SUITMA

(soils of urban, industrial, traffic, mining and military areas)

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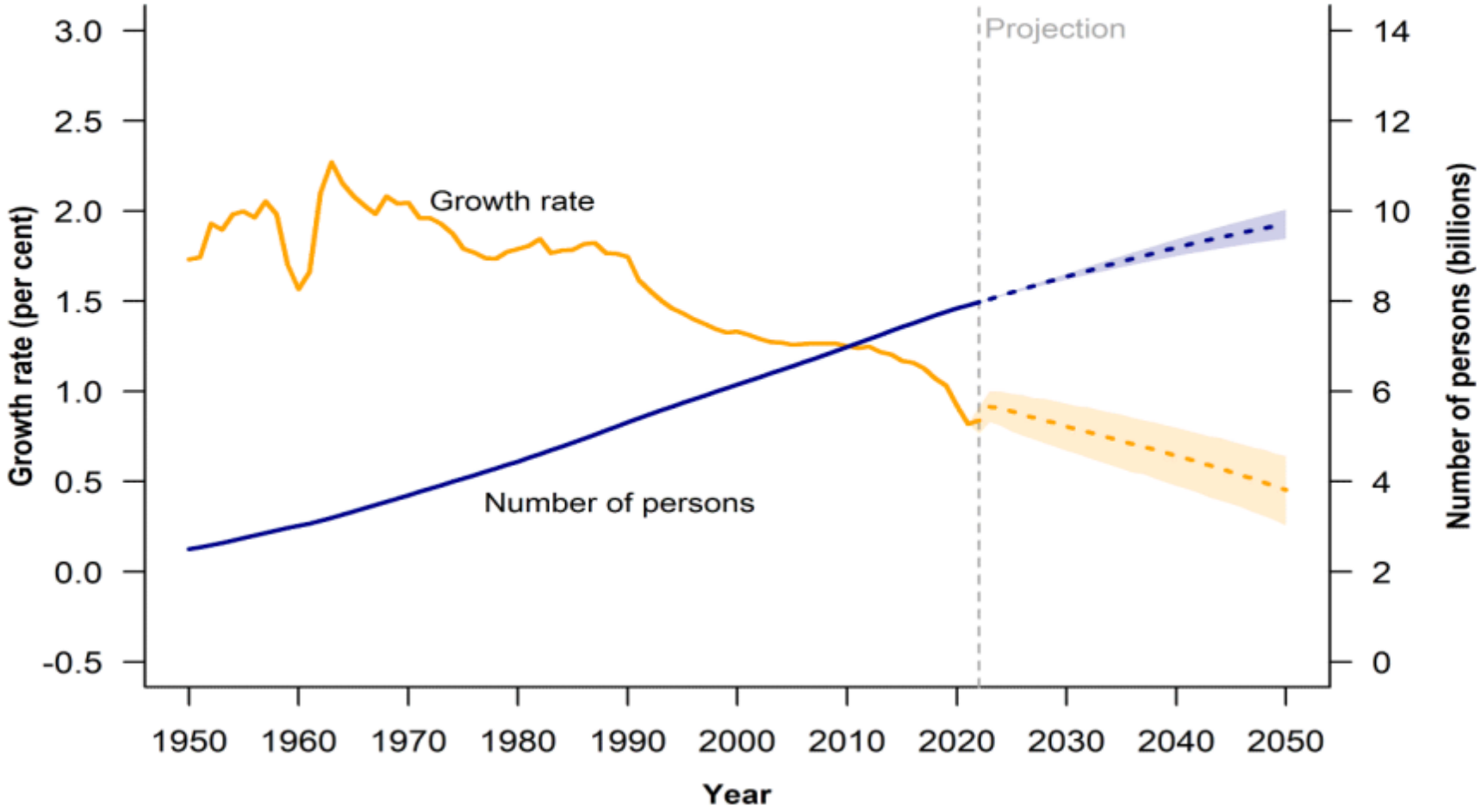
Population change

Global population size and annual growth rate: estimates, 1950-2022, and medium scenario with 95 per cent prediction intervals, 2022-2050



<World Population Prospects-UN, 2022>

Urbanization rate (%)

Table. Percentage urban by geographic region during 1950-2050.

	Percentage urban					
Geographic region	*1950*	*1970*	*1990*	*2018*	*2030*	*2050*
World	29.6	36.6	43.0	55.3	60.4	68.4
Africa	14.3	22.6	31.5	42.5	48.4	58.9
Asia	17.5	23.7	32.3	49.9	56.7	66.2
Europe	51.7	63.1	69.9	74.5	77.5	83.7
Latin America and the Caribbean	41.3	57.3	70.7	80.7	83.6	87.8
Northern America	63.9	73.8	75.4	82.2	84.7	89.0
Oceania	62.5	70.2	70.3	68.2	68.9	72.1

<World Urbanization Prospects-UN, 2018>

Challenges for urban environment

- ✓ Urban population increase
- ✓ Competition for land between agriculture and urbanization
- ✓ Climate change
- ✓ Biodiversity deterioration
- ✓ Human health and social stability

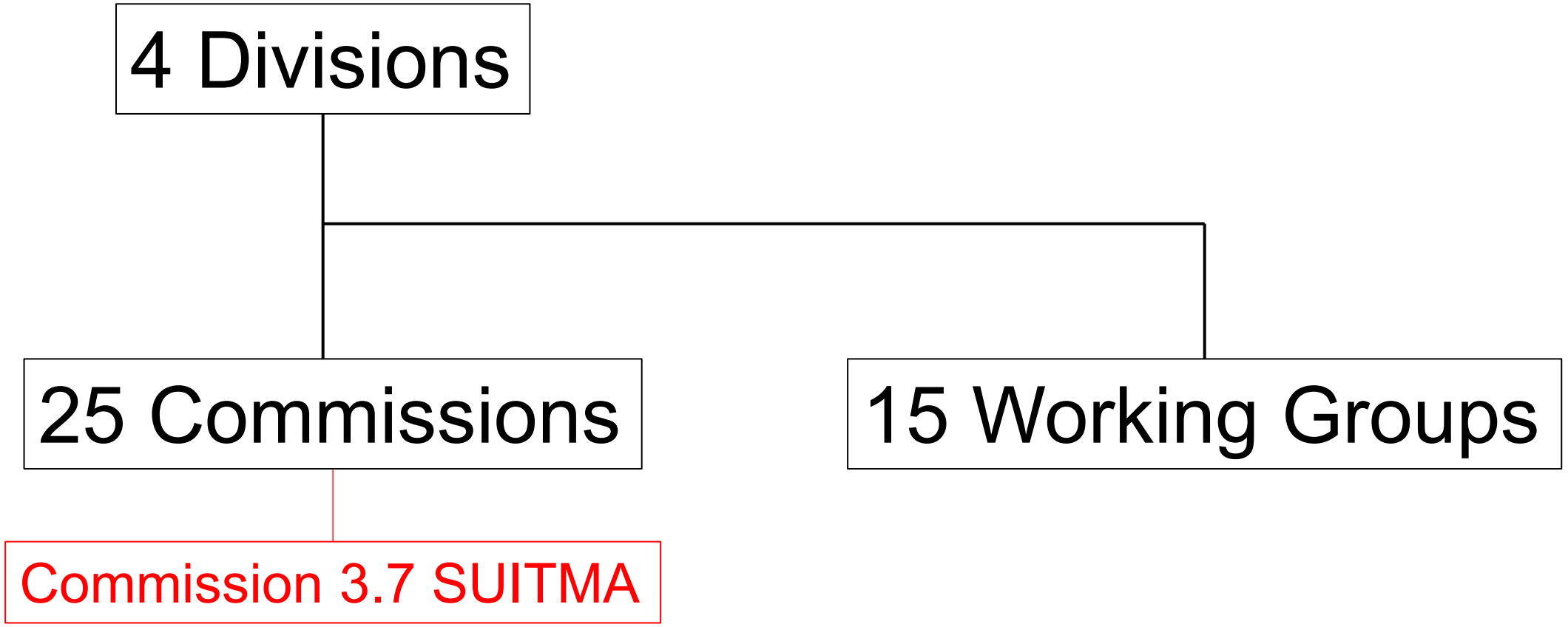
Urban population increase

Severe flooding in Manhattan, New York

Urban land slide, Busan, Korea

Graveyard living of Manila, Philippines

IUSS


4 Divisions
25 Commissions
15 Working Groups
Commission 3.7 SUITMA

History of urban soil science

- ✓ **Effects of toxic wastes on soil fertility**

<Ferdinand Senft (1847) (Cited in Lehmann and Star, 2007)>

- ✓ **The 1st attempt for urban soil survey and establishment of urban soil mapping**

<Muekenhausen and Mueller, 1951>

- ✓ **Soil formation processes on the waste heaps of the coal industry**

<Skawina, 1958>

- ✓ **Report of early description of the chemical and physical properties of soils of Moscow**

<Zemlyanitsky, 1963>

- ✓ **Soil survey of Washington, D.C. in the early 1970s**

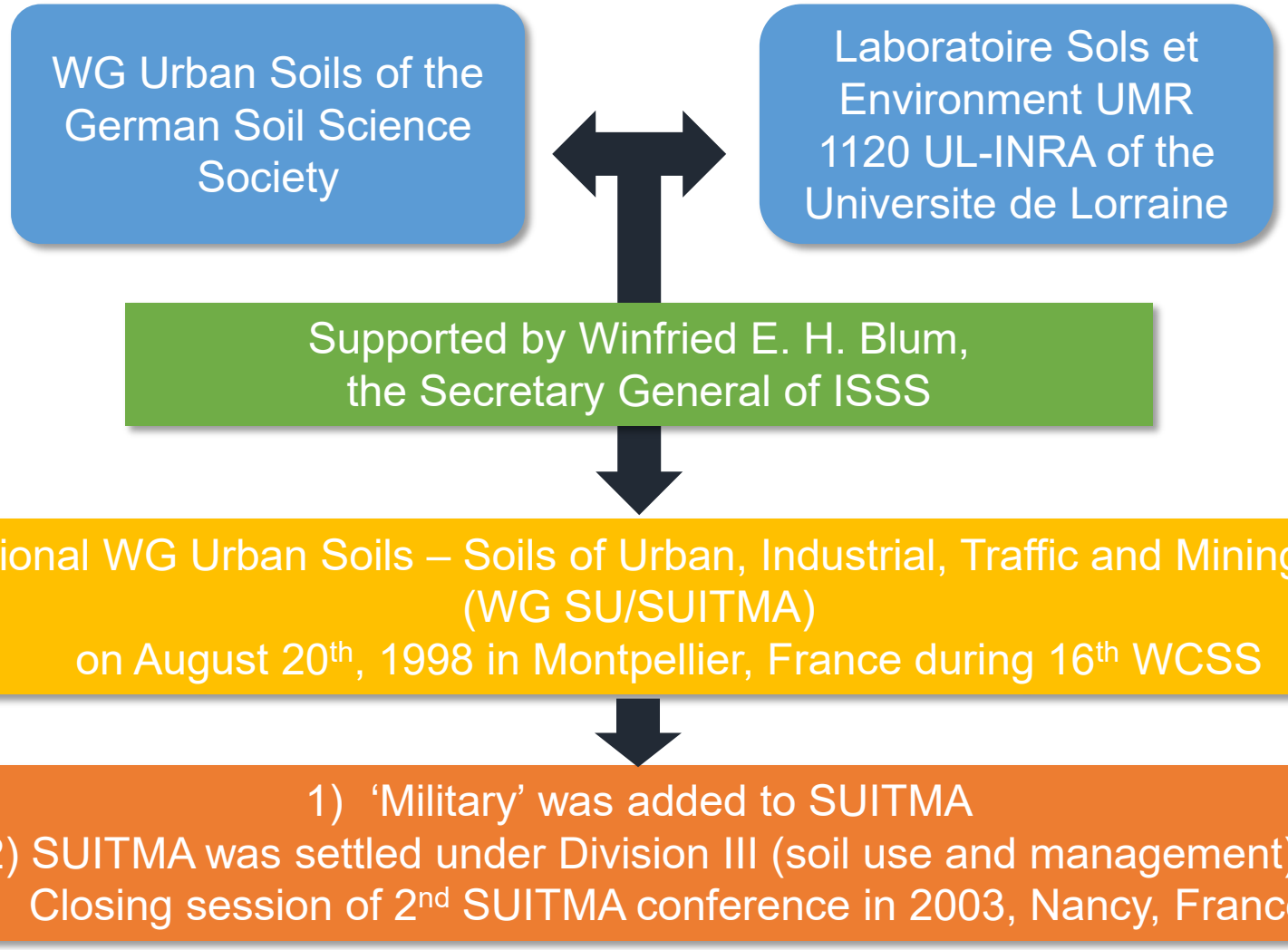
<Smith, 1976>

- ✓ **International symposium on urban soils in Berlin in 1981: a successful first attempt to bring together urban soil scientists**

<Blume and Schlichting, 1982>

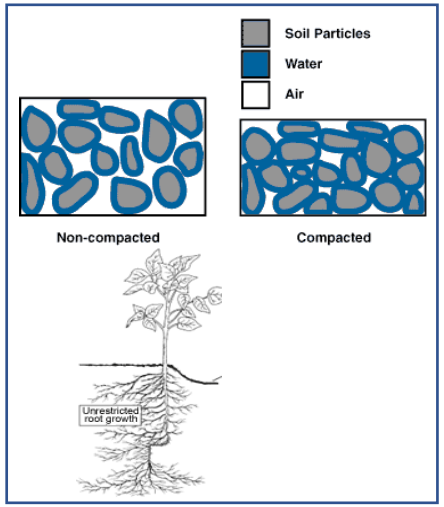
After pioneering and hard work with urban soils in Germany, France, Poland, USA and other countries

Birth of SUITMA



General features of SUITMA

- **Mainly composed of coarse materials**
  - natural and anthropogenic materials (*e.g.* concrete, asphalt)
  - coarse elements may contain high concentration of pollutants (reverse of agricultural soils)
- **High organic carbon content**
  - waste disposal and combustion residues
  - soils used for horticulture
  - in subsoil as a result of incorporation of top soil material
- **High pH**
  - presence of carbonatized materials
- **High bulk density**
  - mechanical compaction of topsoil and subsoil
- **Presence of contaminants**
  - organic (e.g. hydrocarbons),
  - inorganic (e.g. heavy metals)
- **Often sealed soils**

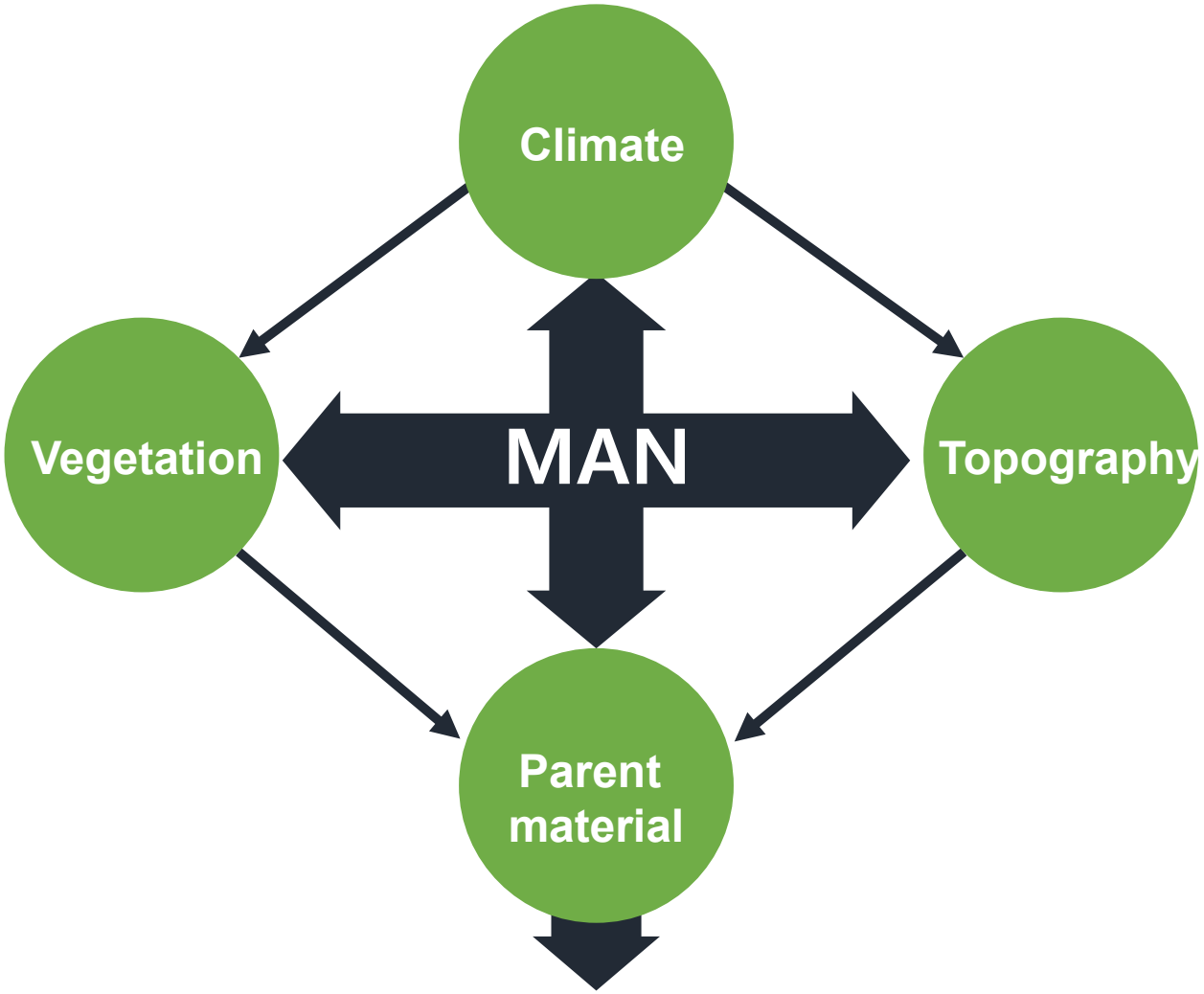


Technosol developed on combustion residues New York City

Technosol Karlsruhe

<From Prof. Morel>

Soil forming factors of SUITMA



“SUITMA”

Man is the dominant soil-forming factor of SUITMA

<From Prof. Morel>

Groups of SUITMA according to their potential as life-support systems

Vegetated pseudo-natural SUITMA

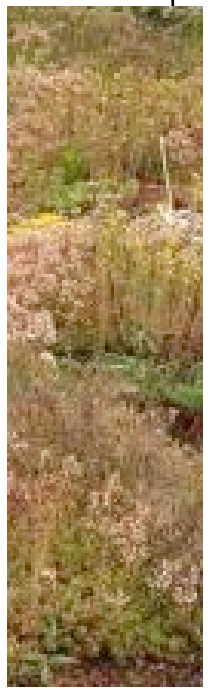
Luvisol urban forest

Cambisol urban agriculture

Vegetated engineered SUITMA

Anthrosol horticulture

Constructed Technosol



Technosol Green roof

Dumping sites SUITMA

Technosol Brownfield

Technosol Decantation pond

Bare SUITMA

Paved Technosol

Sealed Technosol

Decreasing potential

<From Prof. Morel>

Activities of SUITMA

- ✓ Symposia
- ✓ Conferences
- ✓ Publications

Symposia (during WCSS)

	Year	City, Country	Theme
1	1998	Montpellier, France	Urban and suburban soils: nature, management and risks for human health
2	2002	Bangkok, Thailand	Improving knowledge about soils and their functions in urban, industrial and mining areas for better life
3	2006	Philadelphia, USA	Soils in Urban Ecosystems: Characteristics and Functioning
4	2010	Brisbane, Australia	Pedogenesis and functioning of soils in urban and industrial areas
5	2014	Jeju, Korea	Urban soils – properties, functions and evolution
6	2018	Rio, Brazil	Urban Soils - Soils of Urban, Industrial, Traffic, Mining and Military Areas
7	2022	Glasgow, UK	SUITMA
8	2024	Firenze, Italy	SUITMA - Urban Soils and Land Planning

Conferences

	Year	Venue	Participants	Countries	Oral presentations	Poster presentations
1	2000	Essen, Germany	161	37	99	115
2	2003	Nancy, France	130	20	37	69
3	2005	Cairo, Egypt	194	21	47	70
4	2007	Nanjing, China	120	19	43	85
5	2009	New York City, USA	125	16	37	36
6	2011	Marrakech, Morocco	>100	19	45	48
7	2013	Toruń, Poland	>110	24	47	74
8	2015	Mexico City, Mexico	112	18	49	74
9	2017	Moscow, Russia	204	21	100	143
10	2019	Seoul, Korea	165	20	68	90
11	2022	Berlin, Germany	Public online + field trip	20	45	37
12	2023	Santiago de Compostela, Spain	85	22	42	45
13	**2025**	**Pisa, Italy**	**111**	**25**	**58**	**54**

Book

Soils within Cities

Global approaches to their sustainable management

- composition, properties, and functions of soils of the urban environment

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Przemyslaw Charzynski; Richard K. Shaw

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Thanks for your attention