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7. Title

Data Validation of Temporal and Spatial Dynamics of Physicochemical Soil Properties

12. Investigator Name(s) (Last Name and Initials)

Weindorf, D. C.

20. Termination Date 04/30/2013	40. Period Covered (mo/da/year): 01/01/2011 TO 12/31/2011

Outputs:

Research has been focused on new technologies for field soil survey and environmental assessment. Results were published in eight peer reviewed manuscripts, and ten published abstracts. Research progress was also presented at national and international meetings.

Outcomes/Impacts:

The project made several key scientific advances. Field portable x-ray fluorescence spectrometry was shown to be a useful technique for evaluating soil pedological features in the field (spodic horizons, hydric depletions, soil texture, etc). Such features have implications for land use management, soil classification, and environmental quality assessment. The technique was used on historically mounted soil monoliths which may provide a good baseline to illustrate anthropogenic changes to soil quality over time. Compost/mulch was shown to be extremely effective in reducing erosion in roadside soils. The compost/mulch treatment provides additional moisture retention and moderated soil temperatures. Use of the compost/mulch as a best management practice will facilitate improvements to Louisiana surface water quality. The use of visible near infrared diffuse reflectance spectroscopy (VisNIR DRS) for rapid, on-site hydrocarbon quantification in soils has gained traction in private industry with a new company wanting to explore this research further. Both PXRF and VisNIR DRS were used to rapidly characterize compost physical and chemical properties; new methods provided for rapid, on-site assessment of compost/mulch quality. Soil organic carbon was characterized on several benchmark soils of Louisiana in support of a national initiative to establish more accurate levels of soil organic carbon stock. Soil carbon sequestration is a key means of addressing global climate change.

Publications:

Bakr, N., D.C. Weindorf, M.H. Bahnassy, and M.M. El-Badawi. 2011. Multi-temporal assessment of land sensitivity to desertification in a fragile agro-ecosystem: Environmental indicators. Ecological Indicators 15(2012):271-280.

Zhu, Y., D.C. Weindorf, and W. Zhang. 2011. Characterizing soils using a portable x-ray fluorescence spectrometer: 1. Soil texture. Geoderma 167-168:167-177. doi:10.1016/j.geoderma.2011.08.010.

Ramanarao, M.V., D.C. Weindorf, G. Breitenbeck, and N. Baisakh. 2011. Differential expression of the transcripts of Spartina alterniflora Loisel (smooth cordgrass) induced in response to petroleum hydrocarbon. Mol. Biotechnol. doi: 10.1007/s12033-011-9436-0.

Darilek, J.L., W. Sun, B. Huang, Z. Wang, Y. Qi, and D.C. Weindorf. 2011. Effect of moisture conditions in rice paddies on phosphorus fractionation in agriculture soils of rapidly developing regions of China. Communications in Soil Science and Plant Analysis 42:1752-1764. doi: 10.1080/00103624.2011.584599.

Wang, S.H., X. Shi, Y.C. Zhao, D.C. Weindorf, D.S. Yu, S.X. Xu, M.Z. Tan, and W.X. Sun. 2011. Regional simulation of soil organic carbon dynamics for dry farmland in East China by coupling a 1:500,000 soil database with the Century Model. Pedosphere 21(3):277-287.

Zhang, W., D.C. Weindorf, and Y. Zhu. 2011. Soil organic carbon variability in croplands: Implications for sampling design. Soil Sci. doi: 10.1097/SS.0b013e31821eb7d2.

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Zhang, W., D.C. Weindorf, Y. Zhu, B. Haggard, and N. Bakr. 2011. Wetland Reserve Program: A soil carbon sequestration strategy in Louisiana. ASA-CSSA-SSSA National Meetings. 16-19 October, San Antonio, TX. http://a-c-s.confex.com/crops/2011am/webprogram/Paper65063.html. Abstract.

Weindorf, D.C., and N. Rolong. 2011. Dr. B.L. Allen: A retrospective of field experiences. ASA-CSSA-SSSA National Meetings. 16-19 October, San Antonio, TX. http://a-c-s.confex.com/crops/2011am/webprogram/Paper64401.html. Abstract.

Zhu, Y., D.C. Weindorf, and W. Zhang. 2011. In-situ approximating clay contents with aid of PXRF in Louisiana soils. ASA-CSSA-SSSA National Meetings. 16-19 October, San Antonio, TX. http://a-c-s.confex.com/crops/2011am/webprogram/Paper65168.html. Abstract.

Bakr, N., D.C. Weindorf, Y. Zhu, and M. Selim. 2011. Evaluation of mulch application as an erosion retardant on Louisiana roadsides. ASA-CSSA-SSSA National Meetings. 16-19 October, San Antonio, TX. http://a-c-s.confex.com/crops/2011am/webprogram/Paper65184.html. Abstract.

Weindorf, D.C., T. Rusu, H. Cacovean, and B. Haggard. 2011. Teaching and research experiences from an agricultural Fulbright in Eastern Europe. ASA-CSSA-SSSA National Meetings. 16-19 October, San Antonio, TX. http://a-c-s.confex.com/crops/2011am/webprogram/Paper63751.html. Abstract.

Weindorf, D.C., S. Chakraborty, Y. Zhu, J. Galbraith, and Y. Ge. 2011. New technologies in field soil survey. Applied Industrial Optics Spectroscopy, Imaging, and Metrology International Meetings. 10-14 July, Toronto, Canada. Abstract.

Rusu, T., D.C. Weindorf, B. Haggard, P. Moraru, H. Cacovean, I. Bogdan, and M. Sopterean. 2011. Soil moisture and temperature monitoring for sustainable land use and water management in Transylvanian Plain, Romania. European Geosciences Union General Assembly. 5 Apr, Vienna, Austria 13:EGU2011-2690. Abstract.

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Weindorf, D.C., and B.J. Haggard. 2011. The role of women in soil science, An experiential comparison of the United States and Romania. East-West Cultural Passage Conference: Contact Zones in the Global World. 6-7 May, Sibiu, Romania. Abstract.

Participants:

D.C. Weindorf (PI), LSU AgCenter.

Target Audiences:

Department of National Resources, USGS, environmentalists, water quality specialists, and soil scientists.

Project Modifications:

Nothing significant to report during this reporting period.

Approved (Signature)	Title	Date