THE OHIO STATE UNIVERSITY
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Fall 2010 Newsletter

Summer Student Exchange Program with the University of Iceland

Graduate student Nick Stanich in Icelandic back country

This past summer Melissa Herman, Josh Beniston and myself, all graduate students of the Carbon Management and Sequestration Center in the School of Environment and Natural Resources at the Ohio State University, traveled to Iceland as part of a team of soil scientists to describe soil development along the recessional path of the rapidly receding glacier Skaftafellsjökull. The research is part of an exchange program developed between The Ohio State University and the University of Iceland that involves three Ohio State graduate students studying in Iceland for the summer quarter, and one University of Iceland graduate student (Olga Kolbrún Vilmundardóttir) traveling to Ohio State for three quarters of study. The trip was exhilarating!

The experience was comprised of two components: a hands-on educational component that counted towards curricular credit, and the research component. As part of the curriculum-based experience, Iceland's Soil Conservation Service kindly hosted students for ten days, guiding them through the Soil Conservation Service's efforts to restore degraded land in Iceland, and to prevent catastrophic flooding from the ash-choked streams that have resulted from Eyjafjallajökull's recent eruption in March. (Continued Page 2....)

Carbon Management and Sequestration Center
2021 Coffey Rd.,
210 Kottman Hall
Columbus, OH 43210
colson.6@osu.edu (614) 292-9049

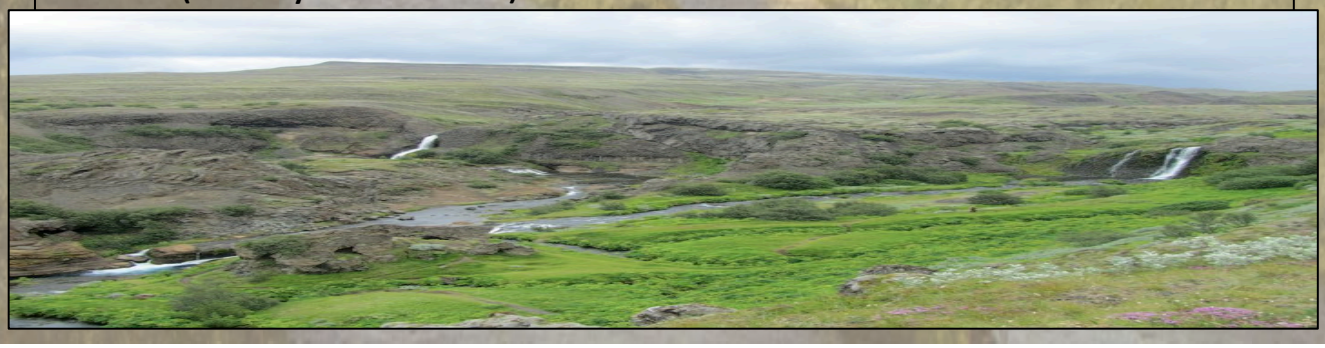
Inside:

C-MASC Student Exchange Program continued from page 1...

To further the hands on experience, Professors Gudrun Gisladottir, Thora Ellen Thorhallsdottir, and Gísli Már Gíslason, from the University of Iceland, then led them on a 6 day backpacking trip to Thjorsarver, a remote wetland at the base of the Hofsjökull Icecap in the central Icelandic highlands. Thjorsarver was an experience like none other, over the course of the six days they traversed glaciers, mountainous skree slopes, hiked barefoot through mossy wetlands, forded 30+ near freezing glacial rivers, and bathed in natural hot-springs, all while receiving lessons from three experts on the ecology and geo-morphology of Iceland.

Curricular-based experiences aside, students traveled to the research site at Skaftafellsjökull, an outlet glacier of Vatnajökull located in south central Iceland. The research entails studying how soil develops along the recessional path of of Skaftafellsjökull, which has been rapidly receding since 1890. The pro-glacial area is approximately 7.5km^2 and the location of the glacial front has been identified for the years 1890, 1945, and 2002. Six transects running parallel to the glacial face have been identified for each of the three years, and three samples were taken from each transect. The sampling was surprisingly difficult. Unlike the older well developed till soils of Ohio that are largely devoid of coarse rocky fragments, the till-based Andisols in Iceland are extremely rocky and impossible to sample with a soil core. Students initially attempted to use a water displacement method to measure the bulk density, but the volume calculations displayed too much error, so they adopted the polyurethane foam displacement method instead. After three intense weeks of sampling and field sieving gravely soils to 8mm, they had accomplished the objectives of sampling two depths and describing vegetative cover at each of the 54 plots, and were ready to return to the University of Iceland's campus in Reykjavik. In Reykjavik they sieved the soil down to the <2mm fraction, which was extremely time-intensive due to the large number of roots and moss fragments, and they measured the volume of the foam casts to determine bulk density. Back at Ohio State, biological, chemical, and physical properties such as microbial biomass, nutrient levels, carbon content, texture, moisture retention and particle density will be measured and the data will be used to identify trends that quantify short term soil development in Iceland as glaciers retreat into the century.

Students' experience in Iceland was delightful, and logistically flawless. Special thanks to Ann Bau, Gudrun Gisladottir and Sveinn Runólfsson for planning the majority of the experience and for going out of their way to ensure that students had a nice bed and were well fed. (Courtesy of Nick Stanich)



C-MASC Student Exchange Program continued from page 2...

This past summer, three students from C-MASC travelled to Iceland on a 7-week research trip. During the first ten days of the trip, students were graciously hosted by Iceland's Soil Conservation Society, and had the privilege of witnessing the aftermath of the recent eruption of Eyjafjallajokull and research work being done to understand its impact. They also really enjoyed their interactions with the farmers and people in the community to come, learning about Iceland's culture and history, and coming to a better understanding of this people's ability to live in such a harsh, unpredictable, and unforgiving landscape.

During the second part of the trip, students conducted their own research work at the base of Skaftafellsjökull, a receding outlet glacier of Vatnajökull, Europe's largest glacier. This experience definitely stretched them as scientists. The general objective of the project was to observe how the soil at the base of the Skaftafellsjökull has been developing post glacial recession. Their particular focus within this study was on the soil nutrient pools and chemical properties regulating them, as well as correlating the soil data to its corresponding vegetative cover. They learned that such an ecological study requires a totally different research design and framework than the agricultural studies they were used to working on in Ohio, and this area's rocky terrain required completely different sampling strategies than what they were using for agricultural soils in Ohio. All in all, it took quite a bit of team effort and ingenuity, but well worth the trip. (Courtesy of Melissa Herman)

Melissa Herman, in glacier climbing gear

Josh Beniston, with the Portable Soil Physics Lab

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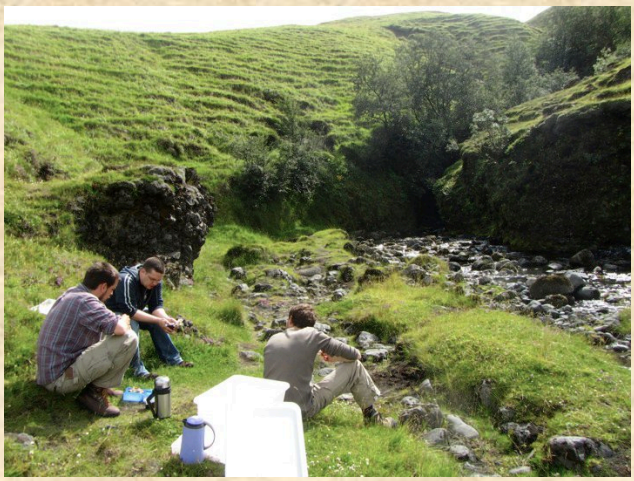
Photos By Mellissa Herman



C-MASC SUMMER PICNIC

August 20, 2010

VISITING SCHOLARS

Top row left to right: Heba Yehia, Carey Liu, V. Srinivasan, H.P. Maheswarappa,, Aweke Mulualem, Alex Lenz
Seated left to right: Ibrahim Ortas, Rattan Lal, Atsunobu Kadono

Staff, Students and Scholars

Top row left to right: Ryan Hottle, Raj Shrestha, Sandeep Kumar, Chris Eastman, Heba Yehia, Carey Liu, V. Srinivasan, H.P. Maheswarappa,, Aweke Mulualem, Basant Rimal, Alex Lenz, Atsunobu Kadono, Klaus Lorenz, David Ussiri, Ji Young Jung
Seated left to right: Anjali Dubey, Theresa Colson, Merry Anne Varghese, Ibrahim Ortas, Rattan Lal,

New Arrivals to C-MASC

DR. ATSUNOBU KADONO

Post-doctoral Researcher
Carbon Management and Sequestration Center

Former occupation: Assistant Professor
Graduate School of Urban Environmental Sciences
Tokyo Metropolitan University, Japan
E-mail: kadono.1@osu.edu

RESEARCH INTERESTS:

His research interest lies in the modeling of soil organic matter dynamics and green house gas emission form soils under the different management. He will stay in the C-MASC for 11 months, August 2010 to June 2011. he will review the recent studies about modeling of soil organic matter dynamics and conduct an experiment described below.

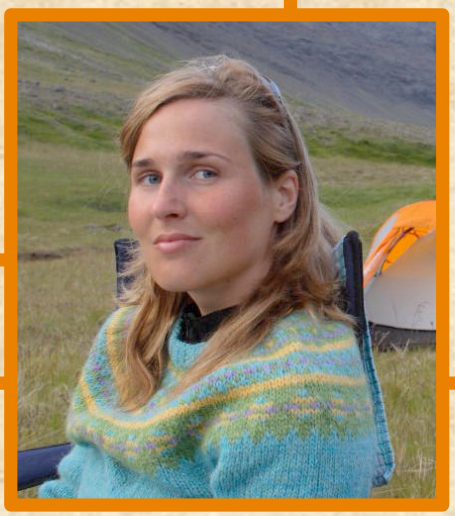
PROGRAM OF STUDY AT C-MASC:

Weekly to monthly measurement of soil respiration using closed chamber method will be conducted in the Waterman Farm under the different management, including cropland (no tillage vs. conventional tillage), grassland (pasture vs. turf) and forest sites. Soil meteorological and physico-chemical properties will be also monitored. The monitored data are integrated to a soil organic dynamics model to predict the soil respiration.

Visiting Scholars

MS. OLGA KOLBRÚN VILMUNDARDÓTTIR

M.Sc. in Geography
Department of Geography and Tourism
Faculty of Life- and Environmental Sciences
University of Iceland
okv2@hi.is; vilmundardottir.1@osu.edu



Program of Study

Exchange Student 2010/2011 Academic Year

She is a Ph.D. student at the University of Iceland. I finished my B.Sc. studies in Geography in June 2004 and the M.Sc. studies in February 2009 in Physical Geography, both from the UI. Since 2005, she has worked at the Icelandic Institute of Natural History on research of geothermal vegetation and environmental changes along a hydro-electric reservoir. The latter was the theme of my M.Sc. research project, which was carried out in cooperation with the UI and the IINH. My research resulted in two scientific publications.

She started Ph.D. studies in summer 2010 at the University of Iceland under the supervision of Professor Guðrún Gísladóttir and co-supervision of Professor Rattan Lal at the Ohio State University. The Ph.D. research is focusing on soil formation in relation to climate change, vegetation succession and terrestrial ecosystem development. The research is a part of a joint research project (Terrestrial ecosystem development south of Vatnajökull glacier, Iceland) between UI and OSU, coordinated by the two of my above mentioned supervisors.

Due to climate warming Icelandic glaciers have been retreating since the end of the 19th century. She will make use of the unique geographic setting in front of Skaftafellsjökull outlet glacier in Vatnajökull glacier in South Iceland, where retreat and glacier position are known over the past 120 years. The research is aimed at modelling carbon sequestration and soil quality of the newly exposed land, taking into consideration spatial variability in the age of the exposed land, substrate, micro tophography, drainage, plant species composition and cover as well as soil biological crust. The joint research project involves graduate students from both UI and OSU.

DR. AWEKE MULUALEM GELAW

Lecturer
Department of Land Resources Management and Environmental Protection
Mekelle University
Ethiopia

Education: 2005 M.Sc. Soil Science, 2001 B.Sc. Plant Sciences

Research Interests: Carbon Sequestration, Soil Quality and Soil Water Management

Program of Study at C-MASC:
He is a visiting scholar at C-MASC for one year from August 1, 2010 through July 31, 2011. He will be researching Soil Carbon, Climate Change and Soil Quality under the supervision of Professor Rattan Lal. The focus of his research will be on analyzing the aggregate and primary particle associated carbon and nitrogen as well as organic carbon and total Nitrogen contents of soils under different land uses in northern Ethiopia. Finally, he will write articles on SOC and TN sequestration potentials of soils and magnitude and stability of SOC and TN associated with soil aggregates and primary particles under different land uses in northern Ethiopia.

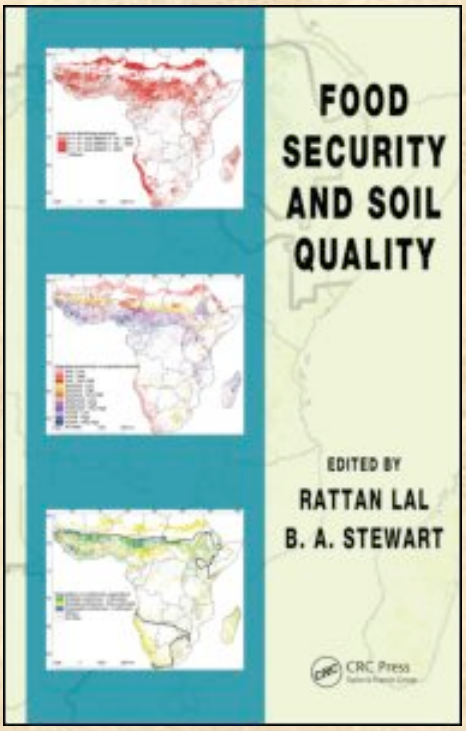
MR. ALEXANDER LENZ

Undergraduate Geography
Department of Landscape Ecology
Georg-August-University, Göttingen, Germany

Research at C-MASC:
He is a visiting scholar for ten weeks between August and October, 2010. He is studying the influence of tillage management practices under long-term continuous corn (*Zea mays* L.) on soil organic carbon (SOC) sequestration in soil aggregates and primary particle-size fractions. Sampling was done to 40-cm depth at Ohio Agricultural Research and Development Center (OARDC) Western Agricultural Research Station Farm near South Charleston, OH. Further sampling is planned at the North Appalachian Experimental Watershed near Coshocton, OH, to study the changes in SOC stabilization occurring when surface soil is transported in eroding watersheds under long-term continuous no-till corn. The results will be published in peer-reviewed journals.

Forthcoming New Books

Food Security and Soil Quality



Just five years ago, it was generally believed that the number of food insecure people in the world was on continuous decline. Unfortunately, widespread soil degradation along with resistance to recommended agronomic practices, and little attempt to restore degraded soils have conspired with significant droughts (in regions that could least tolerate them) to swell the ranks of the food insecure to over a billion people. The U.N. Millennium Development Goals' intent to halve hunger by 2015 will not be realized.

Food Security and Soil Quality, **the second publication in the series *Advances in Soil Science,* brings together leading experts from across the world to provide a concise and factually supported exploration of the problem at hand and the critical steps needed to reverse it. Edited by Rattan Lal, and B.A. Stewart, two of the world's most respected soil scientists, this important work:**

- **Assesses farming systems and food security in Sub-Saharan Africa, with special emphasis on land degradation**
- **Examines concerns with and approaches to soil quality management in Brazil and China Details achievable methods for improving soil quality for sustainable production**
- **Provides an insightful comparison of temporal changes in agricultural systems productivity in Punjab, India and Ohio**
- **Discusses the human dimension of the crisis including the influence of culture and spiritual beliefs**

Dr. Lal writes that despite the existence of scientific data on sustainable management of soil and water resources, problems of soil and environmental degradation have persisted and have been aggravated. And that these problems are rooted in land misuse and soil mismanagement. This book does provide policymakers and others with an understanding of the depth, complexity, and immediacy of this crisis, but more than a call to action, it also offers soil scientists working in this area with an understanding of what is being done and what needs to be done. Most importantly, this book helps us understand that the situation is not beyond remediation were we to act with great resolve and a sense of urgency.

***A tree's leaves may be ever so good, So may its bark, so may its wood; But unless you put the right thing to its root, It never will show much flower or fruit*.**

— from Leaves Compared With Flowers, by Robert Frost

- **Vol. 3 entitled "World Soil Resources and Food Security" will be available December 2010**

Moldova

Dr. Rattan Lal visited the Alecu Russo Balti State University, Republic of Moldova. The visit coincided with the 65th anniversary of the University. The dates of the visit were 20-26th September 2010. Prof. Lal visited universities and farms in Moldova, Ukraine, and Romania.

From Left to Right: Dean Stanislav Stadnic, Prof. Dr. Boris Boincean, Prof. Dr. Rattan Lal, and Rector Prof. Dr. Gheorghe Popa Stadnic

From left to right: Prof. Dr. Rattan Lal and Rector Prof. Dr. Gheorghe Popa

Typical rural views of Moldova