World Conference on Ecology

March 19-20, 2018 | Berlin, Germany

Keynote Forum

Day 1

Ecology 2018

Gilbert C Sigua, J Ecosyst Ecography 2018, Volume 8
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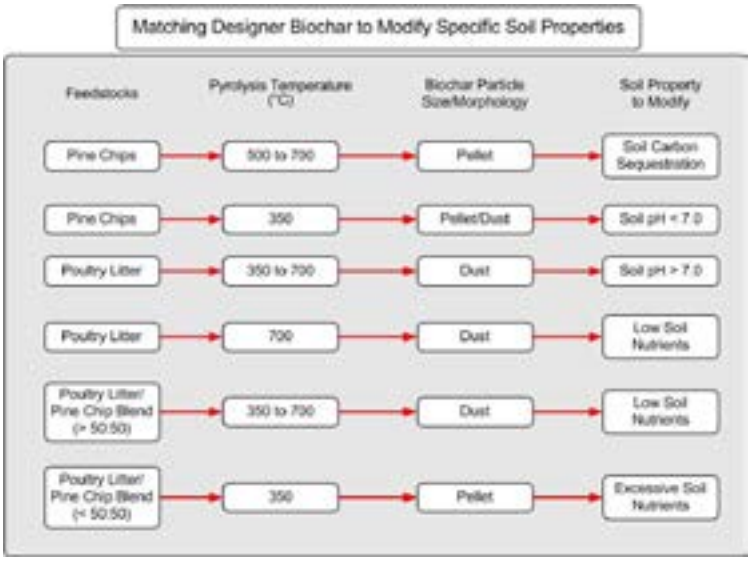
Gilbert C Sigua

USDA-ARS, USA

Recycled agricultural wastes: Biochars multifunctional role in agriculture and environment

The rapid population growth, urbanization and modernization worldwide have resulted in the significant increase of waste generated. Waste production is a major environmental problem in our society. In fact, recycling and using raw materials from the waste we generate are some of the environmental challenge that we face today. Promotion of innovative and appropriate technologies is necessary to achieve sound and sustainable waste management. Biochar production using pyrolysis technology can utilize most urban, agricultural or forestry biomass residues, including wood chips, corn stover, rice or peanut hulls, tree bark, paper mill sludge, animal manure, and many other recycled organics. Biochar is the solid product that results from pyrolysis of agricultural wastes and organic materials. Biochars as specialized soil amendments can provide multifunctional roles with remarkable agronomic and environmental significance. Our biochars studies demonstrated the favorable and beneficial effects of different designer biochars on biomass productivity and nutrient uptake of winter wheat grown in Norfolk soils with hard setting subsoil layer. Application of 80:20 blends of pine chips and poultry litters was found to be superior over other blends of biochars because of its favorable effects on biomass productivity and nutrient uptake of winter wheat. Our research investigations have also confirmed that biochars have binding mechanisms to sequester metals. Recently, biochars ability to sequester metals has caught the attention of the mine reclamation sector. It is proposed that biochar is a suitable amendment to remediate heavy metals in mine spoils, as well as improve chemical conditions for enhanced plant growth. Better plant growth will improve phytostabilization, increase containment of metal-laden sediment, while also reducing potential metal uptake by plants. As such, utilization of a biochar with appropriate chemical and physical characteristics is crucial for effective binding of heavy metals while also improving plant growth conditions in the mine spoils.



Recent Publications

1. Sigua G C, Novak J, Watts D, Cantrell K, Shumaker P, Szogi A and Johnson M (2014) Carbon mineralization in ultisols amended with different sources and particle sizes of biochar. Chemosphere. 103:313-321.
2. Sigua G C, Hunt P G, Stone K C, Cantrell K B and Novak J M (2014) Contrasting effects of sorghum biochars and sorghum residues on soil chemical changes of coastal plains ultisols with winter wheat. Soil Sci. 179(8):369-408.
3. Novak J M, Sigua G C, Busscher W J, Cantrell K B, Watts D W, Glaz B and Hunt P G (2015) Plant macro and micro-nutrient dynamics in a biochar-amended wetland muck. Water, Air, and Soil Pollution. DOI:10.1007/s11270-014-2228-y.
4. Sigua G C, Hunt P G, Stone K C, Cantrell K B and Novak J M (2015) Increasing biomass of winter wheat using sorghum biochars. Agron Sustainable Develoment. 35:739-748.
5. Sigua G C, Novak J M and Watts D (2016) Ameliorating soil chemical proerties of a hard setting subsoil layer in coastal plain USA with different designer biochars. Chemosphere. 142: 168-175.

Biography

Gilbert C Sigua is a Research Soil Scientist at the USDA-ARS Coastal Plains Soil, Water, and Plant Research Center in Florence, South Carolina, USA. His research program focuses on both the short-term and long-term solutions to enhancing agricultural and environmental sustainability and improving water and nutrient management in humid region. He is a nationally and internationally recognized expert and authority in his field because of his work on agricultural, ecological and environmental management research as evidenced by his various international projects in Brazil, Australia, Philippines, Japan and Cambodia. His scholarly achievements and expertise have been widely recognized through numerous honors and awards. As a testimony to this, he was recently awarded major fellowship awards, to wit: a) Fellow of American Society of Agronomy; b) Fulbright Fellow; c) Japan Society for Promotion of Science Fellow; d) Balik Scientist Fellow; and e) Fellow of Soil Science Society of America.

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Notes:

Kartlos J Kachiashvili, J Ecosyst Ecography 2018, Volume 8
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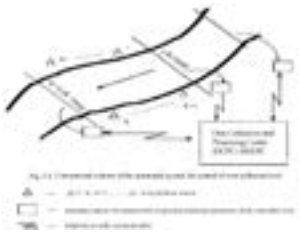
Kartlos J Kachiashvili

Georgian Technical University, Georgia

Information technologies for control and management of environmental water quality

For solving the problems of study, analysis and quality management of the environment there is ne¬ce¬ssary operatively to treat great amount of measuring information on physical, chemical and biological parameters characteristic for them. To do it in a proper way, in conformity to the modern requirements, is possible only by wide use of modern mathematical methods and computers. For this purpose it is necessary to develop automated systems and universal program packages with developed mathematical methods consisting of self-learning algorithms requiring whenever it is possible minimum a prior information and having capability of adaptation to the most unexpected changes of the character of the investigated objects. Among the most topical problems of monitoring of a natural water environment, it is necessary to single out the following issues: simulation of pollutants transferring in water objects; methods of making decisions about condition of controlled objects and processes taking place in them; identification of sources of emergency pollution to take measures for their elimination. With the purpose of overcoming of the mentioned problems, the consideration and the demonstration of the following program packages are offered in the work: automated water quality control system, mathematical models of pollutants transport in rivers and identification of river water excessive pollution sources. These packages are developed under guidance of the present work and are introduced in a real water objects such as rivers and sewage of factories.



Conventional scheme of the automated system for control of river pollution level.

Recent Publications

1. Kachiashvili K J and Melikdzhanian D I (2016) Software for pollutants transport in rivers and for identification of excessive pollution sources. MOJ Ecology & Environmental Science, 1(1):1-8.
2. Kachiashvili K J and Melikdzhanian D I (2015) Software for statistical hypotheses testing. International Journal of Modern Sciences and Engineering Technology (IJMSET), 2(4):33-52.
3. Kachiashvili K J and Melikdzhanian D I (2009) Software realization prob¬lems of mathe¬ma¬tical models of pollu¬tants transport in ri¬vers. International Journal Advances in Engineering Software, 40:1063-1073.
4. Kachiashvili K J, Gordeziani D G, Lazarov R G and Melikdzhanian D I (2007) Modeling and simulation of pollutants transport in rivers. International Journal of Applied Mathema¬tical Modelling (AMM), 31:1371-1396.
5. Kachiashvili K J and Melikdzhanian D I (2006) Identification of river wa¬¬ter excessive pollu¬tion sources. International Journal of Information Tech-no¬logy & Decision Making, 5(2):397-417.

Biography

Kartlos J Kachiashvili has his expertise in development of automated monitoring and control systems of environmental water pollution level, metrology of the suitable measurement devices, mathematical mo¬deling and simulation of pollutants transport in water objects and measurement devices and processes, development of new computer technologies, system analysis and analysis of environmental, agricultural and medical data. He developed his activities in scientific production associations, research institutes and universities of different countries. Developed by him systems, program packages, models, methodologies were practically realized in real systems of different countries of former USSR. His research results are published in many scientific articles and monographs published in many well-known, international journals and publishing houses.

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Day 2

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Fang Yiping

Chinese Academy of Sciences, China

The role of permafrost in ecological resilience of alpine grassland and spatial heterogeneity in the source regions of Yangtze and Yellow Rivers

Under the context of human activities and climate warming, the change in permafrost has affected the alpine grassland ecosystem. To describe the ecological resilience of alpine grassland in a more objective manner, the factor of frozen soil has to be considered. In this paper, using the structural dynamics method, we established the structural dynamics model of ecological resilience for alpine grassland from the aspects of grassland quality, grassland intervention, grassland potential and grassland pressure dimension, analyzed the variation in the grassland ecological resilience of permafrost regions and its sensitivity to the change of permafrost, and also quantified the contribution rate of permafrost active layer change to the ecological resilience of alpine grassland. The results indicated that (1) the ecological resilience of grassland in permafrost regions showed an increasing trend, especially after 1997, which is the integrated results of precipitation, air temperature in grassland growing season (April to September), NPP and ecological protection projects; (2) the sensitivity of ecological resilience of grassland to the variation in permafrost active layer was complicated, experiencing the course of sensitivity, high sensitivity and low sensitivity. Geographically, the sensitivity of northern and western regions was overall higher than that of southern and eastern regions. The shape of the high sensitive zone gradually changed from island to band shape and from island to plane shape; (3) grassland ecological resilience was reduced as the increase in the thickness of permafrost active layer. The contribution rate of permafrost to the grassland ecological resilience was -4.3%, that is, a 0.04 unit reduction in the resilience is caused by every 1 unit increase in the thickness of permafrost active layer.

Recent Publications

1. Fang Y P, Zhao C, Ding Y J, Qin D H and Huang J L (2016) Impacts of snow disaster on meat production and adaptation: an empirical analysis in the yellow river source region. Sustainability Science 11:246-260.
2. Fang Y P, Liu Y W and Yan X (2015) Meat production' sensitivity and adaptation to precipitation concentration index during the growing season of grassland: Insights from rural households. Agricultural and Forest Meteorology 201:51-60.
3. Fang Y P (2013) The effects of natural capital protection on pastoralist's livelihood and management implication in the source region of the Yellow River, China. Journal of Mountain Science 10:885-987.
4. Fang Y P (2013) Managing the three rivers headwater region, China: from ecological engineering to social engineering. AMBIO 42:566-576.
5. Fang Y P and Wei Y Q (2013) Climate change adaptation on the Qinghai–Tibetan Plateau: The importance of solar energy utilization for rural household. Renewable and Sustainable Energy Reviews 18:508-518.

Biography

Fang Yiping is currently a full Professor and Supervisor of PhD candidates at Institute of Mountain Hazards & Environment, CAS, and University of Chinese Academy of Sciences. He is recognized within the field of human geography and the field of ecological economics for both his critiques of and contributions to balancing mountain ecosystem protection and development even while he spends most of his time working across disciplinary ways of understanding. His research interests mainly cover climate change adaptation and sustainability for mountainous areas. He is an active scholar who has published 146 research papers in peer-reviewed journals and 19 books. He serves as Vice Director of Academic Committee for Institute of Mountain Hazards & Environment, CAS; as Vice Director, Professional Committee of Economic Geography, Chinese Association for Geography; as Director, Professional Committee for Cryospheric Change and Sustainable Development, Clic and IACS.

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