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EMERGING RESEARCH FRONTS - 2010

February 2010

(Late commentary entry added in Feb. 2010 for Dec. 2009)

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Alex McBratney talks with *ScienceWatch.com* and answers a few questions about this month's Emerging Research Front Paper in the field of Agricultural Sciences.

Article: On digital soil mapping
Authors: McBratney, AB;Santos, MLM;Minasny, B
Journal: GEODERMA, 117 (1-2): 3-52 NOV 2003
Addresses: Univ Sydney, Fac Agr Food & Nat Resources, Australian Ctr Precis Agr, McMillan Bldg A05, Sydney, NSW 2006, Australia.
Univ Sydney, Fac Agr Food & Nat Resources, Australian Ctr Precis Agr, Sydney, NSW 2006, Australia.
EMBRAPA, Ctr Nacl Pesquisa Solos, BR-22460 Rio De Janeiro, Brazil.

SW: Why do you think your paper is highly cited?

I think it both defined a new approach and brought recognition to a new area of research and application. It is also timely because, at the turn of the century, scientists recognized the difficulty of conventional soil mapping. With limited budgets, soil and environmental scientists are looking for new ways of producing soil and related maps more efficiently.

SW: Does it describe a new discovery, methodology, or synthesis of knowledge?

At first this paper was a review, then, after some thought, it became a synthesis, and then, after some further thought, it was clear that there was a more generic approach that could be developed. This is a good example of going from review to new ideas.

This paper introduced the quantitative scorpan concept, where soil can be predicted from S: soil, C: climate, O: organism, R: relief, P: parent materials, A: age, and N: geographic space. It also proposed the spatial soil prediction function which allows us to spatially predict soil properties across any region of interest.

"The paper probably led to a scientific movement which then led to a global project. "

SW: Would you summarize the significance of your paper in layman's terms?

It suggests a new way of doing soil mapping that uses the latest technology and our best ideas about how soil varies across a landscape. The new way is potentially much

more efficient and more quantitative than the old one.

SW: How did you become involved in this research and were any particular problems encountered along the way?

I've been involved in various aspects of quantitative soil mapping my entire research career. It was only with the time for reflection that sabbatical leave allows that I could thoroughly investigate what everyone had been doing during the previous years, and see the threads and commonalities to put it all together, and then suggest a new way of thinking.

It only goes to show that time set aside for reading and reflection is quite important for the development of science and, too often, this opportunity is denied us by the increasing hurly-burly involved in the administration of science.

SW: Where do you see your research leading in the future?

This research has led to a movement of people across the world who are investigating digital soil mapping as a way of producing soil information for today's problems. Several conferences have been held and books have been produced and there is a growing literature in the scientific periodicals. Most importantly, there is now a global project to produce a global map of soil properties at a resolution of 90m x 90m.

This idea was not even conceived at the turn of the millennium. However, after the first and second conferences on digital soil mapping, which were held in 2004 and 2006, subsequent to the publication of our *Geoderma* paper, a group of people felt confident enough that we could achieve such an aim. It's a great challenge but it's one that we must engage. Some of the aspects of this were described recently in a paper by Pedro A. Sanchez, *et al*. "Digital soil map of the world," *Science* 7(325): 680-1, August 2009.

SW: Do you foresee any social or political implications for your research?

The paper probably led to a scientific movement which then led to a global project. The major aims of the global project are to produce relevant soil information for solving today's and tomorrow's great problems: food security, water security, energy security, and sustainable response to climate change. The information digitally produced by global soil mapping will allow modelers, planners, and policymakers to put in place responsive and responsible actions for the use of the global community.

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KEYWORDS: SOIL MAP; SOIL SURVEY; DIGITAL MAP; CLASSIFICATION TREE; DEM; DTM; GAM; GENERALIZED LINEAR MODEL; GEOPHYSICS; GEOSTATISTICS; GIS; NEURAL NETWORK; PEDOMETRICS; PEDOTRANSFER FUNCTION; REGRESSION TREE; REMOTE SENSING; SOIL SPATIAL PREDICTION FUNCTION; WAVELETS; LOWER NAMOI VALLEY; GENERALIZED LINEAR-MODELS; MAPPED REFERENCE AREA; FUZZY-C-MEANS; SPATIAL PREDICTION; OPTIMAL INTERPOLATION; ELEVATION MODEL; DRAINAGE CLASS; ENVIRONMENTAL CORRELATION; ELECTRICAL-CONDUCTIVITY.

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