

Universal Soil Classification

IUSS Universal Soil Classification Working Group

Meeting Report

Jon Hempel

USDA-NRCS-NSSC

National Cooperative Soil Survey Conference

May 22-25, 2011

“Bridging the Centuries” Conference in • • • • • -September 2009 Declaration to “IUSS”



18. September, 2009, Gödöllő, Hungary

Resolution
of the conference "From the Dokuchaev School to Numerical Soil Classifications"
as part of the series of events organized for the
100th anniversary of the 1st International Conference of Agrogeology

The "Bridging the Centuries: 1909 – 2009" events¹ were organized to celebrate the 100th anniversary of the 1st International Conference of Agrogeology and to overview the 100 years of advances in soil sciences, in Hungary, 16-22 September, 2009.

The purpose of the 1st conference was to discuss the different approaches in field and laboratory methods for soil descriptions, in soil classification and in soil mapping. To get to common understanding in methods and language, and to develop to develop common classification and mapping schemes was also an important objective.

The participants of the 2009 conference "From the Dokuchaev School to Numerical Soil Classifications" (as part of the series of the centennial events) concluded that soil science community is still lacking commonly accepted and used standards in soil characterization (field and laboratory) and classification, making communication and data exchange difficult within our soil science and other disciplines.

Therefore the participants of the conference declared that there is a need to develop common standards, methods and terminology in soil observations and investigations and a "universal soil classification system".

It was recommended that a proposal to be addressed to the IUSS Council at the 2010 World Congress of Soil Sciences in Brisbane, Australia.

The further recommendation was that a universal system should be based on the experiences of broadly used classification systems, like the Soil Taxonomy, the Chinese, the Russian the French and other national systems and the experiences of the World Reference Base for Soil Resources, the endorsed correlation system of IUSS, as well as on accumulated soil information and state-of-the-art observation and data processing tools.

The organization of a working group composed of representatives from countries from all continents with currently applied classifications systems, and representatives from relevant organizations was also recommended.

On behalf of the organizing committee and the participants² of the conference

Erika Michéli

Vice-chair of Commission Soil Classification

1. Events:

Central event: Bridging the Centuries: 1909-2009, 16 - 17 September, 2009

Complementary events:

Plenary meeting of the European Soil Bureau Network, 14 - 15 September, 2009

From the Dokuchaev School to numerical soil classifications, 18 September, 2009

IUSS Conference and field excursion on Salinization, 20 - 22 September, 2009

2. There was general agreement to document the resolution.

Individuals participating in the wording of the resolution: M. Goldan (USA), L. Montanarella (EC, JRC), R. Arnold (USA), J. Hempel (USA), J. G. Zhang (China), P. Schad (Germany) P. Krasilnikov (Russia), A. McBratney (Australia), A. Hartemink (ISRIC), E. Dobos (Hungary), E. Michéli (Hungary)

Proposal for new Working Group in IUSS

15 July 2010

To: Prof. S. Nortcliff, Secretary General, IUSS
Prof. A. Mermut, Chair, Division 1., IUSS
Prof. A. McBratney, Vice Chair, Division 1., IUSS

Dear Mr. Secretary General and Division 1 officers,

On May 6th 2010 I addressed an email to Prof. Nortcliff, in which I asked for discussion in the Council, during the 19th WCSS in Brisbane. I hope my request was considered when planning the Council meeting agenda. In this email, I would like to confirm the original request with more specifics.

In September 2009, several events were organized to celebrate the 100th anniversary of the 1st International Conference of Agrogeology and to overview the 100 years of advances in soil sciences, in Hungary. One of the events was the Conference "From the Dokuchaev School to Numerical Soil Classifications". As result of the discussion, a resolution was prepared and recommended to be addressed to the IUSS Council at the 2010 World Congress of Soil Sciences in Brisbane, Australia. Please find attached the resolution that declares that there is a need to develop common standards, methods and terminology in soil observations and investigations and a universal soil classification system and there is also a proposal for a new Working Group to coordinate the efforts.

Related topic was discussed during the IUSS Inter-Congress Council Meeting in summer 2008. I copied below item 25. from the Minutes of the Council Meeting (25. Nomenclature and Taxonomy):
... "Paul Bertsch on behalf of the US National Committee raised that IUSS on behalf of Soil Science needs to address the problem of our lack of a common language within the Soil Science community, particularly in relation to the taxonomy of soils. There followed some discussion of the background and structure of the Soil Taxonomy and the World Reference Base, in particular stressing that WRB was originally designed to act as an 'umbrella' for National Soil Classification Systems, rather than as a specific soil classification system. 'Council recommends that IUSS through its WRB Working Group should make steps towards the establishment of uniform definitional observations and criteria and appropriate quantification within the various soil classification systems. (Proposed by Winfried Blum, seconded by Rainer Horn)."

The above two paragraphs were part of my original request for council discussion. In the meantime most of the scientists* who participated in the wording of the "Godollo Resolution" had a formal meeting in Rome during "Digital Soil Mapping 2010" meeting (24. May, 2010) and further discussed the issue. There was a general agreement that there is a need for evaluation of current spatial soil definition and classification systems and new innovative approaches should be investigated to develop a common universally accepted system. It was also agreed that a new working group should set up to coordinate the work. It was also agreed that the development of a Universal Soil Classification (USC) may need several years, hence national systems and the official correlation system of IUSS, the WRB (World Reference Base for soil Resources) should be maintained.

Based on the above mentioned documents and meetings hereby, I would like formally propose a new Working Group of IUSS to carry out the proposed investigations and development of a universal soil classification. I also propose Jon Hempel (USDA, NRCS) to chair the working group. All participants of the Rome meeting supported this proposal and Jon Hempel accepted the nomination.

Dear Mr. General Secretary and addressed officers please put this proposal for discussion to the agenda of the Council meetings in Brisbane.

Erika Michélli
Vice-chair of Commission 1.4 Soil Classification
President, Hungarian Soil Science Society

* Colleagues who participated in the Rome meeting:
M. Golden (USA), L. Montanarella (EC/JRC), Freddy Nectergaële (FAO), J. Hempel (USA), P. Schad (Germany) P. Krasilnikov (Russia), A. McBratney (Australia), A. Hartemink (ISRIC), E. Dobos and, E. Michélli Hungary)

IUSS Council Approval of USC Working Group

from the minutes of IUSS Council, Brisbane,
AU, August 2010

- **The Working Group on Universal Soil Classification** was agreed with a time limit of 8 years (2018) and a review of progress towards an agreed Soil Classification System after 4 years (2014), with an interim document report in 2012.

(Jon Hempel elected as chair/Erika Micheli elected as co-chair)

Working Group Charge Develop Common Standards

- Soil characterization-field and laboratory
- Methods and terminologies for soil observations
- Diagnostic Horizons
- Universal Soil Classification System

Working Group Membership

- Jon Hempel, Director-National Soil Survey Center, Lincoln, NE (Chair)
- Erika Micheli, Head Department of Soil Science and Agricultural Chemistry Szent Istvan University

Ways forward for Universal Soil Classification

- Very positive responses from many sectors of soil scientific community
- IUSS Backing
- Growing interest in soil science information
- We need not start from scratch
- Needs for the future

Proposals for USC

- Micheal Golden-Soil Taxonomy
- Numerical Classification
- Define a specific taxonomic level within ST for USC, allow national systems to develop

Task Groups

- Assemble diagnostic criteria from existing systems
 - Chair: Erika Micheli
- Determine the appropriate categorical level at which to start classification
 - Chair: Pavel Krasilnikov

Task Groups

- Compare guidelines for field profile descriptions (redox, structure, color, consistency, texture, etc.)
 - Propose a standardized nomenclature
 - Chair: Peter Schad (Reinhold Jahn)
- Compare and compile horizon nomenclature, designations, definitions
 - Propose a standardized nomenclature
 - Chair: Curtis Monger and Lucia Anjos

Task Groups

- Larger user groups than the current systems
 - Chair: Luca Montanarella
- Dual (parallel) nomenclature that includes and accommodates both a scientific and non-technical language (English lay / Texas vernacular)
 - Chair: John Galbraith

Task Groups

- Recommend laboratory methods and correlation rules
 - IUSS Liaison: Alfred Hartemink
- Explore other diagnostics (e.g. soil biology)
 - IUSS and NCSS soil ecology Liaison: Alfred Hartemink
- Explore other observation methods (e.g. spectroscopy, gamma radiometrics)
 - Chair: Alex McBratney

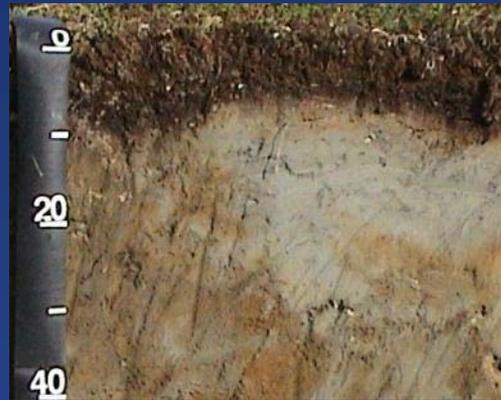
Task Groups

- Explore data and knowledge acquisition for soils (pedons) from Earth and other planets and depths greater than 2 m (e.g. Anthropogenic, Urban, Subaqueous, Paleosols, Other planets)
 - Chair: Pavel Krasilnikov, Alex McBratney

Considerations for a Universal Soil Classification System

- Simplification
- Enable others???
- Anthropogenic concerns (erosion, compaction, drainage, siltation, etc)
- Ochric epipedon

Contemporary soil classification systems (including Soil Taxonomy) are very poor for topsoil assessments



ST Issues

- Soil Climatic Information
- Cold Soil (Gelisols)
- Oxisols

Next meetings

- Time set to meet during the SSSA meetings in October
- IUSS Classification meeting in Lincoln, June 2012



Questions???