama, the northern part of the Shimokita Peninsula, Aomori Prefecture. *Abstracts of Japan Geoscience Union Meeting 2021*: MIS15-P02, June, Online. (in Japanese)
- Ishimura, D., Iwasa, Y., Takahashi, N., Oda, R. and Tadokoro, R. 2021. Paleo-seismic events on the Futagawa fault, Futa, Nishihara Village, Kumamoto Prefecture. The 2021 Seismological Society of Japan Fall Meeting: S10-03. October, Online. (in Japanese)
- Matsukaze, J. and Shirai, M. 2021. Landform evolution since the Middle Pleistocene estimated at the lower reaches of the Himekawa River, central Japan. *Abstracts of Japan Geoscience Union Meeting 2021*: HQR04-P08, May, Online. (in Japanese)

- Murata, M., Takahashi, T., Aoki, K., Nishizawa, F., Kobayashi, M. and Suzuki, T. 2021. Identification of reworked volcanoclastic deposits composing the upper Alluvium along the Moto-Arakawa River, east part of the Saitama Prefecture, Central Japan. *Abstract of Japan Geoscience Union Meeting 2021*: HQR04-P06, June, Online. (in Japanese)
- Murata, M., Takahashi, T., Aoki, K., Nishizawa, F., Kobayashi, M. and Suzuki, T. 2021. Impact of reworked volcanic products on the formation of Alluvial lowland along the Moto-Arakawa River, east part of the Saitama Prefecture, Central Japan. *Proceedings of the General Meeting of the Association of Geographers* **100**: 86, September, Online. (in Japanese)
- Nakazawa, T., Cho, I., Komatsubara, J., Naya, T., Nonogaki, S., Miyachi, Y., Ozaki, M., Sakata, K., Nakazato, H., Suzuki, T. and Nakayama, T. 2021. Ground-type classification based on Quaternary stratigraphy and sedimentary facies and the corresponding ground motion characteristics, with special reference to the 3D Urban Geological Map of Central Tokyo. *Abstracts of Japan Geoscience Union Meeting 2021*: HQR04-04, June, Online. (in Japanese)
- Naya, T., Nakazawa, T., Nonogaki, S., Sakata, K., Nakazato, H., Suzuki, T. and Nakayama, T. 2021. Stratigraphic division, age and distribution pattern of the Middle to Upper Pleistocene Shimosa Group in central Tokyo area. *Abstracts of Japan Geoscience Union Meeting 2021*: HQR04-05, June, Online. (in Japanese)
- Nishizawa, F., Ishihama, S. and Taguchi, K. 2021. Characteristics of a plant residue layer at the Nishitomioka-Mukoubata Site, Isehara City, Japan. *Japan Association for Quaternary Research, Programme and Abstracts* **51**, 32, August, Online. (in Japanese)
- Niwa, Y. and Ishimura, D. 2021. Spatial distribution of Holocene crustal movements along the Sanriku coast, northeast Japan. *Proceedings of the General Meeting of the Association of Geographers* **100**: 35, September, Online. (in Japanese)
- Oda, R., Ishimura, D. and Suzuki, T. 2021. Simultaneous rupturing of the Tanna fault and its branch faults in the Kita-Izu fault zone. *Abstracts of Japan Geoscience Union Meeting 2021*: SSS10-02, June, Online. (in Japanese)
- Okuno, M., Sugai, T., Suzuki, T., Toda, S., Takarada, S. and Yamada, K. 2021. Introduction of the JAQUA remote-symposium environmental change and mega disasters viewed from terrestrial archives: toward disaster prevention and mitigation. *Proceedings of the International Meeting on Eruptive History and Informatics* (2021, No.1) 68-69, July, Online. (in Japanese)
- Ramos, N. T., Reyes, J. S., Nawanao, Jr. L. P., Mangahas, R. Z., Narag, I. C., Ramirez, A. B. G., Claro, S. M. D., Tsutsumi, H., Ishimura, D., Baba, T., Chikasada, N., Goto, K. and Satake, K. 2021. Tsunami Hazard Assessment of Subduction Zones in the Philippines. Regional Geoscience Congress of Southeast Asia 2021, December, Online.

- Sato, J. and Suzuki, T. 2021. Reexamination of the characteristics and eruption style of Haruna-Hakoda tephra found from the southern foot of Akagi Volcano to the eastern foot of Haruna Volcano in North Kanto, Northeast Japan. *Abstracts of Japan Geoscience Union Meeting 2021: SVC30-05*, June, Online. (in Japanese)
- Sato, K., Yamada, M., Ishimura, D., Ishizawa, T. and Baba, T. 2021. Tsunami source estimation of paleotsunami deposits formed in the 17th century at Sekinehama, northern Shimokita Peninsula, Aomori Prefecture. *Abstracts of Japan Geoscience Union Meeting 2021: MIS15-P03*, June, Online. (in Japanese)
- Sato, K., Yamada, M., Ishimura, D., Ishizawa, T. and Baba, T. 2021. Tsunami source estimation based on the distribution of paleotsunami deposit in the 17th century at Sekinehama, northeast Japan. AGU Fall Meeting 2021, December, Online.
- Shirai, M. and Utsugawa, T. 2021. Characteristics in hyperconcentrated flood flow deposit formed by the Hoei Earthquake ca. 300 years ago in upper reaches of the Abe River, central Japan. *Abstracts for Annual Meeting of the Sedimentological Society of Japan 2021: P-10*, November, Online. (in Japanese)
- Shirai, M., Kobayashi, M., Kawajiri, K. and Utsugawa, T. 2021. Riverine erosion/deposition of the Katsura River according to occurrences of the Fuji-Sagamigawa Lahar and the Saruhashi Lava events. *Japan Association for Quaternary Research, Programme and Abstracts 51: 41*, August, Online. (in Japanese)
- Shirai, M., Akiyama, T., Kawajiri, K. Utsugawa, T. and Takahashi, T. 2021. Coastal transport process of pebble along the Seisho Coast, Kanagawa Prefecture, estimated from changes in lithological composition and form of pebble particles. *Abstracts of Japan Geoscience Union Meeting 2021: HCG28-P06*, May, Online. (in Japanese)
- Suzuki, T. 2021. Geography of Tokyo, Physical Geography, Landforms and Geology. Tokyo Metropolitan University, Open University, November, Online. (in Japanese)
- Suzuki, T. 2021. Assessment of slope disaster potential deduced by tephric loess: distribution in the Japanese Islands and assessment in the artificial landform transformation areas. *Abstract of 2021 Meeting for Landslide Disaster Prediction 11-12*, December, Online. (in Japanese)
- Suzuki, T. 2022. Geology and landforms in Akiruno: east-west compression during last 3 million years. Open Lecture of Akiruno Citizen College, January, Online. (in Japanese)
- Suzuki, T. 2022. Stratigraphy and age of the Kazusa Group distributed in the west margin of the Kanto Plain: what is clarified and not clarified. 171st Society Meeting of Palaeontological Society of Japan, February, Online. (in Japanese)
- Suzuki, T. 2022. Kanto Plain and the Kazusa Group formed in a forearc basin, central Japan (Plenary talk). *Proceedings of 36th Symposium of Geological Survey of Japan: 3D Geological*

- Map of Central Tokyo: Visualizing the detailed subsurface geology beneath the Tokyo Metropolis* 6-7, February, Online. (in Japanese)
- Suzuki, T. and Utsugawa, T. 2021. Tephrochronological studies on huge volcanic eruptions and disasters in Japan. *Proceedings of the International Meeting on Eruptive History and Informatics (2021, No.1)*: 94-95, July, Online. (in Japanese with English abstract)
- Suzuki, T., Chigira, M., Matsushi, Y. and Nakayama, D. 2021. Map of earthquake-induced landslides potential on artificially transformed hills in the depositional area of tephric soil deposits. *Abstracts of Japan Geoscience Union Meeting 2021*: HDS08-03, June, Online. (in Japanese with English abstract)
- Takahashi, T. and Sugai, T. 2021. Landform changes according with the flood in response for 2017 Heavy Rain in Northern Kyushu, and their implications for the fluvial terrace development since the late Pleistocene in the tributaries of the Chikugo River, southwestern Japan. *Japan Association for Quaternary Research, Programme and Abstracts* **51**: 36, August, Online. (in Japanese)
- Takahashi, T., Ichikawa, R. and Toda, S. 2022. Research for the landform development focused on the landslides during the Holocene in the northern foot of the Mt. Kurikoma, northeastern Japan. Conference for Reports on Research Grant of Mt. Kurikoma Area Geopark, March, Online. (in Japanese)
- Utsugawa, T. 2021. Conduct of practical online lesson and case model of online student assistant through Microsoft Teams. *Proceedings of International ICT Application Research Society 1st Special seminar (online edition)* : 4, June, Online. (in Japanese)
- Utsugawa, T. and Shimazu, H. 2021. Changes of the coastal line on New Caledonia islands, South Pacific Ocean, estimated from the landscape and aerial photos. The General Meeting of The Risho Geography Association 2021, October, Online. (in Japanese)
- Watanabe, T., Suzuki, T. and Ishimura, D. 2021. Tephrostratigraphy during the past 30,000 years in the Jaishi Oike Moor, southern Izu Peninsula, Japan. *Abstracts of Japan Geoscience Union Meeting 2021*: HQR04-P07, June, Online. (in Japanese)
- Watanabe, T., Suzuki, T. and Ishimura, D. 2021. An attempt to detect fallout-tephras by continuous analysis for the Jaishi core (JIS) obtained from the Jaishi Oike Moor, Izu Peninsula, Central Japan. *Japan Association for Quaternary Research, Programme and Abstract* **51**: 37, August, Online. (in Japanese)

2. Laboratory of Climatology

1) Staff

Professor : Jun MATSUMOTO

Monsoon Climatology, Environmental Climatology

Professor : Hideo TAKAHASHI

Urban Climatology, Climatic Change, Rainfall Climatology

Assistant Professor : Hiroshi TAKAHASHI

Asian Monsoon, Cloud-Precipitation Climatology, Regional Climate Modeling

Project Professor : Fumiaki FUJIBE

Urban Climatology, Environmental Climatology

Project Associate Professor : Jun-Ichi HAMADA

Tropical Climatology, Meteorological Observation

Project Assistant Professor : Tomoshige INOUE

Monsoon Climatology, Climate Change, Global Warming

Project Researcher : Yoshihito SETO

Urban Climatology, Local Climatology, Statistical Analysis

Project Researcher : Masato NODZU

Tropical Climatology, Satellite Meteorology, Climatology over Small Islands

Project Researcher : Rakesh Teja KONDURU

Diurnal Convection, Tropical Climatology, Land-Atmosphere Convection, Regional and Global climate modeling

2) Overview of Research Activities

Our laboratory investigates climate system on the earth in various temporal-spatial scales. In particular, we focus on climate changes due both to natural and anthropogenic causes, for example, processes of heat island and heavy rainfall events over and around urban regions, and

influences of land-use changes and deforestation on regional climates. We also investigate diurnal, intra-seasonal, and inter-annual variabilities and long-term changes of climate, in particular, rainfall activities in the Asian monsoon region, and influences of global warming on regional climates (future projection).

We apply three major methods, observation (monitoring), data-analysis of various global and regional datasets, and numerical modeling for investigating above-mentioned topics.

- 1) Climate changes and climate variability over Japan and around the world
- 2) Variability and seasonal changes of regional climate over Asian monsoon region
- 3) Observational study on formation processes of urban heat island, detailed structure of urban boundary layer, and elucidation of urban effects on short duration intense rainfall
- 4) Impacts of land-surface conditions and changes on cloud and precipitation activities, in particular, in the tropics
- 5) Reconstruction of past climate during the historical period in Japan and in East Asia

3) List of Research Activities in FY2021

Peer-reviewed Articles

Fujibe, F. and Matsumoto, J. 2021. Estimation of excess deaths during hot summers in Japan. *SOLA* **17**: 220-223. <https://doi.org/10.2151/sola.2021-038>

Fujiwara, H., Okochi, H., Kamogawa, M., Suzuki, T., Hayashi, S., Sato, N., Orihara, Y., Matsumoto, J., Hamada, J.-I., Murata, K., Yoshikawa, E. and Kudo, T. 2021. Difference between lightning activities in thunderstorm cells with and without hailfall in western Tokyo. *Journal of Atmospheric Electricity* **40**: 10-31. <https://doi.org/10.1541/jae.40.10>

Hirano, J., Mikami, T. and Zaiki, M. 2022. Analysis of early Japanese meteorological data and historical weather documents to reconstruct the winter climate between the 1840s and the early 1850s. *Climate of the Past* **18**: 327-339. <https://doi.org/10.5194/cp-18-327-2022>

Hoshi, R. and Takahashi, H. G. 2021. Role of oceanic memory effects in the Barents Sea in the seasonal linkage between the winter and summer Arctic Oscillation. *Journal of Geophysical Research: Atmospheres* **126**: e2021JD034799. <https://doi.org/10.1029/2021JD034799>

Manalo, J. A., Matsumoto, J., Takahashi, H. G., Villafuerte II, M. Q., Olaguera L. M. P., Ren, G. and Cinco, T.A. 2022. The effect of urbanization on temperature indices in the Philippines. *International Journal of Climatology* **42**: 850-867. <https://doi.org/10.1002/joc.7276>

Olaguera, L. M. P., Manalo, J. A. and Matsumoto, J. 2021. Influence of boreal summer intraseasonal oscillation on rainfall extremes in the Philippines. *International Journal of Climatology*. <https://doi.org/10.1002/joc.7495>

Olaguera, L. M. P., Caballar, M. B., De Mata, J. C., Dagami, L. A. T., Matsumoto, J. and Kubota,

- H. 2021. Synoptic conditions and potential causes of the extreme heavy rainfall event of January 2009 over Mindanao Island, Philippines. *Natural Hazards* **109**: 2601-2620. <https://doi.org/10.1007/s11069-021-04934-z>
- Pham-Thi, T. H., Matsumoto, J. and Nodzu, M. I. 2021. Evaluation of the Global Satellite Mapping of Precipitation (GSMaP) data on sub-daily rainfall patterns in Vietnam. *Vietnam Journal of Earth Sciences* **44**(1): 33-54. <https://doi.org/10.15625/2615-9783/16594>
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None

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None

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Matsumoto, J. 2022. Characteristics of monsoon climate and its effect on agriculture and human production activities. Provision of teaching materials in Geography (Chiri-sogo): School Education Support Site (On-line teaching materials)

<https://www.chirisougou.geography-education.jp/sustainable-world/global-issue/physical-geography-knowledge/monsoon-climate/>

Presentations

Akasaka, I., Zaiki, M., Kubota, H. and Matsumoto, J. 2021. Characteristics on seasonal marches of rainfall and surface wind at Manila for the late 19th century. *The 34th International Geographical Congress*, August, Online. (Poster)

Akasaka, I., Zaiki, M., Kubota, H. and Matsumoto, J. 2021. Data rescue of the Philippine meteorological records for the late 19th century. *ACRE 2021 Virtual Workshop*, October, Online.

Algodon, M., Takahashi, Y., Sato, M., Kubota, H., Yamashita, K., Perez, G. J., Marciano, J. J., Matsumoto, J., Hamada, J.-I., Tsuboki, K. and Yamada, H. 2021. 3D Reconstruction of Tropical Cyclone Trami (2018) eye and eyewall clouds observed by airborne camera. *Abstract of the American Geophysical Union Fall Meeting*, A25R-1889, December, Online.

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- Fujibe, F. and Matsumoto, J. 2021. Regional features of the dates of maximum and minimum precipitation in the warm season in Japan. *Proceedings of the General Meeting of the Association of Japanese Geographers 2021 Fall Meeting* **100**: 30, September, Online.
- Fujibe, F., and Matsumoto, J. 2021. Long-term changes in the newspaper coverage of words related to meteorology and disaster. *Abstracts of the Meteorological Society of Japan 2021 Autumn Meeting* **120**: 143, December, Online.
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- Kitabayashi, S. and Takahashi, H. G. 2021. Climate response to anthropogenic aerosols and related SST variabilities including ENSO in the Asian monsoon region. *Abstracts of European Geosciences Union General Assembly 2021: EGU21-14099*, April, Online.
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- Manalo, J. A., Matsumoto, J., Nodzu, M. I. and Olaguera, L. M. P. 2021. Diurnal variability of urban heat island intensity in Metro Manila, Philippines. *Abstracts of the Asia Oceania Geosciences Society 2021 Annual Meeting: AS09-A034*, August, Online.
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- Matsumoto, J. and Asada, H. 2021. The rice agriculture development and severe flood history since the late 20th century in Bangladesh. *The Sixth Biennial Conference of East Asian Environmental History*, September, Online.
- Matsumoto, J. and Asada, H. 2021. Comments on the irrigated agriculture in Bangladesh. *Seminar on Irrigated Agriculture in Bangladesh: Past, Present, and Future*, November, Online.
- Matsumoto, J. and Olaguera, L. M. P. 2021. Synoptic climatology of the wet and dry conditions in the pre-summer monsoon season of the Philippines. *The 34th International Geographical Congress*, August, Online.
- Matsumoto, J., Olaguera, L. M. P., Dado, J. M. B. and Narisma, G. T. 2021. Winter time extreme rainfall in the southern Philippines. *The 34th International Geographical Congress*, August, Online.

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- Nodzu, M. I., Matsuyama, H. and Matsumoto, J. 2021. Horizontal distribution of spring precipitation peaks over the Pacific Ocean along the Japanese Islands. *Abstracts of the Meteorological Society of Japan 2021 Autumn Meeting* **120**: 210, December, Online. (in Japanese)
- Nodzu, M. I., Matsumoto, J., Bui, H. K. T., Pham-Thi, T. H., Ngo-Duc, T. and Nguyen-Vinh, T. 2021. Comparative analysis of the GSMaP and quantitative precipitation estimation based on surface observation by radars and gauges in heavy rainfall events over Vietnam. *Abstracts of the Japan Geoscience Union Meeting 2021: ACG36-P09*, June, Online.
- Ogino, S.-Y., Miyazaki, K., Fujiwara, M., Nodzu, M. I., Shiotani, M., Hasebe, F., Matsumoto, J., Witte, J., Thompson, A. M., Nguyen, H. A., and Nguyen, V. 2021. Formation of lower-tropospheric high-ozone layer in spring over Southeast Asia. *Quadrennial Ozone Symposium 2021*, October, Online.
- Olaguera, L. M. P., Manalo, J. A., Matsumoto, J. and Solis, A. L. S. 2021. On the spatio-temporal characteristics of the dry rainy season during 2020 over Luzon Island, Philippines. *2021 Philippine Meteorological Society Annual Convention*, April, Online.
- Sato, M., Takahashi, Y., Kubota, H., Noda, A., Hamada, J.-I. and Lopez, G. V. C. 2021: Quasi-Real Time Monitoring of Lightning and Weather in the Philippines and Western North Pacific for the Severe Weather Intensity Prediction. *Abstracts of the European Geophysical Union General Assembly 2021: EGU21-13950*, April, Online.
- Sengoku, K. 2022. Climatological features of Cold-Air Damming in Kanto Plain. The 70th National Geography Major Graduation Article Conference, March, Online. (poster, in Japanese)
- Sengoku, K., Takahashi, H., Fujibe, F. and Takahashi, H. G. 2021. Climatological features of Cold-Air Damming in Kanto Plain. *Abstracts of the Meteorological Society of Japan 2021 Autumn Meeting* **120**: 129, December, Online. (in Japanese)
- Seto, Y. and Takahashi, H. 2021. Characteristics of recent changes in the local wind system over the Kanto Plain in summer. *Abstracts of the 73rd Japanese Study Group for Climate Impact and Application*: 15–16, April, Online. (in Japanese)
- Seto, Y. and Takahashi, H. 2021. Recent changes in local wind patterns in summer over the

- Kanto Plain. *Proceedings of the General Meeting of the Association of Japanese Geographers 2021 Autumn Meeting* **100**: 79, September, Online. (in Japanese) https://doi.org/10.14866/ajg.2021a.0_68
- Seto, Y., Watanabe, S. and Takahashi, H. 2022. Characteristics of local wind patterns during daytime and nighttime over the Kanto Plain in summer. *Proceedings of the General Meeting of the Association of Japanese Geographers 2022 Spring Meeting* **101**: 184, March, Online. (in Japanese) https://doi.org/10.14866/ajg.2022s.0_198
- Shrestha, B.B., Kawasaki, A., Inoue, T. Matsumoto, J. and Shiroyama, T. 2021. Impact of rainfall variability on rice yield in Burma during historical colonial period. *The Annual Conference on Asian Network for GIS-based Historical Studies (ANGIS) 2021*, December, Online.
- Takahashi, H. G. 2021. Role of tropical cyclones along the monsoon trough in the future changes of the Asian monsoon precipitation by high-resolution models. *Abstracts of the European Geosciences Union General Assembly 2021*: EGU21-13986, April, Online.
- Takahashi, H. 2021. Tokyo's climate. TMU Open University, Geography of Tokyo: Physical geography, November, Online. (in Japanese)
- Takahashi, H. 2022. Urban climate of Tokyo revealed by meteorological observation. Tokyo Metropolitan High School of Science and Technology, Short-term Intensive Course. March, Koto-ku. (in Japanese)
- Takahashi, H., Seto, Y., Sugawara, H., Tsunematsu, N. and Nakajima, K. 2021. Relationship between temperature fluctuations at the top of the inversion layer in the western part of Tokyo wards area and the surface wind systems. *Proceedings of the General Meeting of the Association of Japanese Geographers 2021 Autumn Meeting* **100**: 28, September, Online. (in Japanese) https://doi.org/10.14866/ajg.2021a.0_67
- Takahashi, Y., Sato, M., Kubota, H., Ishida, T., Castro, E. C., Algodon, M., Purwadi, Perez, G. J., Marciano, J. J., Matsumoto, J. and Hamada, J.-I. 2021. Extreme weather monitoring based on coordinated observation system consisting of ground networks and micro-satellites. *Abstract of the American Geophysical Union Fall Meeting*: NH44A-07, December, Online.
- Takahashi, Y., Sato, M., Kubota, H., Ishida, T., Castro, E. C., Estrebillo, L. J., Purwadi, Algodon, M., Perez, G. J., Marciano, J., Matsumoto J. and Hamada, J.-I. 2021. Current status and prospects of ULAT/SATREPS. *Abstract of the Japan Geoscience Union Meeting 2021*: MIS07-01, May, Online.
- Terao, T., Kanae, S. and Matsumoto J. 2021. The focus of the AsiaPEX Science Plan and Implementation of Asian Monsoon Year-II. *Abstracts of the Asia Oceania Geosciences Society 2021 Annual Meeting*: AS28-A013, August, Online.
- Terao, T., Kanae, S. and Matsumoto, J. 2021. GEWEX AsiaPEX (Asian Precipitation Experiment) and Asian hydroclimatological system. *Proceedings of 2021 Annual Conference, Japan Society*

- of Hydrology and Water Resources (JSHWR) and Japan Association of Hydrological Sciences (JAHS): OP-P2-01, September, Online.*
- Terao, T., Kanae, S. and Matsumoto, J. 2021. GEWEX AsiaPEX: Toward understanding of variability of the Asian hydroclimatological system. *International Symposium on Tropical Meteorology*, November, Online. (invited)
- Terao, T., Kanae, S. and Matsumoto, J. 2021. Research strategies and approaches of the Asian Precipitation Experiment (AsiaPEX). *The First Climate Research Forum in the Southern Asia Region*, November, Online.
- Terao, T., Kanae, S. and Matsumoto, J. 2022. GEWEX AsiaPEX: Collaboratio toward understanding of multiscale variability of Asian hydroclimatological system. *Seventh WMO International Workshop on Monsoons (IWM-7)*, March, Online. (invited)

3. Laboratory of Environmental Geography

1) Staff

Professor: Makiko WATANABE

Soil Geography, Environmental Dynamic Analysis, Geoarcheology

Professor: Masayuki KAWAHIGASHI

Soil Ecology, Environmental Chemistry, Material Dynamics in Ecosystems

2) Overview of Research Activities

This research unit focuses on the relations between human and natural environment. For understanding processes enacted upon environment in local and regional scales, we try to integrate subdivisions of both physical and human geography together with interdisciplinary aspects of environmental sciences, such as botanical science, forest ecology, zoology, soil science, landscape design, political ecology, folklore, anthropology and so on. Research methods are in primary based on fieldworks, including weather observation, land survey, soil and vegetation surveys, and interview survey and in participative on laboratory analyses on soil-water analyses and interpretations of aerial photo and satellite imagery as well.

1. Development of survey methods for evaluation of soils in urban area
2. Characterization of sclerotium grains and their function in forest soil ecosystem
3. Geoarcheological study of ancient water environment in Kharga, Western Desert, Egypt
4. Environmental dynamics study of watershed area of Small Water Impounding Project dam in central Luzon, Philippines
5. Influence of anthropic pressure in a river basin on downstream water environment
6. Evaluation of forest fire impact on soil, vegetation and landform in terrestrial ecosystems
7. Study for elemental dynamics in urban ecosystems
8. Soil carbon sequestration from the point of view of soil parent material

3) List of Research Activities in FY2021

Peer-reviewed Articles

Guo, Y., Nishizawa, T., Sakagami, N., Fujimura, R., Kamijo, T. and Ohta, H. 2021. Root bacteriome of a pioneer grass *Miscanthus condensatus* along restored vegetation on recent Miyake-jima volcanic deposits. *Rhizosphere* **19**: 100422. <https://doi.org/10.1016/j.rhisph.2021.100422>

- Hardenbicker, U.M., Kelly, C.L., Watanabe, M. and Kotwicz, R. 2021. Alluvial fan development and paleo-environment during the Holocene in the Qu'Appelle Valley, Saskatchewan. *The Canadian Geographer*. <http://doi.org/10.1111/cag.12723>
- Ishizuka, S., Hashimoto, S., Kaneko, S., Tsuruta, K., Kida, K., Aizawa, S., Hashimoto, T., Ito, E., Umemura, M., Shinomiya, Y., Morishita, T., Noguchi, K., Ono, K., Okamoto, T., Mizoguchi, T., Torii, A., Sakai, H., Inagaki, Y., Shichi, K., Toriyama, J., Sakai, Y., Inagaki, M., Shirato, Y., Obara, H., Kohyama, K., Takata, Y., Katayanagi, N., Kanda, T., Inoue, H. and Kusaba, T. 2021. Soil carbon stock changes due to afforestation in Japan by the paired sampling method on an equivalent mass basis. *Biogeochemistry* **153**: 263-281.
- Morishita, M. and Ishitsuka, N. 2021. Estimation of soil properties distribution using UAV observation and machine learning - Application of data augmentation to soil physicochemical properties. *Journal of the Japanese Agricultural Systems Society* **37**: 21-28. (in Japanese)
- Morishita, M. Kida, K. and Kawahigashi, M. 2021. A new proposal for the classification of peat materials distributed in Japan: Using the dataset of peat soils in Hokkaido. *Japanese Journal of Soil Science and Plant Nutrition* **92**: 225–237. (in Japanese)
http://doi.org/10.20710/dojo.92.3_225
- Nyamsanjaa, K., Oyuntsetseg, B., Takashima, Y., Sakagami, N. and Watanabe, M. 2022. Characteristics of *Cenococcum geophilum* sclerotia found in steppe forest soil in Mongolia. *Journal of Forest Research* **27**: 76-82. <https://doi.org/10.1080/13416979.2021.2008618>
- Srisomkiew, S., Kawahigashi, M. and Limtong, P. 2022. Digital soil assessment of soil fertility for Thai jasmine rice in the Thung Kula Ronghai region, Thailand. *Geoderma*, **409**: 115597. <https://doi.org/10.1016/j.geoderma.2021.115597>

Other Articles

- Kawahigashi, M. 2021. Environmental changes in soil distributed in permafrost terrain. *Perspective of sciences*. **27**: 44-48. (in Japanese)
- Kawahigashi, M. 2021. Mega fire in Australia. In *100 Regional Problems in the World*, ed. Urushibara, K., Fujizuka, Y., Matuyama, H. and Ohnishi, H., 36-37. Kyoto: Nakanishiya Shuppan. (in Japanese)
- Kawahigashi, M. 2021. Research territory of a pedologist. *Pedologist* **65**:1-2. (in Japanese)
- Kawahigashi, M., Inubushi, K. and Nanzyo, M. 2021. Report of Science Council of Japan: “Urban soils” and Potential of agricultural resources”. *Japanese Journal of Soil Science and Plant Nutrition* **92**: 220.
- Kida, K. 2022. Estimation methods of mineral soil carbon stocks in settlements: A review of national greenhouse gas inventory reports. *Geographical Report of Tokyo Metropolitan*

University, **57**: 71-78.

- Matsuura, E. and Sakagami, N. 2022. Column: Climate change and crop management in Indonesia. In: *Interlocal Adaptations to Climate Change in East and Southeast Asia - Sharing Lessons of Agriculture, Disaster Risk Reduction, and Resource Management*, ed. Ito, T., Tamura, M., Kotera, A. and Ishikawa-Ishiwata, Y., 145-147. Switzerland: Springer Nature Switzerland AG.
- Morishita, M., Sprague, D. Sakamoto, T. and Ishitsuka, N. 2022. Application of RTK-GNSS technology for field surveys based on cm-level high-precision positioning information. *Geographical Report of Tokyo Metropolitan University* **57**: 31-38.
- Murata T., Kawai N., Endo, T., Yano, M., Tanabe R. and Watanabe, M. 2021 Soil properties of the earthworks in the Institute for Nature Study. *Miscellaneous Reports of the Institute Nature Study* **53**: 43-48.
- Ono K., Noguchi, H., Murakami, H., Arai, R., Ugawa, Y., Komoriya, A., Nitta, K., Fukuyama, F., Saito, N., Yoshida, T., Tachibana, R., Kawahigashi, M., Kida, K., Watanabe, N., Hagino, H., Noguchi, K., Shinomiya, Y. and Imaya, A. 2021. Characteristics of the anthropogenic soils in the coastal disaster prevention forests and seaside parks in north-eastern Japan. *Bulletin of Forestry Forest Products Research Institute* **20**: 205-262.
- Osada, T., Tashiro, T., Murata, T., Endo, T. and Watanabe, M. 2021. Analysis of the topographical variations on the earthwork slope in the Institute for Nature Study. *Miscellaneous Reports of the Institute Nature Study* **53**: 49-54.
- Sakagami, N. and Seo, M. 2022. Change of awareness and eagerness to join the international study program in the College of Agriculture, Ibaraki University after the Covid-19 pandemic. *Journal of Global Education, Institute for Liberal Arts Education, Ibaraki University* **5**: 107-117. (in Japanese)
- Srisomkiew, S., Kawahigashi, M. and Limtong, P. 2022. Comparison between random forest and multiple linear regression to create digital maps of soil chemical properties in the Thung Kula Ronghai region, Thailand. *Geographical Report of Tokyo Metropolitan University*, **57**: 1-11.
- Watanabe M. 2022. Mt. Pinatubo 1991 eruption and regional change in the disaster area. In *100 Regional Problems in the World*, ed. Urushibara, K., Fujizuka, Y., Matuyama, H. and Ohnishi, H., 140-141. Kyoto: Nakanishiya Shuppan. (in Japanese)

Books

None

Reports

None

Book Reviews

- Kida, K. 2021. Book review (Japanese Society of Pedology, Soil Survey Handbook Newly revised edition). *Japanese Journal of Forest Environment* **63**: 47. (in Japanese)
- Sakagami, N. 2021. Book review (Tanaka, H., Murata, T. Introduction to Soil Environmental Survey and Analysis). *Soil Microorganisms* **75**: 94. (in Japanese)
- Sakagami, N. 2021. Book review (Inubushi, K., Shiratori, Y. Overview of Soil Science). *Soil Microorganisms* **75**: 95. (in Japanese)

Miscellaneous Reports

None

Presentations

- Asagi, N. and Sakagami, N. 2022. Effect of sweet sorghum residual application on yield and quality in turmeric rhizomes. *Tropical Agriculture and Development* 15(ex1): 13-14, March, Online. (in Japanese)
- Battulga, B., Kawahigashi, M. and Oyuntsetseg, B. 2021. Plastic debris as a carrier of inorganic contaminants in the urban river of Mongolia. *Abstracts of the Japan Geoscience Union Meeting 2021*: AHW20-11, June, Online.
- Battulga, B., Atarashi-Andoh, M. and Koarashi, J. 2021. A new extraction method to obtain organic coatings from environmental plastics. *Abstract of the 7th International Symposium on Strategies for Sustainability in Food Production, Agriculture and the Environment 2021* (ISFAE2021): ENV1-OP1-01, December, Online.
- Fukuda, M., Takashima, N., Noguchi, M., Matsuura, E., Narisawa, K., Sakagami, N. and Komatsuzaki, M. 2021. Non-tillage and organic cultivation techniques of cherry tomato production using robotic mower and root endophyte inoculation. *79th annual meeting of Japanese Society of Agricultural Machinery and Food Engineers*, 2-10 (O-2), September, Online. (in Japanese)
- Kajiwara, T. and Kawahigashi, M. 2021. Evaluation of heterogeneity in growth of black pines planted for artificial coastal forests in the Sendai Plain. *Abstracts of the Japan Geoscience Union Meeting 2021*: HTT18-P04, June, Online. (in Japanese)
- Kajiwara, T., Kawahigashi, M. and Ozawa, Y. 2021. Soil properties affecting to heterogenous growth of black pines planted on artificial coastal forests in the Sendai Plain. *Abstract of Annual Meeting of Japanese Society of Soil Science and Plant Nutrition* **67**: 85, September, Online. (in Japanese)

- Kajiwara, T., Kawahigashi, M., Ono, K. and Kodani, E. 2021. Evaluation of heterogeneity in growth of black pines planted for artificial coastal forests in the Sendai Plain to consider constrains on their poor growth. *Abstract of Annual Meeting of Japanese Society of Coastal Forest 2021 Meeting*: 5, October, Online. (in Japanese)
- Kajiwara, T., Kawahigashi, M., Ono, K. and Kodani, E. 2022. Comparison between three vegetation indices to express heterogeneity in growth of the *Pinus thunbergii* in the coastal forest on the planting base. *Proceedings of the General Meeting of the Association of Japanese Geographers 2022 Spring Meeting* **101**: 158, March, Online. (in Japanese)
- Kawahigashi, M. 2021. Environmental change in soils on the permafrost terrain. *Symposium of Science Council of Japan*, 2021 December, Minato, Online.
- Kawahigashi, M. and Battulga, B. 2021. Chemical properties of films developed on microplastics distributed on the urban river shore in Mongolia. *Abstracts of the Japan Geoscience Union Meeting 2021*: MIS20-10, June, Online. (in Japanese)
- Kawahigashi, M. and Kida, K. 2021. How do soils change beneath constructions? Abstract of SDG11 - Suitma-20 years of advances in research on soils of urban, traffic, mining and military areas 1, O432, *Euro soil 2021*, July, Online.
- Kawahigashi, M. and Prokushkin, A. 2021. Behavior of riverine dissolved organic matter affected by environmental changes. *Abstract of the 37th meeting of Japanese Humic Substances Society* 12, November, Online. (in Japanese)
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4. Laboratory of Geographical Information Sciences

1) Staff

Professor: Hiroshi MATSUYAMA

Hydrometeorology, Land Surface–Atmosphere Interaction, Statistical Analysis, Programming

Assistant Professor: Takeki IZUMI

Urban Climatology, Geographical Information Sciences, Numerical Meteorological Modelling

Assistant Professor: Daichi NAKAYAMA

Geographical Information Sciences, Remote Sensing, Computational Geomorphology

Project Researcher: Takanori WATANABE

Urban Climatology, Atmospheric Chemistry, Air Quality Modelling

2) Overview of Research Activities

This laboratory is mainly going to study the natural environment as a whole which is composed of geomorphology, climate, hydrology, vegetation, and so on. Concretely, deductive approach and inductive approach are combined for conducting studies. The former approach is going to explain results from causes by physical laws such as mass balance, energy balance, equation of motion, and so on. The latter approach is going to explain facts demonstratively based on field surveys and *in situ* observations. Therefore, collection of quantitative data, digital mapping, statistical analyses, numerical modeling, and GIS (Geographical Information Systems) are main methods used in this laboratory.

The main study themes in this laboratory are listed as follows.

1. Energy and water cycle in the atmosphere and hydrosphere
2. Capturing snow distribution and snow water resources, along with snowmelt-runoff based on remote sensing techniques and field surveys
3. Quantitative evaluation of spectral reflectance characteristics of coniferous forests and their leaf area indices
4. Water environment around Mt. Aso and Tokyo metropolis
5. Numerical simulation of urban climate and local wind
6. Capturing surface conditions of cities using GIS
7. Monitoring and modeling natural environment and natural hazards

3) List of Research Activities in FY2021

Peer-reviewed Articles

- Editorial Committee of History of Geosciences in Japan, Tokyo Geographical Society (including Matsuyama, H.) 2022. Trends of geosciences after the Pacific War in Japan, 1945 to 1965 Part 7. *Journal of Geography (Chigaku Zasshi)* **131**: 95-113.
<https://doi.org/10.5026/jgeography.131.95> (in Japanese with English abstract)
- Flores, J. and Matsuyama, H. 2021. The influence of tropical cyclones on the seasonal variability of precipitation on Chichi-jima in the Ogasawara (Bonin) Islands during El Niño/La Niña events. *Journal of Geography (Chigaku Zasshi)* **130**: 353-368.
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- Iijima, Y., Abe, T., Saito, H., Ulrich, M., Fedorov, A. N., Basharin, N. I., Gorokhov, A. N. and Makarov, V. S. 2021. Thermokarst landscape development detected by multiple spatial data in Churapcha, eastern Siberia. *Frontiers in Earth Science* **9**: 1153. <https://doi.org/10.3389/feart.2021.750298>
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- Ishikawa, M. and Yamamoto, R. 2021. A study on the characteristics of green infrastructure in the right-side area of the middle and lower Arakawa River basin and perspectives on Metropolitan Tokyo regional planning based on the watershed analysis. *Journal of the Planning Institute of Japan* **56**: 1099-1106. <https://doi.org/10.11361/journalcpij.56.1099> (in Japanese with English abstract)
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- Saito, H., Uchiyama, S. and Teshirogi, K. 2022. Rapid vegetation recovery at landslide scars detected by multitemporal high-resolution satellite imagery at Aso volcano, Japan. *Geomorphology* **398**: 107989. <https://doi.org/10.1016/j.geomorph.2021.107989>
- Yamaura, Y., Yamada, Y., Matsuura, T., Tamai, K., Taki, H., Sato, T., Hashimoto, S., Murakami, W., Toda, K., Saito, H., Nanko, K., Ito, E., Takayama, N., Tsuzuki, N., Takahashi, M., Yamaki, K. and Sano, M. 2021. Modeling impacts of broad-scale plantation forestry on ecosystem services in the past 60 years and for the future. *Ecosystem Services* **49**: 101271. <https://doi.org/10.1016/j.ecoser.2021.101271>
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Other Articles

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- Fujitsuka, Y. 2021. Gentrification in New York City. In *100 Regional Problems in the World*, ed. Urushibara, K., Fujitsuka, Y., Matsuyama, H. and Ohnishi, K., 76-77. Kyoto: Nakanishiya Shuppan. (in Japanese)
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- Fujitsuka, Y. 2021. Residential redevelopments along the Vltava River in Prague. In *100 Regional Problems in the World*, ed. Urushibara, K., Fujitsuka, Y., Matsuyama, H. and Ohnishi, K., 98-99. Kyoto: Nakanishiya Shuppan. (in Japanese)
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- Hasegawa, K. 2021. Role of vegetation on the circulation of atmosphere and hydrosphere. In *Circulation of Atmosphere and Hydrosphere: 14 Classes for Learning Hydrometeorology*, ed. Matsuyama, H. and Masuda, K., 63-75. Tokyo: Asakura Publishing Co. Ltd. (in Japanese)
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- Urushibara, K., Fujitsuka, Y., Matsuyama, H. and Ohnishi, K. 2021. Regional problems in the world. In *100 Regional Problems in the World*, ed. Urushibara, K., Fujitsuka, Y., Matsuyama, H. and Ohnishi, K., 2-3. Kyoto: Nakanishiya Shuppan. (in Japanese)
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- Watanabe, T. 2021. Simulations of air pollution. In *Circulation of Atmosphere and Hydrosphere: 14 Classes for Learning Hydrometeorology*, ed. Matsuyama, H. and Masuda, K., 96. Tokyo: Asakura Publishing Co. Ltd. (in Japanese)
- Watanabe, T. and Matsuyama, H. 2021. Increase of extreme meteorological events in Western Siberia related to global warming. In *100 Regional Problems in the World*, ed. Urushibara, K., Fujitsuka, Y., Matsuyama, H. and Ohnishi, K., 104-105. Kyoto: Nakanishiya Shuppan. (in Japanese)
- Yamamoto, R. and Izumi, T. 2022. An observational study on the measurement of street trees using a mobile mapping system to obtain 360-degree images. *Geographical Reports of Tokyo Metropolitan University* **57**: 23-30.

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- Ninomiya Shoten Co. Ltd. and coauthors (including Matsuyama, H.) 2021. *Chiri-sogo (Geography)*. Ninomiya Shoten Co. Ltd. (in Japanese)
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- Ninomiya Shoten Co. Ltd. and coauthors (including Matsuyama, H.) 2022. *Commentary Version of Chiri-sogo (Geography) for Teachers*. Ninomiya Shoten Co. Ltd. (in Japanese)
- Urushibara, K., Fujitsuka, Y., Matsuyama, H. and Ohnishi, K. eds. 2021. *100 Regional Problems in the World*. Kyoto: Nakanishiya Shuppan. (in Japanese)

Reports

None

Book Reviews

- Matsuyama, H. 2022. Book Review (Takakura et al.: Permafrost and Culture: Global Warming and Shkha Republic (Yakutia), Russian Federation). *Chiri* **67**(2): 104. (in Japanese).

Miscellaneous Reports

- Editorial Board of Geographical Review of Japan Ser. A. (written by Matsuyama, H.) 2021. Message from Editorial Board of Geographical Review of Japan Ser. A. *Geographical Review of Japan* **94A**: 482. (in Japanese)
- Hasegawa, K. 2021. Fieldwork for class: Commuting with fieldwork. *Chiri* **66**(10): 76-81. (in Japanese)
- Ishikawa, K. 2021. Abstract of doctoral thesis related to geography in FY2020: Quantitative study of people and traffic flows in relation to the urban structure of Tokyo in the modern era. *Geographical Review of Japan* **94A**: 275-276. (in Japanese)
- Matsuyama, H. 2021. We don't have to consider the occurrence of drought in Japan in the future? *Chiri* **66**(6): 23-27. (in Japanese)
- Matsuyama, H. 2021. What is the change of the taking a detour train in the suburbs of Tokyo area due to COVID-19. *Report of Old Boys/Girls of Wandervogel Club in the University of Tokyo* **13**: 62-64. (in Japanese)
- Nakayama, D. 2021. An excursion to explore the history of Tokyo's waterworks. *Chiri* **66**(6): 7-16. (in Japanese)
- Saito, H. 2021. Landslides and grass vegetation recovery from birds eye view of drones. *Kagaku* **91**(10): 974-976. (in Japanese)

Yamaura, Y., Yamada, Y., Matsuura, T., Tamai, K., Taki, H., Sato, T., Hashimoto, S., Murakami, W., Toda, K., Saito, H., Nanko, K., Ito, E., Takayama, N., Tsuzuki, N., Takahashi, M., Yamaki, K. and Sano, M. 2021. Relationships between the multifunction of forest, forest type, and stand age. *Forest Technology* **952**: 22-23. (in Japanese)

Presentations

- Iijima, Y., Abe, T. and Saito, H. 2021. Detection of permafrost degradation in eastern Siberia using InSAR and UAS. The 71st (Autumn 2021) Conference of the Remote Sensing Society of Japan: A7, November, Online. (in Japanese)
- Iijima, Y., Abe, T., Saito, H., Ulrich, M. and Fedorov, A.N. 2022. Thermokarst landscape change detected by multiple geospatial data in Churapcha, Central Yakutia. *Proceedings of the International Symposium of Pan-Arctic Water-Carbon Cycles and Terrestrial Changes in the Arctic: For Resilient Arctic Communities 2022*: 19, March, Online.
- Inagaki, K., Nakayama, D., Matsuyama, H., Khromykh, V. and Khromykh, O. 2022. Simulation of evacuation behavior in the event of river flooding—A case study of Tomsk City, Russia—. *Proceedings of the General Meeting of the Association of Japanese Geographers* **101**: 25, March, Online. (in Japanese)
- Izumi, T., Matsuura, T., Harashina, K., Kosugi, T., Yano, A., Takahashi, R., Sato, Y., Fukui, H., Sugita, A. and Taguchi, H. 2021. Aerial disaster investigation and information support during the sediment disaster at Izusan, Atami City. *Research Abstracts on Center for Spatial Information Science, CSIS DAYS 2021*: A03, November, Online. (in Japanese)
- Kirimura, T., Iijima, Y. and Saito, H. 2022. Population growth after 2010 in the Sakha Republic, Russian Federation. *Proceedings of the General Meeting of the Association of Japanese Geographers* **101**: 30, March, Online. (in Japanese)
- Matsuura, T., Izumi, T., Takahashi, R., Sato, Y., Fukui, H., Sugita, A. and Taguchi, H. 2021. Social implementation of DX “Terra Cloud (Platform for supporting information against disaster)”. *Research Abstracts on Center for Spatial Information Science, CSIS DAYS 2021*: A12, November, Online. (in Japanese)
- Matsuyama, H. 2021. There are three loaches: Importance of continuing observations in physical geography. Online Seminar of Physical Geography, Season 4, November, Online. (in Japanese)
- Matsuyama, H. 2021. Geography of Tokyo: Physical geography (1). Open University, Tokyo Metropolitan University, November, Online. (in Japanese)
- Matsuyama, H. 2021. How to write papers in geography? Diversity Research Group on Methods and Papers in Hydrology and Water Resources, November, Online. (in Japanese)

- Matsuyama, H. 2022. Water environment of Ogasawara (Bonin) Islands in relation to droughts and typhoons. Open University, Tokyo Metropolitan University, February, Online. (in Japanese)
- Matsuyama, H. 2022. Purpose of the symposium “Japan-Russia joint research on the environmental change in Siberia”. *General Meeting of the Association of Japanese Geographers 2022 Spring Meeting*, March, Online. (in Japanese)
- Nagai, S., Nemoto, Y., Matsuyama, H. and Fujitsuka, Y. 2021. Study on the location characteristics of Hikawa Shrine in the Tokyo Metropolis. *Proceedings of the General Meeting of the Association of Japanese Geographers* **100**: 50, September, Online. (in Japanese)
- Nakayama, D. 2022. A study on prediction of volcanic mudflows on Miyake Island using machine learning. *Proceedings of the General Meeting of the Association of Japanese Geographers* **101**: 177, March, Online. (in Japanese)
- Nakayama, D., Tateno, M., Khromykh, V. and Khromykh, O. 2022. Land cover change since 2000 in Tomsk region, Russia. *Proceedings of the General Meeting of the Association of Japanese Geographers* **101**: 24, March, Online. (in Japanese)
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- Nodzu, M. I., Matsuyama, H. and Matsumoto, J. 2021. Horizontal distribution of peak-precipitation months over the southern ocean of Japan. *Abstracts of the 2021 Fall Meeting of the Meteorological Society of Japan* **119**: 210, December, Online and Tsu. (in Japanese)
- Oyagi, H. 2021. A study on the water temperature environment during winter and vertical circulation in deep lakes in Japan. *Proceedings of the General Meeting of the Association of Japanese Geographers* **100**: 27, September, Online. (in Japanese)
- Saito, H., Uchiyama, S. and Teshirogi, K. 2021. Rapid vegetation recovery at landslide scars detected by multitemporal high-definition data. *Proceedings of the Japan Geoscience Union Meeting 2021*: HTT30-02, May, Online.
- Saito, H., Uchiyama, S. and Teshirogi, K. 2021. Rapid vegetation recovery at landslide scars at Aso volcano detected by constellation satellite images. *Research Abstracts on Center for Spatial Information Science, CSIS DAYS 2021*: A04, November, Online. (in Japanese)

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- Suzuki, T., Chigira, M., Matsushi, Y. and Nakayama, D. 2021. Map of earthquake-induced landslides potential on artificially transformed hills in the depositional area of tephric soil deposits. *Abstracts of Japan Geoscience Union Meeting 2021*: HDS08-03, June, Online. (in Japanese with English abstract)
- Watanabe, T., Matsuyama, H., Kuzhevskaja, I., Nechepurenko, O., Chursin, V. and Zemtsov, V. 2022. Long-term trends of extreme climate indices in Western Siberia. *Proceedings of the General Meeting of the Association of Japanese Geographers* **101**: 22, March, Online. (in Japanese)
- Yamamoto, R. 2021. Considering water environment in the Tokyo metropolitan area from the viewpoint of green infrastructure: Status and issues of data development in the Tokyo metropolitan area. *COI-S 5th Symposium "Sustainable Water and Human Environment Based on the General Circulation of Water"*: 3, June, Online. (in Japanese)

5. Laboratory of Urban and Human Geography

1) Staff

Professor : Yoshiki WAKABAYASHI

Urban Geography, Behavioral Geography, Geographical Information Sciences

Associate Professor : Akihiro TAKINAMI

Regional Studies, Representation Studies

Associate Professor : Naoto YABE

Quantitative Geography, Urban Geography

Assistant Professor : Hiroyuki TSUBOMOTO

Urban Geography, Office Study

2) Overview of Research Activities

This research unit specializes in human geography, with special emphasis on the city and its environs. Our research interests center on the structural explanation of the relationship between human activities and geographic environment by employing approaches of social sciences and humanities. Methodologically, the emphasis lies largely on positivistic (viz., quantitative or mathematical); fieldwork is also encouraged. The research interests cover quantitative, socioeconomic, urban and behavioral geography. The main themes of our current research are as follows:

1. Mathematical modeling of human geographic phenomena
 - 1) Location of economic activities
 - 2) Human migration, commodity flow, and spatial diffusion of information
 - 3) Mental map and spatial behavior
 - 4) Time geography
2. Regional analysis of human geographic phenomena
 - 1) Relationship between human activities and geographic environment
 - 2) Land use change in the city and its suburbs
 - 3) Spatial organization of the society
 - 4) Transformation of human activities brought about by environmental change

3. Geographical studies of urban systems
 - 1) Spatial structures of intra-urban system
 - 2) System of cities
4. Geographical thought
 - 1) History of modern geography
 - 2) Bibliometric research of geographical studies

3) List of Research Activities in FY2021

Peer-reviewed Articles

- Sugiura, Y. 2021. Walter Christaller's scientific excursion to Nordic countries in Summer,1934. *Geographical Review of Japan*. **94A**: 313-347. (in Japanese with English Abstract)
- Wakabayashi, Y. 2021. Map literacy and spatial thinking in an information society. *The Journal of Ritsumeikan Geographical Society (Ritsumeikan Chirigaku)* **33**: 1-12. (in Japanese)

Other Articles

- Takinami, A. 2021. Tourist. In *Introducing Contemporary Tourism Geographies*, eds. Kanda, K., Morimoto, I. and Yamamoto R., 62-69. Kyoto: Nakanishiya Publishing. (in Japanese)
- Wakabayashi, Y. 2021. 2020 annual review: cartography. *Jimbun Chiri (Japanese Journal of Human Geography)* **73**(3): 381-385. (in Japanese)
- Wakabayashi, Y. 2021. Spatial thinking and spatial behavior. In *Encyclopedia of Maps*, ed. Japan Cartographers Association, 4-7. Tokyo: Asakura Shoten. (in Japanese)
- Wakabayashi, Y. 2021. A3-1 Introduction. In *Encyclopedia of Maps*, ed. Japan Cartographers Association, 62-63. Tokyo: Asakura Shoten. (in Japanese)
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- Yabe, N. 2022. Developments of map and GIS. In *The World through Human Geography*, ed. Sato, R. and Miyazawa, H., 25-40. Tokyo: Foundation for the Promotion of the Open University of Japan. (in Japanese)
- Yabe, N. 2022. Urban space of central parts of world city. In *The World through Human Geography*, ed. Sato, R. and Miyazawa, H., 155-170. Tokyo: Foundation for the Promotion of the Open University of Japan. (in Japanese)
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- Yabe, N., Yoshida, K., Tanaka, T. and Kometani, S. 2021. An analysis for spatial diffusion of inbound tourists to Japanese countryside. *New ESRI Working Paper 55*: 1-40. (in Japanese)
- Yabe, N., Kurihara, T., Nagai, K., Yamaji, H. and Shindo, H. 2022. An analysis of factors influencing the amount of expenditure and expenditure items of foreign visitors to Japan based on longitudinal data. *New ESRI Working Paper 62*: 1-29. (in Japanese)

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- Wakabayashi, Y. 2022. *How to read and make maps in a digital society*. Chikuma Shobo (in Japanese)

Reports

None

Book Reviews

None

Miscellaneous Reports

Valentine, G. (Translation by Susaki, S. 2022) 1998. "Sticks and stones may break my bones": A personal geography of harassment. *Space, Society and Geographical Thought* **25**:85-104.

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- Araori, T. and Wakabayashi, Y. 2021. Development of disease maps in modern Japan. *Papers and Proceedings of the Annual Conference of the Japan Cartographers Association 2021*: 12-13, August, Online. (in Japanese)
- Bettaieb, B. and Wakabayashi, Y. 2021. Comparative study of visitors' perceptions of places by analyzing visual content of photographs in Shinjuku, Tokyo. *Abstracts of the Japan Geoscience Union Meeting 2021*: HTT14-02, June, Online.
- Bettaieb, B. and Wakabayashi, Y. 2021. Comparative analysis of tourists' behavior in Tokyo using locational data from the photo-sharing service of Flickr. International Geographical Congress 2021, August, Online.
- Bettaieb, B. and Wakabayashi, Y. 2021. Visualization of the distribution of areas of interest for foreign visitors and its change by using online geotagged photographs. The Annual Conference of the Japan Cartographers Association 2021, August, Online. (in Japanese)
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- Hirama, K., Yokota, K., Otsuka, Y., Watanabe, K. and Yabe, N. 2021. Factors related to the criminal trips: Analyses focusing on residential burglars in Tokyo. *Proceedings of the 49th Annual Meeting of the Behaviormetric Society*: 48-51, September, Online. (in Japanese)
- Saito, A., Tsubomoto, H., Higa, F. and Sugano, F. 2021. A study on workplace evaluation using the "SOF" model based on intellectual productivity. *Journal of 22th JOS National Convention*: 25-29, September, Online. (in Japanese with English abstract)
- Susaki, S. 2021. Tourism and commodification of a Japanese gay district: The case of Shinjuku Ni-chome, Tokyo. The 34th International Geographical Congress, August, Online.

- Tsubomoto, H. 2021. Spatial development of flexible offices in the Tokyo metropolitan area. 68th Annual Conference of Japan Society for Urbanology, October, Online. (in Japanese)
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