

## Yuichi S. Hayakawa

Geomorphologist, Assistant Professor at The University of Tokyo

### CONTACT INFORMATION

Center for Spatial Information Science, The University of Tokyo, Japan  
Office Address: Rm. 421, Kashiwa Research Complex Bldg. (Sougou-Kenkyu-Tou), 5-1-5 Kashiwanoha,  
Kashiwa City, Chiba 277-8568, Japan  
Tel: +81-4-7136-4304  
Fax: +81-4-7136-4292  
E-mail: hayakawa@csis.u-tokyo.ac.jp

### ACADEMIC TRAINING

04/1998-03/2002

College of Natural Sciences, First Cluster of Colleges, University of Tsukuba, Japan  
BSc degree in Science (Geoscience) (January, 2002)  
Thesis on "*Rates of waterfall recession in Boso Peninsula, Japan*"

04/2002-03/2004

Department of Earth and Planetary Science, The University of Tokyo, Japan  
MSc degree in Science (Earth and Planetary Science) (January 2004)  
Thesis on "*Form and distribution of fluvial knickzones in mountainous watersheds: A GIS analysis for Kanto, Japan*"

04/2004-03/2007

Department of Earth and Planetary Science, The University of Tokyo, Japan  
PhD degree in Science (Earth and Planetary Science) (January 2007)  
Thesis on "*Spatial distribution and formation of fluvial knickzones in Japanese mountain watersheds*"

### PROFESSIONAL EXPERIENCE

04/2004-03/2007

JSPS\* Research Fellow (DC1)  
@ Department of Earth and Planetary Science, The University of Tokyo, Japan

02/2005-03/2005

Academic Visitor  
@ Department of Geosciences, Colorado State University, USA

04/2009-present

Assistant Professor  
@ Center for Spatial Information Science, The University of Tokyo, Japan

04/2007-03/2009

JSPS\* Research Fellow (PD)  
@ Geoenvironmental Sciences, University of Tsukuba, Japan

04/2007-03/2009

Visiting Postdoctoral Researcher  
@ Center for Spatial Information Science, The University of Tokyo, Japan

04/2008-03/2009

Adjunct Lecturer  
@ Department of Tourism, Kawamura Gakuen Woman's University, Japan

04/2009-present

Assistant professor  
@ Center for Spatial Information Science, The University of Tokyo, Japan

09/2009-present

Adjunct Lecturer  
@ Faculty of Environment and Information Studies, Keio University, Japan

04/2010-present

Adjunct Lecturer  
@ College of Arts, Rikkyo University, Japan

09/2011-present

Adjunct Lecturer  
@ Faculty of Letters and Education, Ochanomizu University, Japan

\*JSPS = Japan Society for the Promotion of Science

### PROFESSIONAL ORGANIZATIONS

Member of the Japanese Geomorphological Union (2002-)  
Member of the American Geophysical Union (2005-)  
Member of the Geological Society of America (2005-)  
Member of the European Geosciences Union (2007)  
Member of the 東京地学協会 (2010-)  
Member of the GISA (2011-)

### GRANTS

04/2004-03/2007

Grant-In-Aid for JSPS Fellows, the Ministry of Education, Science, Sports and Culture of the Japanese Government (16-11373), "GIS analysis on formation and recession of knickzones and its impact on watershed landforms", JPY2,700,000

04/2007-03/2009

Grant-In-Aid for JSPS Fellows, the Ministry of Education, Science, Sports and Culture of the Japanese Government (19-2271), "Establishing a geomorphological model of bedrock rivers with effects of erosion of knickzones and mechanical properties of bedrock", JPY2,200,000

04/2010-03/2011

Fukada Grant-in-Aid of Fukada Geological Institute, "Changes in bedrock river morphology after earthquake: An example of knickpoint erosion following Chi-Chi earthquake in west-central Taiwan", JPY500,000

04/2011-03/2013

Grant-In-Aid for..., JPY4,420,000

### RESEARCH ACTIVITIES

My current research explores landform evolution and geomorphological processes using Geospatial Information System (GIS), Global Navigation Satellite System (GNSS/GPS) surveying, Airborne and Terrestrial Laser Scanning (ALS and TLS), and rock property measurements. The major focus of my research is on knickzones (namely knickpoints and waterfalls) in bedrock rivers. Rates of landform changes at knickzones are investigated using both field- and GIS-based data. Current study field includes Japan, Taiwan, North America and European Alps. Spatial distribution of knickzones is also examined using GIS techniques for analyzing Digital Elevation Models.

My research interest also involves geoarchaeological examination of palaeoenvironments, with particular emphasis on impacts of landforms on human activities and human-induced changes in landforms. The studies include the use of GIS, remote sensing, Laser Range Finder (LRF) or TLS measurement, GNSS/GPS mapping and other field data collection techniques. Current study areas include archaeological sites in and around Anatolia and the Middle East. These studies are conducted in close conjunction with archaeologists in Japan and Turkey.

### PUBLICATIONS - REFEREED ARTICLES

1. Oguchi, T., Hayakawa, Y.S., Wasklewicz, T. (2011.11) Data sources. In: Smith, M., Paron, P., Griffiths, J. (eds.) Geomorphological Mapping: Methods and Applications: A Professional Handbook of Techniques and Applications. Developments in Earth Surface Processes 15, Elsevier, 189-224.
2. Oguchi, T., Hori, K., Watanuki, T., Oguchi, C.T., Komatsubara, J., Hayakawa, Y. (2011) Fluvial surfaces along the Khabur River near Tell Seker al-Aheimar and their palaeoenvironmental implications. In: Nishiaki, Y., Kashima, K., Verhoeven, M. (eds.) Neolithic Archaeology in the Khabur Valley, Upper Mesopotamia and Beyond. UMUT Monograph Series, Tokyo. Oxbow Books, Oxford, in press.
3. Hayakawa, Y.S. (2011.04) Postglacial Recession Rates of Waterfalls in Alpine Glacial Valleys. Transactions, Japanese Geomorphological Union, 32 (2), 179-184.

4. Hayakawa, Y.S., Matsukura, Y. (2010.10) Stability analysis of waterfall cliff face at Niagara Falls: An implication to erosional mechanism of waterfall. *Engineering Geology*, 116 (1-2), 178-183. doi:10.1016/j.enggeo.2010.08.004
5. Stark, C.P., Barbour, J.R., Hayakawa, Y.S., Hattanji, T., Hovius, N., Chen, H., Lin, C-W., Horng M-J., Xu K-Q., Fukahata, Y. (2010.03) The climatic signature of incised river meanders. *Science*, 327 (5972), 1497-1501. doi:10.1126/science.1184406
6. Imaizumi, F., Hattanji, T., Hayakawa, Y.S. (2010.02) Channel initiation by surface and subsurface flows in a steep catchment of the Akaishi Mountains, Japan. *Geomorphology*, 115,32-42. doi:10.1016/j.geomorph.2009.09.026
7. Obanawa, H., Hayakawa, Y.S., Matsukura, Y. (2009.12) Rates of slope decline, talus growth and cliff retreat along the Shomyo River in central Japan: A space-time substitution approach. *Geografiska Annaler*, 91 (4), 269-278. doi:10.1111/j.1468-0459.2009.00369.x
8. Hayakawa, Y.S., Aoki, H., Fujinaga, G., Maekado, A., Matsukura, Y. (2009.07) Reexamination of Surface Lowering Rate of Uplifted Reef Limestone in Kikai Island, Southwestern Japan, Derived from the Height of a Pedestal in Shibusawa Film. *Transactions, Japanese Geomorphological Union*, 30 (3), 227-231. (in Japanese with English abstract)
9. Hayakawa, Y.S., Oguchi, T. (2009.10) GIS analysis of fluvial knickzone distribution in Japanese mountain watersheds. *Geomorphology*, 111, 27-37. doi:10.1016/j.geomorph.2007.11.016
10. Hayakawa, Y.S., Matsukura, Y. (2009.09) Factors influencing the recession rate of Niagara Falls since the 19th century. *Geomorphology*, 110, 212-216. doi:10.1016/j.geomorph.2009.04.011
11. Hayakawa, Y.S., Tsumura, H. (2009.03/04) Utilization of laser range finder and differential GPS for high-resolution topographic measurement at Hacituğrul Tepe, Turkey. *Geoarchaeology*, 24 (2), 176-190. doi:10.1002/gea.20261
12. Hayakawa, Y.S., Ikeda, A. (2009.01) Accuracy assessment of a topographic mapping method with laser range finder and differential global positioning system: A case study for a rock glacier in the Swiss Alps. *Transactions, Japanese Geomorphological Union*, 30 (1), 29-38.
13. Hayakawa, Y.S., Matsuta, N., Matsukura, Y. (2009.01). Rapid recession of fault-scarp waterfalls: Six-year changes following 921 Chi-Chi Earthquake in Taiwan. *Transactions, Japanese Geomorphological Union*, 30 (1), 1-13.
14. Hayakawa, Y.S., Tsumura, H. (2008.10) A method of acquisition of detailed topographic data using LRF and DGPS for field survey: An application to an archaeological mound of Hacituğrul Tepe in Turkey. *Transactions, Japanese Geomorphological Union*, 29 (4), 421-434. (in Japanese with English abstract)
15. Hayakawa, Y.S., Oguchi, T., Lin, Z. (2008.10) Comparison of new and existing global digital elevation models: ASTER G-DEM and SRTM-3. *Geophysical Research Letters*, 35, L17404. doi:10.1029/2008GL035036
16. Hashimoto, A., Oguchi, T., Hayakawa, Y., Lin, Z., Saito, K., Wasklewicz, T.A. (2008.08) GIS analysis of depositional slope change at alluvial-fan toes in Japan and the American Southwest. *Geomorphology*, 100,120-130. doi:10.1016/j.geomorph.2007.10.027
17. Hayakawa, Y.S., Yokoyama, S., Matsukura, Y. (2008.04) Erosion rates of waterfalls in post-volcanic fluvial systems around Aso volcano, southwestern Japan. *Earth Surface Processes and Landforms*, 33 (5), 801-812. doi:10.1002/esp.1615
18. Hayakawa, Y.S., Obanawa, H., Matsukura, Y. (2008.03) Post-volcanic erosion rates of Shomyo Falls in Tateyama, central Japan. *Geografiska Annaler*, 90A (1), 65-74. doi:10.1111/j.1468-0459.2008.00334.x
19. Hayakawa, Y.S., Oguchi, T., Komatsubara, J., Ito, K., Hori, K., Nishiaki, Y. (2007.03) Rapid on-site topographic mapping with a handheld laser range finder for a geoarchaeological survey in Syria. *Geographical Research*, 45 (1), 95-104. doi:10.1111/j.1745-5871.2007.00431.x
20. Hayakawa, Y.S., Oguchi, T. (2006.08) DEM-based identification of fluvial knickzones and its application to Japanese mountain rivers. *Geomorphology*, 78, 90-106. doi:10.1016/j.geomorph.2006.01.018
21. Hayakawa, Y.S., Yokoyama, S., Matsukura, Y. (2005.12) Recession rates of waterfalls in and upstream of the Tateno Canyon, Aso Volcano. *Transactions, Japanese Geomorphological Union*, 26 (4), 439-449. (in Japanese with English abstract)

22. Hayakawa, Y.S., Wohl, E.E. (2005) Recession rate of Poudre Falls in Rocky Mountain Front Range, Colorado, USA. *Geographical Review of Japan*, 78 (12), 853-858.
23. Hayakawa, Y., Oguchi, T. (2005) Evaluation of gravel sphericity and roundness based on surface-area measurement with a laser scanner. *Computers & Geosciences*, 31 (6), 735-741. doi:10.1016/j.cageo.2005.01.004
24. Hayakawa, Y. (2005) Reexamination of a predictive equation of waterfall recession rates in Boso Peninsula, Chiba Prefecture, Japan. *Geographical Review of Japan*, 78 (5), 265-275.
25. Hayakawa, Y., Matsukura, Y. (2003) Recession rates of Kegon Falls in Nikko, Tochigi Prefecture, Japan. *Journal of Geography (Tokyo)*, 112 (4), 521-530. (in Japanese with English abstract)
26. Hayakawa, Y., Matsukura, Y. (2003) Recession rates of waterfalls in Boso Peninsula, Japan, and a predictive equation. *Earth Surface Processes and Landforms*, 28 (6), 675-684. doi:10.1002/esp.519

#### RESEARCH PRESENTED - INTERNATIONAL CONFERENCES

1. Geomorphometry
2. Hayakawa, Y.S. (2011.05) Fault-scarp knickpoint recession and subsequent riverbank widening in central Taiwan: Changes in bedrock morphology from field and satellite observations. Abstracts, Japan Geosciences Union International Meeting, HGM002-05, Makuhari, Japan.
3. Hayakawa, Y.S., Kontani, R., Sudo, H., Yamaguchi, Y., Kulakoglu, F. (2011.05) Geospatial analysis on topography and archaeological sites in Kayseri, Turkey: A preliminary result. Abstracts, Japan Geosciences Union International Meeting, HTT005-P06, Makuhari, Japan.
4. Hayakawa, Y.S. (2010.09) Post-glacial recession of waterfalls in alpine glacial valleys. Japanese Geomorphological Union and Ankara University Joint Meeting 2010, Ankara, Turkey.
5. Hayakawa, Y.S. (2010.09) A comparison of bedrock river morphology in Japan and Turkey. Japanese Geomorphological Union and Ankara University Joint Meeting 2010, Ankara, Turkey.
6. Hayakawa, Y.S., Matsuta, N., Maekado, A., Matsukura, Y. (2010) Factors affecting recession rates of fault-scarp knickpoints after 1999 Chi-Chi Earthquake in western-central Taiwan. 2010 Western Pacific Geophysics Meeting (Taipei), H52A-06. (invited)
7. Hayakawa, Y.S., Matsuta, N., Maekado, A., Matsukura, Y. (2010) Decadal changes in fault-scarp knickpoints by bedrock erosion following 1999 Chi-Chi Earthquake in Taiwan. *Geophysical Research Abstracts*, 12, EGU2010-3063.
8. Hayakawa, Y.S., Oguchi, T. (2009) Hydraulic formation of knickzones in Japanese mountain rivers. *Eos Trans. AGU*, 90 (52), Fall Meet. Suppl., Abstract EP21C-0608.
9. Hayakawa, Y.S., Matsukura, Y. (2009): Human- and nature-induced changes in recession rates of Niagara Falls during the last century. Conference Abstracts, 7th International Conference on Geomorphology (CD-ROM), 742.
10. Hayakawa, Y.S., Tsumura, H., Kontani, R., Kulakoğlu, F. (2009): Rapid topographic mapping system and its application to geoarchaeological survey in Kayseri region, central Turkey. Conference Abstracts, 7th International Conference on Geomorphology (CD-ROM), 740.
11. Hayakawa, Y.S., Imaizumi, F., Hattanji, T. (2009): Knickpoints and slope degradation detected from ALSM DEM in a mountain watershed, Southern Japanese Alps. Conference Abstracts, 7th International Conference on Geomorphology (CD-ROM), 741.
12. Hayakawa, Y.S., Oguchi, T., Lin, Z. (2008) Comparison of ASTER G-DEM and SRTM-3 for West Japan. Abstracts, 10th International Cooperative Seminar between GISA & KAGIS (Tokyo, Japan), 213-216.
13. Hayakawa, Y.S., Tsumura, H. (2008) Using laser range finder for creation of digital elevation model. *Geophysical Research Abstracts*, Vol. 10, EGU2008-A-09436. European Geosciences Union General Assembly 2008 (Vienna, Austria).
14. Hayakawa, Y.S., Matsukura, Y. (2008) Applicability and limitation of a previously proposed empirical equation estimating waterfall recession rate. GSA Northeastern Section 43rd Annual Meeting Paper (Buffalo, NY), No. 30-2.
15. Hayakawa, Y.S., Oguchi, T. (2006) Formation of fluvial knickzones in Japanese mountainous areas: A spatial analysis using GIS and DEMs. *Eos Trans. AGU*, 87 (52), Fall Meet. Suppl., H51G-0550. American Geophysical Union 2006 Fall Meeting (San Francisco, CA).

16. Hayakawa, Y.S., Oguchi, T. (2005) Distribution of fluvial knickzones along mountain bedrock rivers in Japan. Eos Trans. AGU, 86 (52), Fall Meet. Suppl., H13H-1411. American Geophysical Union 2005 Fall Meeting (San Francisco, CA).
17. Hayakawa, Y.S., Oguchi, T. (2005) Distribution of fluvial knickzones of mountain rivers in central Japan. Abstracts Volume, Sixth International Conference on Geomorphology (Zaragoza, Spain), 372.
18. Hayakawa, Y.S., Yokoyama, S., Matsukura, Y. (2005) Rates of waterfall recession in welded ignimbrites of Aso volcanoes in central Kyushu, Japan. Abstracts Volume, Sixth International Conference on Geomorphology (Zaragoza, Spain), 508.
19. Hayakawa, Y., Oguchi, T. (2004) GIS analysis of longitudinal profiles and knickzones of Japanese mountain rivers. Abstracts, International Conference on Environmental Hazards and Geomorphology in Monsoon Asia: Progress in Process Study and GIS Mapping (Hat Yai, Thailand), 39.

#### **JOURNAL ARTICLES REVIEWED**

2006-2010 Geomorphology (7), Journal of the Geological Society of India (1), Sensors (1), Transactions, Japanese Geomorphological Union (1), GFF (1), International Journal of Earth Sciences (1)

#### **UNIVERSITY SERVICE**

2002-2009 Webmaster, Oguchi Laboratory, CSIS, Univ. Tokyo

2008-2009 Webmaster, Geomorphology Laboratory, Univ. Tsukuba

2009-present Webmaster, Geomorphology & Geography Research Group, CSIS, Univ. Tokyo

2009-present Management of Joint Research in CSIS, Univ. Tokyo

2011-present Webmaster team, CSIS, Univ. Tokyo