POLYCYCLIC AROMATIC HYDROCARBONS IN THE SURFACE SOILS OF ST. PETERSBURG

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Supplementary materials 1. Soil guideline values for PAHs established in some countries, mg·kg^{-1}

	Acenaphthene	Acenaphthylene	Anthracene	Benz(a) anthracene	Benzo(a)pyrene	Benzo(b) Fluoranthene	Benzo(ghi) perylene	Chrysene	Dibenz(ah) anthracene	Fluoranthene	Fluorene	Indeno(123-cd) pyrene	Naphthalene	Phenanthrene	Pyrene	PAH (total)
CCME	**Residential / Parkland**															
				1	0.7	1			1			1	0.6	5	10	
	Industrial / Commercial															
				10	0.7	10			10			10	22	50	100	
	Agricultural															
				0.1	0.1	0.1			0.1			0.1	0.1	0.1	0.1	
US EPA	**Residential** (combined exposure)															
	3,700		22,000	0.62	0.062	0.62		62	0.062	2,300	2,700	0.62	56		2,300	
	Industrial (combined exposure)															
	29,000		240,000	2.1	0.21	2.1		211	0.21	22,000	26,000	2.1	190		29,000	
NZMfE	**Residential** (calculated mean values for all soil types at 0-1 m depth)															
				0.27	0.27	0.27		0.27	0.27			0.27	64		1600[a]	
	Industrial / Commercial (calculated mean values for all soil types at 0-1 m depth)															
				11[a]	11[a]	11[a]		11[a]	11[a]			11[a]	143[a]			
	Agricultural (calculated mean values for all soil types at 0-1 m depth)															
				0.027	0.027	0.027		0.027	0.027			0.027	7.2		160[a]	
DME	**Soil Quality Criteria (Human Health Risk)**															
					0.1				0.1							1.5
	Soil Quality Criteria (Ecological Risk)															
					0.1											1
NL	**Maximum Permissible Concentrations (MPCs) for PAHs** (from **Kalf et al., 1997**)															
			0.12	0.25	0.26		7.5	10.7		2.6		5.9	0.14	0.51		
FME	**Threshold value**															
	1			1	0.2	1				1			1	1		15
	Lower guideline value															
	5 (e)			5 (e)	2 (t)	5 (e)				5 (e)			5 (e)	5 (e)		30 (e)
	Higher guideline value															
	15 (e)			15 (e)	15 (e)	15 (e)				15 (e)			15 (e)	15 (e)		100 (e)
GFME	**Precautionary soil threshold values of organic pollutants** / Soil organic matter (SOM) > 8 % **(BBodSchV, 1999)**															
					1											10
	Precautionary soil threshold values of organic pollutants / Soil organic matter (SOM) ≤ 8 %															
					0.3											3
RF	**Maximum Permissible Concentrations (MPCs)**															
					0.02											

CCME – Canadian Council of Ministers of the Environment; **US EPA** – United States Environmental Protection Agency; **NZMfE** – Ministry for the Environment of New Zealand; **DME** – Danish Ministry of the Environment; **NL** – Netherlands Ministry of Infrastructure and Environment; **FME** – Finnish Ministry of the Environment; **GFME** – German Federal Ministry for the Environment; **RF** – Ministry of Natural Resources and Environment of the Russian Federation.

[a] – marked values are likely correspond to concentrations associated with formation of a residual separate phase.

(e) – calculations are based on ecological risk.

(t) – calculations are based on health risk.

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Supplementary materials 2.PAH molecular markers and ratios end member values

Molecular ratio	Value range	PAH origin	Reference
ANT/(ANT+PHE)	<0.10	Petroleum/petrogenic source	Yunker et al.
	>0.10	Combustion	(2002)
FLT/(FLT+PYR)	<0.40	Petroleum/petrogenic source	Yunker et al.
	0.40-0.50	Gasoline, diesel and crude oil combustion, cars and diesel trucks	(2002)
	>0.50	Grass, coal and wood combustion	
BaA/(BaA+CHR)	<0.20	Petroleum/petrogenic source	Yunker et al.
	0.20-0.35	Petroleum/petrogenic source or combustion	(2002)
	0.35-0.50	Combustion	
	>0.50	Grass, coal and wood combustion	
IPY/(IPY+BPE)	<0.20	Petroleum/petrogenic source	Yunker et al.
	0.20-0.50	Liquid fossil fuel (vehicle and crude oil) combustion	(2002)
	>0.50	Grass, wood and coal combustion	
BaP/BPE	<0.60	Non-traffic sources	Pandey et al.
	>0.60	Traffic sources	(1999)
CombPAH[a]/	<0.30	Petroleum/petrogenic source	Hwang et al.
∑PAH	0.30-0.70	Petroleum/petrogenic source or combustion	(2003)
	>0.70	Combustion dominated source	

[a]CombPAH – combustion PAH = sum of FLT, PYR, BaA, CHR, BbF, BkF, BaP, IPY and BPE