

Preface

Christina Siebe¹ · Maxine J. Levin² · Jean-Louis Morel³

Received: 18 May 2017 / Accepted: 29 May 2017 / Published online: 6 June 2017
© Springer-Verlag Berlin Heidelberg 2017

The study of soils in urban environments and industrial and mining liabilities is a relatively young but rapidly advancing subdiscipline of Soil Science. In 1990, less than 20 scientific papers dealing with these topics were published, while in 2015, this number increased to more than 500 (Siebe et al. 2017). This increasing interest results from the fact that more than half of the world's population currently lives in the cities, and the prospects for the next 30 years indicate that this figure will reach 75% by the year 2050 (United Nations 2014). Also, the effect of industrial, traffic and mining activities on soil degradation deserves to be recognized worldwide. Stakeholders within cities lack essential knowledge about soil distribution patterns and soil processes in cities. A

wide range of soil attributes needs to be considered before decisions are made on the use and management of urban soils to achieve city sustainability. Ecosystem services provided by urban soils need to be acknowledged, as their capacity to render edible products in allotments, the regulation of surface runoff, the disposal of organic and inorganic waste materials, microclimate regulation in green areas including green walls and roofs or the immobilization of pollutants.

The world's soil research interest on urban soils is thus increasing, as are the participants of the interdisciplinary soil science congress on Soils in Urban, Industrial, Traffic, Mining and Military Areas (SUITMA), which is organized every 2 years in a different city around the planet (Burghardt et al. 2017). The SUITMA working group of the International Union of Soil Science (IUSS) was established in 1998 during the World Congress of Soil Science in Montpellier and aims to foster interdisciplinary research specifically among soil scientists, not only at urban sites but also in mining and military areas and former industrial sites (environmental liabilities) and soils affected by traffic. Eight international meetings have been organized until now including those in Germany 2000, France 2003, Egypt 2005, China 2007, USA 2009, Morocco 2011, Poland 2012 and, lately, in Mexico from September 20 to 25, 2015 at the National Autonomous University of Mexico (UNAM).

✉ Christina Siebe
siebe@unam.mx

¹ Departamento de Edafología, Universidad Nacional Autónoma de México, Instituto de Geología, Ciudad Universitaria, 04510 Mexico City, Mexico

² Natural Resources Conservation Service, Soil Survey Division, U.S. Department of Agriculture, 5601 Sunnyside Ave, Beltsville, MD 20705, USA

³ University of Lorraine, Laboratoire Sols et Environnement, 2, avenue de la Forêt de Haye, 54518 Vandoeuvre-lès-Nancy, France



There were 112 registered participants attending the meeting in Mexico, coming from 18 different nations. During 3 conference days, the following 10 sessions with a total of 49 oral and 74 poster presentations took place:

- 1) Considering soil ecological functions in urban planning and management
- 2) Urban soils and human health
- 3) Restoration and reclamation of environmental liabilities
- 4) Soil forming processes in Technosols
- 5) Soil and city biodiversity
- 6) Soils: Archives of settlement history
- 7) Education strategies to promote awareness on urban soil functions
- 8) Food production in urban and peri-urban areas
- 9) Soil conservation and habilitation to improve water management in urban areas
- 10) Geological hazards in urban and peri-urban areas

This special issue of the *Journal of Soils and Sediments* contains selected contributions of the SUTMA 8 meeting. Among them are two papers related to ecosystem restoration of soils in coastal areas with either gypsum amendments to counteract large sodium saturation (Kim et al. 2017) or analyzing heavy metal behavior in tidal systems of the Florida Everglades (Dhaliwal et al. 2017). Another two contributions deal with the challenge of performing soil surveys in urban

environments: one emphasizing the need of building a partnership with the urban community (Shaw et al. 2017) and the other comparing the soil distribution patterns of two middle-sized cities in Poland (Hulisz et al. 2017). Le Guern et al. (2017) propose a typology of excavated sediments used for made grounds in urban redevelopment. The capacity to provide ecosystem services of remediated soils polluted with heavy metals in China is evaluated by Ding et al. (2017). Several contributions deal with characterizing properties of urban allotments, green roofs or other urban greening areas, providing base line and abnormal ranges of trace elements and evaluating portable X-ray fluorescence equipment for surveillance (Béchet et al. 2017), calculating stocks of nutrients and pollutants (Burghardt and Schneider 2016), studying the change of physical and chemical properties of green roofs made out of waste materials over a 4-year period (Bouzouidja et al. 2017) and studying the effects of atmospheric deposition on heavy metal contents in vegetables grown in cities (Engel Di-Mauro 2017). The long-term operation of storm-water bioretention systems emphasizing their capacity to accumulate heavy metals is further studied by Kluge et al. (2017). The use of waste materials as an alternative to the consumption of natural resources in urban greening areas is presented in the paper by Yilmaz et al. (2017) or specifically to enhance soil physical properties is shown in the contribution of Vidal-Beaudet et al. (2017). Soils of peri-urban areas also are studied in three contributions, namely the one by Hernández-Martínez

et al. (2017) describing nitrogen dynamics in soils irrigated with untreated sewage effluents of Mexico City for more than a century, one by Wessolek et al. (2017) showing the reclamation of former wastewater disposal fields of Berlin and one depicting subsoil constraints in urban and peri-urban regions of the small city of Mahikeng in South Africa (Materechera 2017).

References

- Béchet B, Joimel S, Jean-Soro L, Hursthouse A, Agboola A, Leitão TE, Costa H, do Rosário Cameira M, Le Guern C, Schwartz C, Lebeau T (2017) Spatial variability of trace elements in allotment gardens of four European cities: assessments at city, garden, and plot scale. *J Soils Sediments*. doi:10.1007/s11368-016-1515-1 (this issue)
- Bouzouidja R, Rousseau G, Galzin V, Claverie R, Lacroix D, Séré G (2017) Green roof ageing or Isolatic Technosol's pedogenesis? *J Soils Sediments*. doi:10.1007/s11368-016-1513-3 (this issue)
- Burghardt W, Schneider T (2016) Bulk density and content, density and stock of carbon, nitrogen and heavy metals in vegetable patches and lawns of allotments gardens in the northwestern Ruhr area, Germany. *J Soils Sediments*. doi:10.1007/s11368-016-1553-8 (this issue)
- Burghardt W, Morel JL, Tahoum SA, Zhang GL, Shaw RK, Boularbah A, Charsynski P, Siebe C, Kim K-H J (2017) Activities of SUITMA: from origin to future. In: Levin MJ, Kim K-HJ, Morel JL, Burghardt W, Charzynski P, Shaw RK (eds) IUSS Working Group SUITMA. 2017: soils within cities—global approaches to their sustainable management—composition, properties, and functions of soils of the urban environment. *GeoEcology essay-Catena Soil Sciences*, Schweizerbart, Stuttgart
- Dhaliwal SS, Toor GS, Rodriguez-Jorquera IA, Osborne TZ, Newman S (2017) Trace metals in the soils of Water Conservation Area of Florida Everglades: considerations for ecosystem restoration. *J Soils Sediments*. doi:10.1007/s11368-016-1459-5 (this issue)
- Engel Di-Mauro S (2017) An exploratory study of potential As and Pb contamination by atmospheric deposition in two urban vegetable gardens in Rome, Italy. *J Soils Sediments*. doi:10.1007/s11368-016-1445-y (this issue)
- Ding K, Wu Q, Wei H, Yang W, Séré G, Wang S, Echevarria G, Tang Y, Tao J, Morel JL, Qiu R (2017) Ecosystem services provided by heavy metal-contaminated soils in China. *J Soils Sediments*. doi:10.1007/s11368-016-1547-6 (this issue)
- Hernández-Martínez JL, Prado B, Cayetano-Salazar M, Bischoff W-A, Siebe C (2017) Ammonium-nitrate dynamics in the critical zone during single irrigation events with untreated sewage effluents. *J Soils Sediments*. doi:10.1007/s11368-016-1506-2 (this issue)
- Hulisz P, Charzyński P, Greinert A (2017) Urban soil resources of medium-sized cities in Poland: a comparative case study of Toruń and Zielona Góra. *J Soils Sediments*. doi:10.1007/s11368-016-1596-x (this issue)
- Kim HS, Kim K-R, Lee S-H, Kunhikrishnan A, Kim W-I, Kim K-H (2017) Effect of gypsum on exchangeable sodium percentage and electrical conductivity in the Daeho reclaimed tidal land soil in Korea—a field scale study. *J Soils Sediments*. doi:10.1007/s11368-016-1446-x (this issue)
- Kluge B, Markert A, Facklam M, Sommer H, Kaiser M, Pallasch M, Wessolek G (2017) Metal accumulation and hydraulic performance of bioretention systems after long-term operation. *J Soils Sediments*. doi:10.1007/s11368-016-1533-z (this issue)
- Le Guern C, Baudouin V, Sauvaget B, Delayre M, Conil P (2017) A typology of anthropogenic deposits as a tool for modeling urban subsoil geochemistry: example of the Ile de Nantes (France). *J Soils and Sediments*. doi:10.1007/s11368-016-1594-z (this issue)
- Materechera SA (2017) Soil properties and subsoil constraints of urban and peri-urban agriculture within Mahikeng City in the North West Province (South Africa). *J Soils Sediments*. doi:10.1007/s11368-016-1569-0 (this issue)
- Shaw RK, Hernandez L, Levin M, Muñoz E (2017) Promoting soil science in the urban environment—partnerships in New York City, NY, USA. *J Soils Sediments*. doi:10.1007/s11368-016-1456-8 (this issue)
- Siebe C, Cram S, Mora-Palomino L (2017) Enhancing awareness about the importance of urban soils. In: Lal R, Stewart BA (eds) *Urban soils*. Taylor and Francis Group, Boca Raton 416 p
- Vidal-Beaudet L, Rokia S, Nehls T, Schwartz C (2017) Aggregation and availability of phosphorus in a Technosol constructed from urban wastes. *J Soils Sediments*. doi:10.1007/s11368-016-1469-3 (this issue)
- Wessolek G, Kluge B, Trinks S, Facklam M, Zeuschner O (2017) From a stinking wastewater disposal field toward a recreation area—the story of an unconventional soil remediation in Berlin, Germany. *J Soils Sediments*. doi:10.1007/s11368-016-1609-9 (this issue)
- United Nations (2014) *World urbanization prospects: the 2014 revision, highlights (ST/ESA/SER.A/352)*. New York
- Yilmaz D, Cannavo P, Séré G, Vidal-Beaudet L, Legret M, Damas O, Peyneau P-E (2017) Physical properties of structural soils containing waste materials to achieve urban greening. *J Soils Sediments*. doi:10.1007/s11368-016-1524-0 (this issue)