2.5.5 Laboratory: Soil Science

Member:	Professor	Funakawa, Shinya, Ph. D.
	Assistant Professor	Shinjo, Hitoshi, Ph. D.
	Assistant Professor	Watanabe, Tetsuhiro, Ph. D.
	KU Visiting Professor	Anderson, Darwin, Ph. D.
	KU Visiting Professor	Hseu, Zeng-Yei, Ph. D.
	Doctor's program	5
	Master's Program	4
	Undergraduate	2
	Other	1

A. Research Activities (2009.4-2010.3)

A-1. Main Subjects

a) Soil characterization, development of the soil management and environment conservation in the tropics and arid regions

The laboratory of soil science widely concerns soil management strategies for sustainable use and conservation of environment in the tropics and the arid regions. In Central Asia (Kazakhstan), research on soil degradation due to continuous cereal cropping in the steppe region were conducted. In Southeast Asia (Thailand and Indonesia), soil processes under traditional shifting cultivation systems were investigated with special reference to soil organic matter dynamics and the agro-ecological degradation due to excessive land use under increasing population pressure was also analyzed to establish a sustainable land use system there. In Sub-Sahara Africa (Tanzania, Zambia and Niger), human-environment relationship was investigated through the research on the response of soils to the soil management practices under conventional farming systems by small-scale farmers.

b) Dynamic pedology on the soil acidification processes

The acid-buffering and/or storing capacity of the amorphous sesquioxides in the course of pedogenetic acidification of soils derived from several parent materials were studied in the cool and warm temperate forests in Japan and in the tropical forests in Southeast Asia. Conditions for formation and weathering of expandable 2:1 type soil clay minerals in leaching environments were investigated and simultaneous dynamics of organic matter and soil acidity

in different soil ecosystems were analyzed.

c) Studies on dynamics of organic matter and soil microbes under different soil ecosystems

The dynamics of organic matter and soil microbes in ecosystems are key processes in terms of different environmental problems such as global warming and nutrient leaching. The soil organic matter-decomposing characteristics and microbial activities were analyzed for soil collected from different environments (Thailand, Indonesia, Kazakhstan, etc).

A-2.Publications and presentations

a) Publications

Books

- Watanabe, T., S. Funakawa and T. Kosaki:
Distribution of clay minerals in upland soils under different weathering conditions of humid Asia. In Chemical Mineralogy, Smelting and Metallization. Eds. E.D. McLaughlin and L.A. Breaux, p.19–56, Nova Science Publishers, Inc., New York, 2009

Original Papers

- Nakao, A., S. Funakawa and T. Kosaki:
Hydroxy-Al polymers block the frayed edge sites of illitic minerals in acid soils: studies in southwestern Japan at various weathering stages. European Journal of Soil Science, 60; 127–138, 2009
- Nakao, A., S. Funakawa, T. Watanabe and T. Kosaki:
Pedogenic alterations of illitic minerals represented by Radiocesium Interception Potential in soils with different soil moisture regimes in humid Asia. European Journal of Soil Science 60; 139–152, 2009
- Kadono A, Funakawa S, and Kosaki T:
Factors controlling potentially mineralizable and recalcitrant soil organic matter in humid Asia. Soil Science and Plant Nutrition 55; 243–251, 2009
- Funakawa, S., Makhrawie and H. B. Puluggono:
Soil fertility status under shifting cultivation in East Kalimantan with special reference to mineralization patterns of labile organic matter. Plant and Soil 319; 57–66, 2009
- Sawada, K., S. Funakawa and T. Kosaki:
Different effects of pH on microbial biomass carbon and metabolic quotients by fumigation–extraction and substrate-induced respiration methods in soils under different climatic conditions. Soil Science and Plant Nutrition, 55(3); 363–374, 2009

- Fujii, K., M. Uemura, C. Hayakawa, S. Funakawa, Sukartiningsih, T. Kosaki and S. Ohta:
Fluxes of dissolved organic carbon in two tropical forest ecosystems of East Kalimantan, Indonesia. Geoderma 152; 127–136, 2009
- Sawada, K., S. Funakawa and T. Kosaki:
Threshold concentrations of glucose to increase the ratio of respiration to assimilation in a Japanese arable soil and a strongly acidic Japanese forest soil. Soil Science and Plant Nutrition 55; 634–642, 2009
- Funakawa, S. and M. Kanetani:
Chemical composition of water from different origins in Kutch district, Western India. Journal of Arid Land Studies, 19(2); 413–422, 2009
- Ikazaki, K., H. Shinjo, U. Tanaka, S. Tobita and T. Kosaki:
Sediment catcher to trap coarse organic matter and soil particles transported by wind. Trans. ASABE. 52; 487–492, 2009

Reviews

- Pachikin, K., O. Erokhina and S. Funakawa:
Properties and distribution pattern of soils in Kazakhstan. Pedologist, 53(1); 30–37, 2009

b) Conference and seminar papers presented

- Annual meeting of Japanese Society of Pedology: 5 Presentaions
- Annual meeting of Japanese Society of Soil Science and Plant Nutrition: 11 Presentations
- The 107th conference of Japanese Society of Tropical Agriculture: 3 Presentations
- The 5th Conference of African Soil Science Society: 5 Presentations
- The 57th Conference of Japanses Society of Ecology: 2 Presentations
- The 7th International Symposium on Soil-Plant Interactions at Low pH: 1 Presentation
- The 9th International Conference of East and Southeast Asia Federation of Soil Science Societies: 2 Presentations

A-3.Off-campus activities

Membership in academic societies

- Funakawa, Shinya : Japanese Society of Soil Science and Plant Nutrition (Associate Editor-in-Chief for English journal)

- Shinjo, Hitoshi : Japanese Society of Soil Science and Plant Nutrition (Member of Editorial Board for Japanese journal)

Research grants

1. Grants-in-aid for Scientific Research(KAKENHI)

- Scientific Research (B) : Funakawa (Shinjo, member) : Changes of agro-ecological environments in Central Eurasia during the last millennium
- Scientific Research (A) : Funakawa (Watanabe, member) : What has agriculture destroyed in ecosystems? – Towards the recovery of homeostasis of soil ecosystems –
- Scientific Research (A) : Kosaki, Takashi (Funakawa, member) : Identification of stress factors in soil organic matter dynamics in humid regions and its agricultural use
- Scientific Research (B) : Kosaki, Takashi (Funakawa, member) : Spatio-temporal variability of ecological resources in tropical Africa and its agricultural use
- Scientific Research (B) : Tanaka, Ueru (Shinjo, member) : South to south transfer of technology to combat desertification in inland semiarid region in West Africa
- Scientific Research (A) : Araki, Shigeru (Funakawa, member) : Development of cassava production system for smallholders in savanna-forest transitional region of East Cameroon
- Young Researchers (B) : Watanabe : Influences of geological conditions on biogeochemical processes of forest ecosystems in Japan

2.Other Research Grants

- Japanese International Research Center for Agricultural Sciences : Shinjo : Developlement and validation of soil fertility management technologies based on resource dynamics in the Sahel region of West Africa

A-4.International cooperation and overseas activities

International meetings(country,roles)

- Funakawa, Shinya : The 9th International Conference of East and Southeast Asia Federation of Soil Science Societies (Korea, Invited speaker)

International joint research, overseas research surveys

- Study on agricultural ecosystems in tropical Asia, Funakawa, Thailand, Indonesia
- Study on agricultural ecosystems in tropical Africa, Funakawa, Tanzania, Cameroon
- Recent agro-environmental alteration in Central Asia, Funakawa, Kazakhstan
- Study on desertification in West Africa, Shinjo, Niger
- Study on social-ecological resilience in semi-arid Tropics, Shinjo, Zambia
- Study on weathering rate of soil minerals in humid Asia, Watanabe, Indonesia

Visiting Research Scholars

- KU Guest Professor　1（Canada）
- KU Guest Professor　1（Taiwan）

B.Educational Activities(2009.4-2010.3)

B-1.On-campus teaching

a) Courses given

- Undergraduate level：Science of Biosphere (Funakawa), Environmental Science (Funakawa), Outline of Bioresource Science IV (Funakawa), Soil Science- Part I (Funakawa, Shinjo), Soil Science- Part II (Funakawa, Watanabe), Introduction to Foreign Literature in Bioresource Science II (Shinjo), Agricultural Technology and Farm Practice (Funakawa, Shinjo, Watanabe), Introduction to Plant Investigations (Funakawa, Shinjo, Watanabe), Practice in University Forest III (Shinjo, Watanabe), Laboratory Course in Bioresource Science I･II (Funakawa, Shinjo, Watanabe), Fundamentals for the Laboratory Course in Bioresource Science (Funakawa), Seminar in Soil Science (Funakawa, Shinjo, Watanabe),
- Graduate level：Research in Soil Science (Funakawa, Shinjo, Watanabe), Seminar in Soil Science (Funakawa, Shinjo, Watanabe), Tropical Soil Science (Funakawa, Watanabe)