Results and Conclusions from the 3rd Interlaboratory Assessment and Status of the 4th Interlaboratory Assessment

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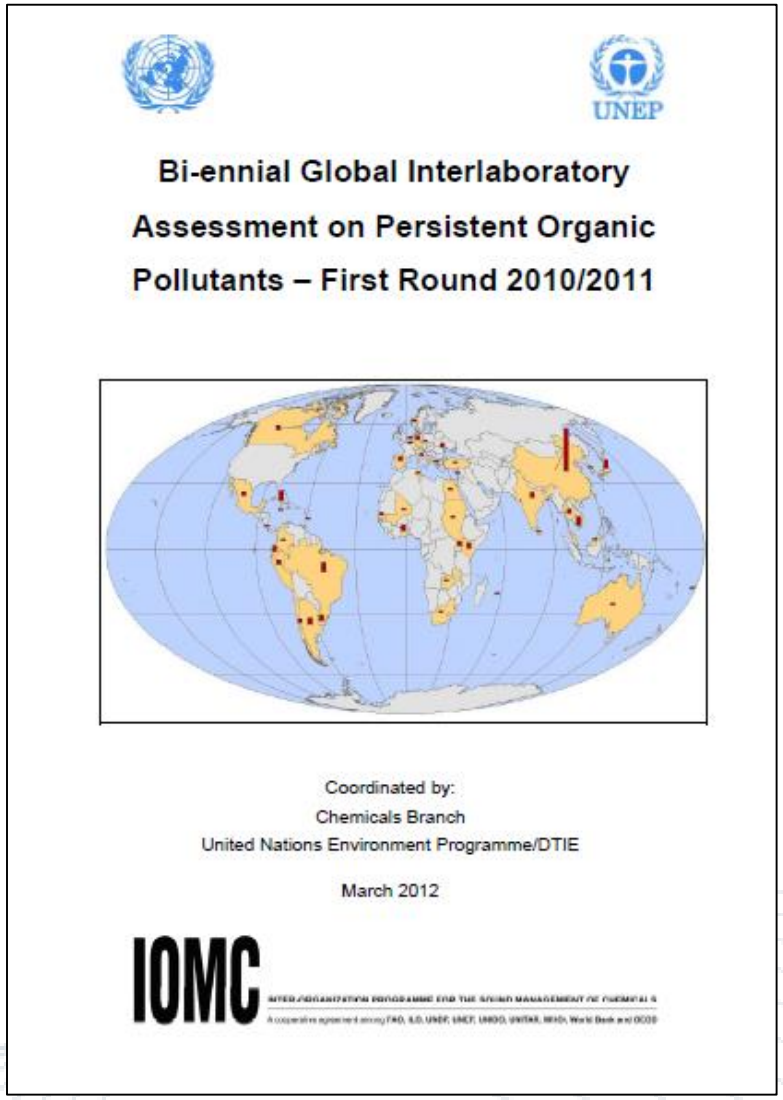
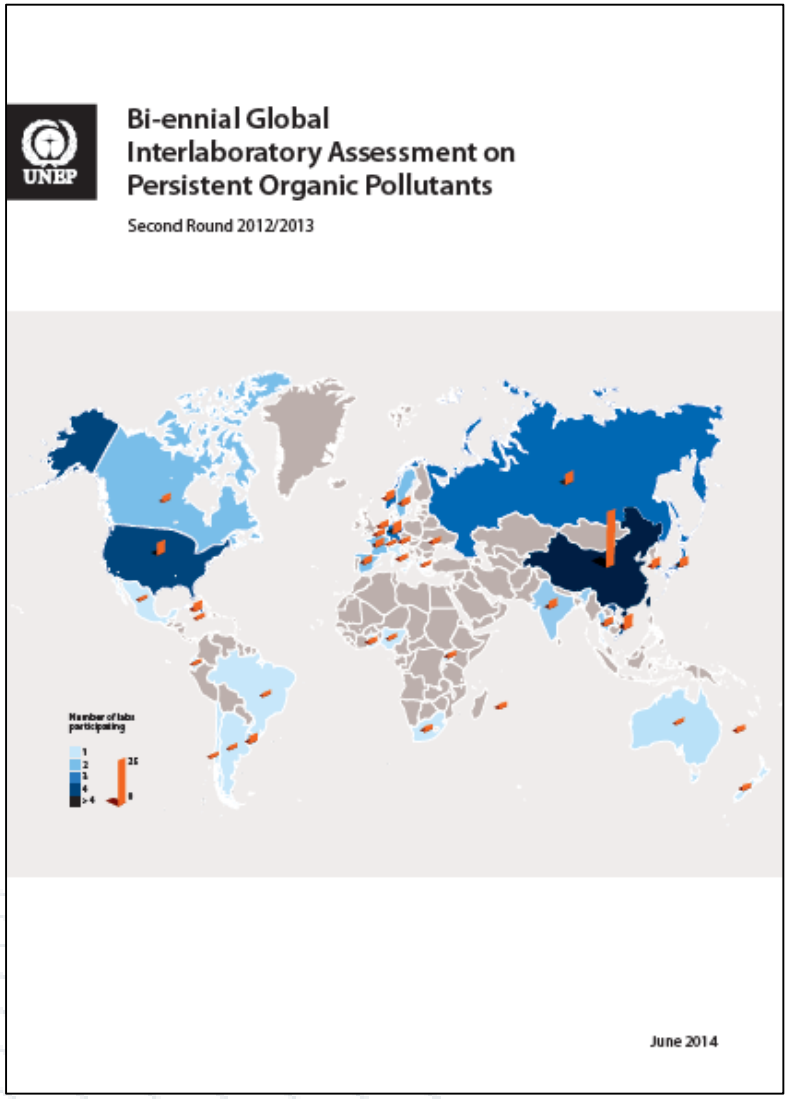
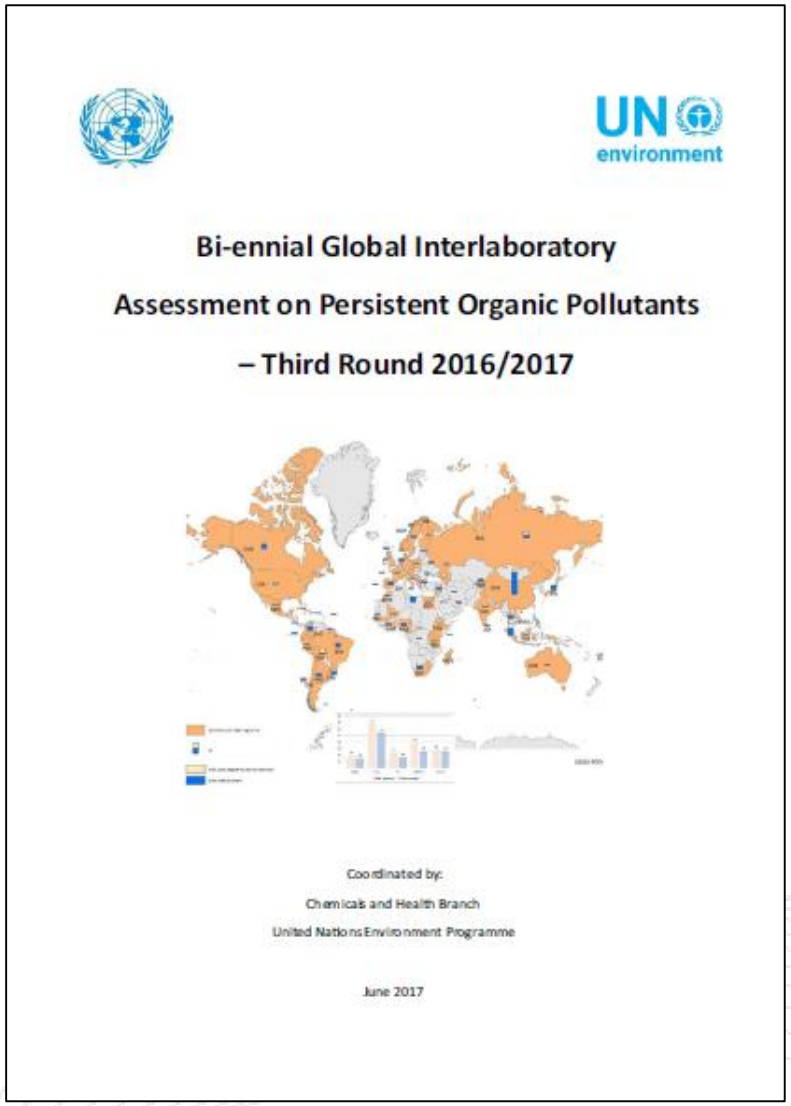
Content

1. Overview on results from 3rd interlaboratory assessment
   - Organizational, financial
   - Dioxin-like POPs and PFOS
   - ”Ranking”
2. Outlook and actions on 4th Interlaboratory assessment
   - Registration
   - Reflections and possible actions

Three rounds of POPs interlaboratory assessments







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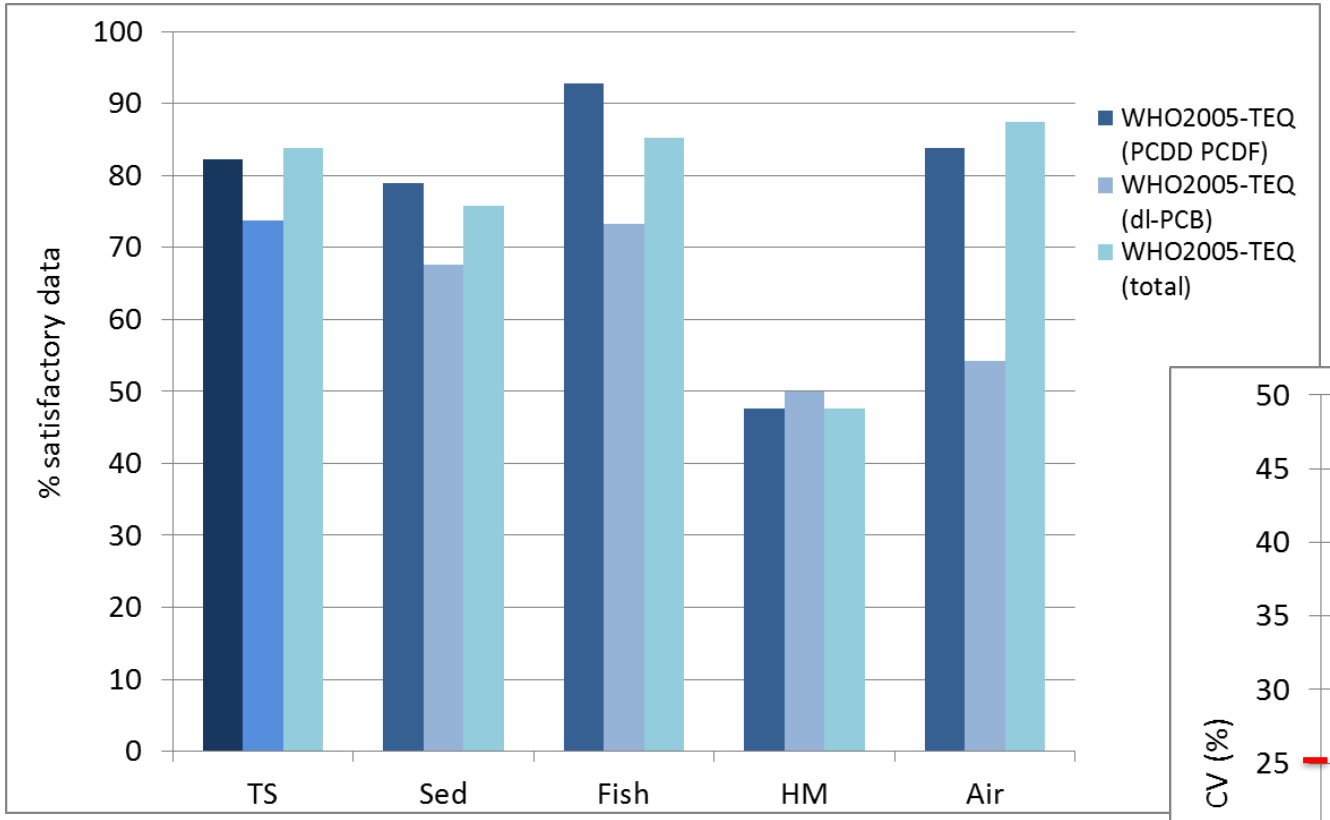
3rd round of interlaboratory assessments

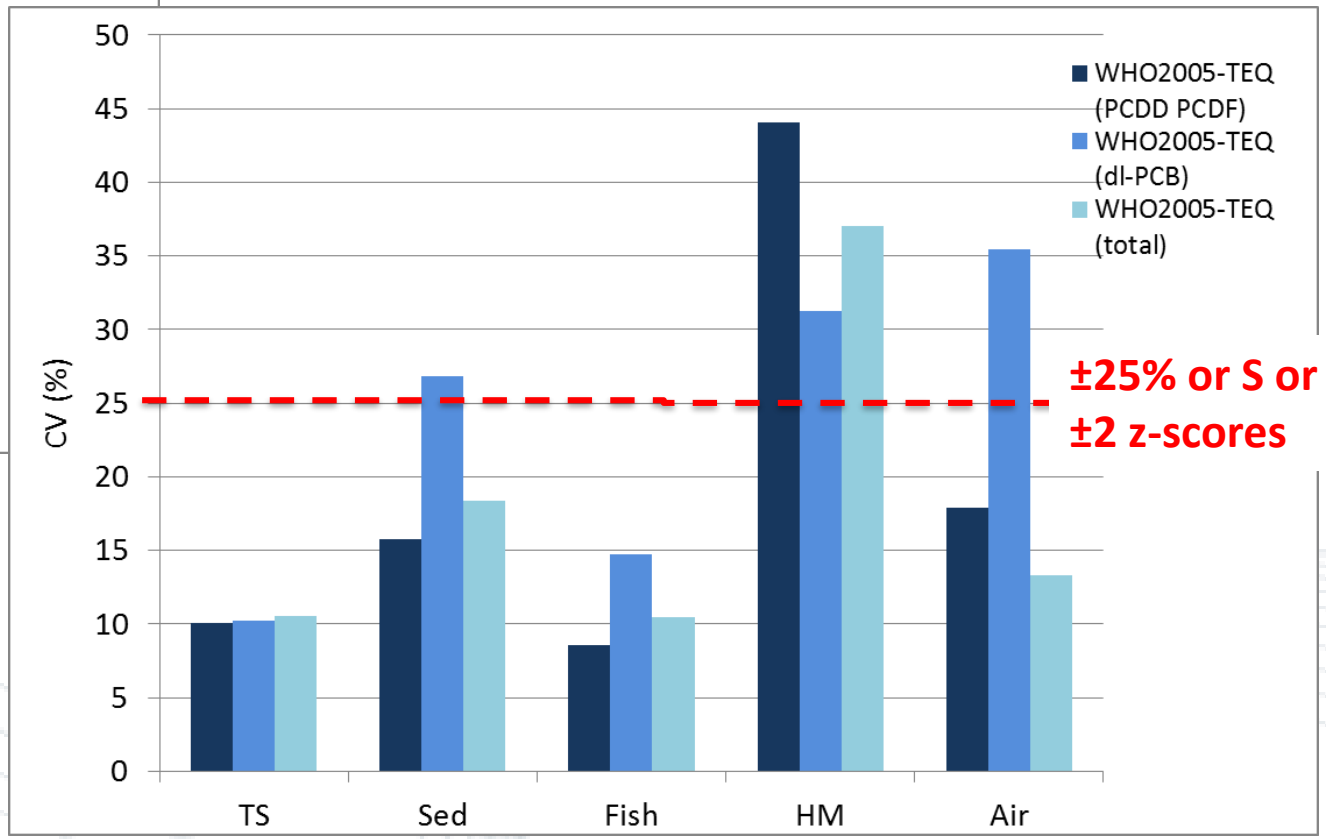
Region	# Labs registered	# Labs samples received	# Labs not reporting results	# Labs results submitted	% Labs with results
Africa	19	18	5	14	74%
Asia	**67**	**61**	**14**	**53**	**78%**
CEE	23	22	7	16	70%
GRULAC	39	34	14	25	64%
WEOG	27	27	2	25	93%
Grand Total	**175**	**162**	**42**	**133**	**75%**

CEE = Central and Eastern Europe; GRULAC = Latin America and Caribbean
WEOG = Western Europe and other groups (USA, Canada, Australia, New Zealand)

Summary performance for dl-POPs (TEQ, LB)



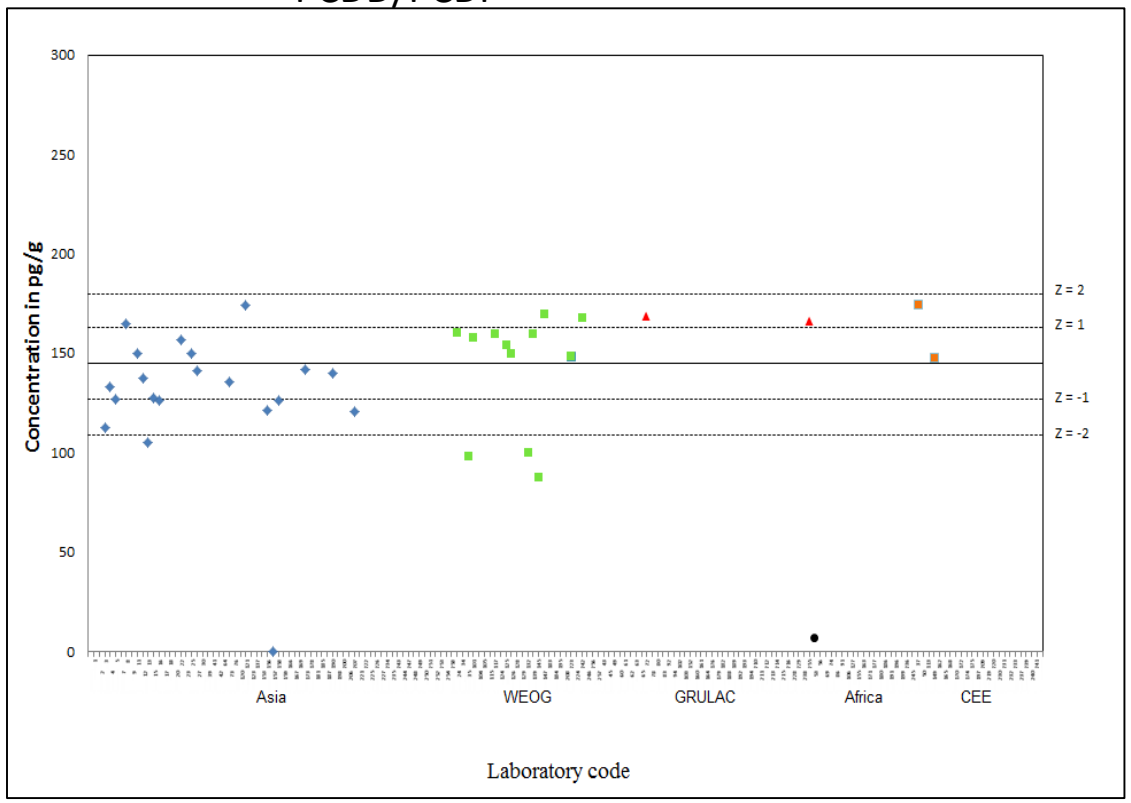
Maximum of 59 labs



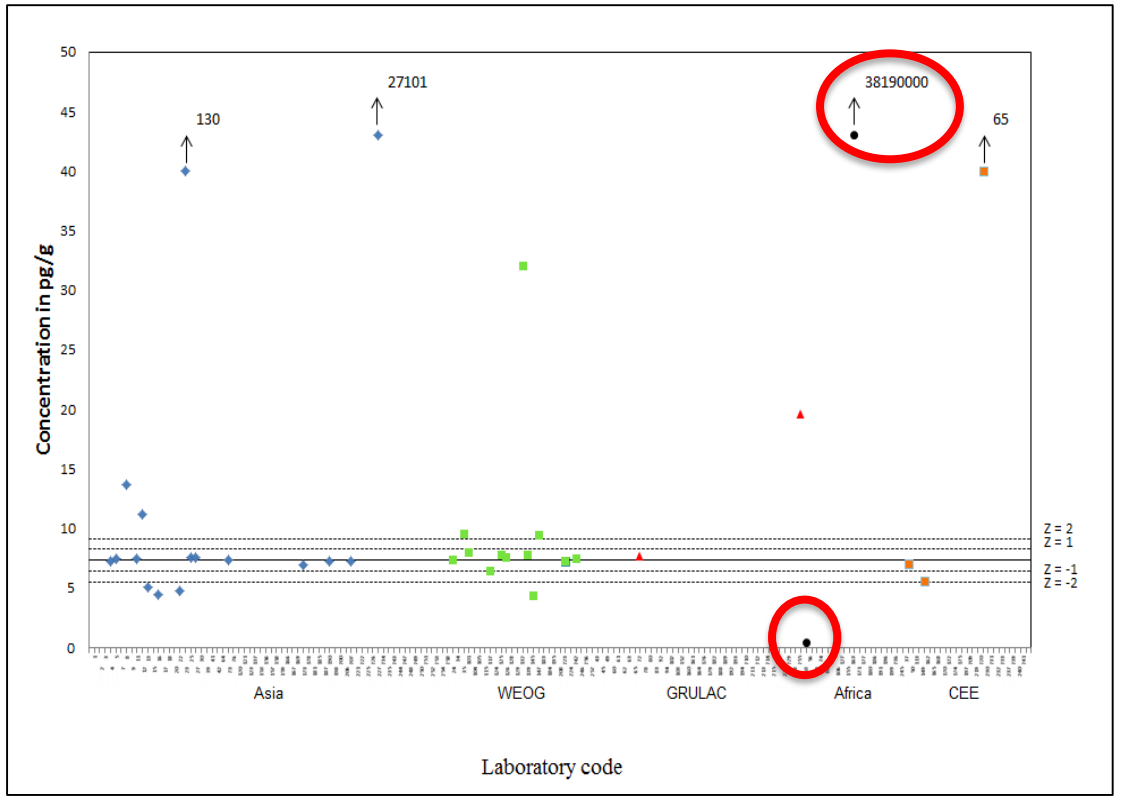
Except for the human milk sample, the performance of laboratories for PCDD/PCDF was better than for dl-PCB

Results of dl-POPs in air extract

$TEQ_{PCDD/PCDF}$ (38 labs)



TEQ_{PCB} (38 labs)



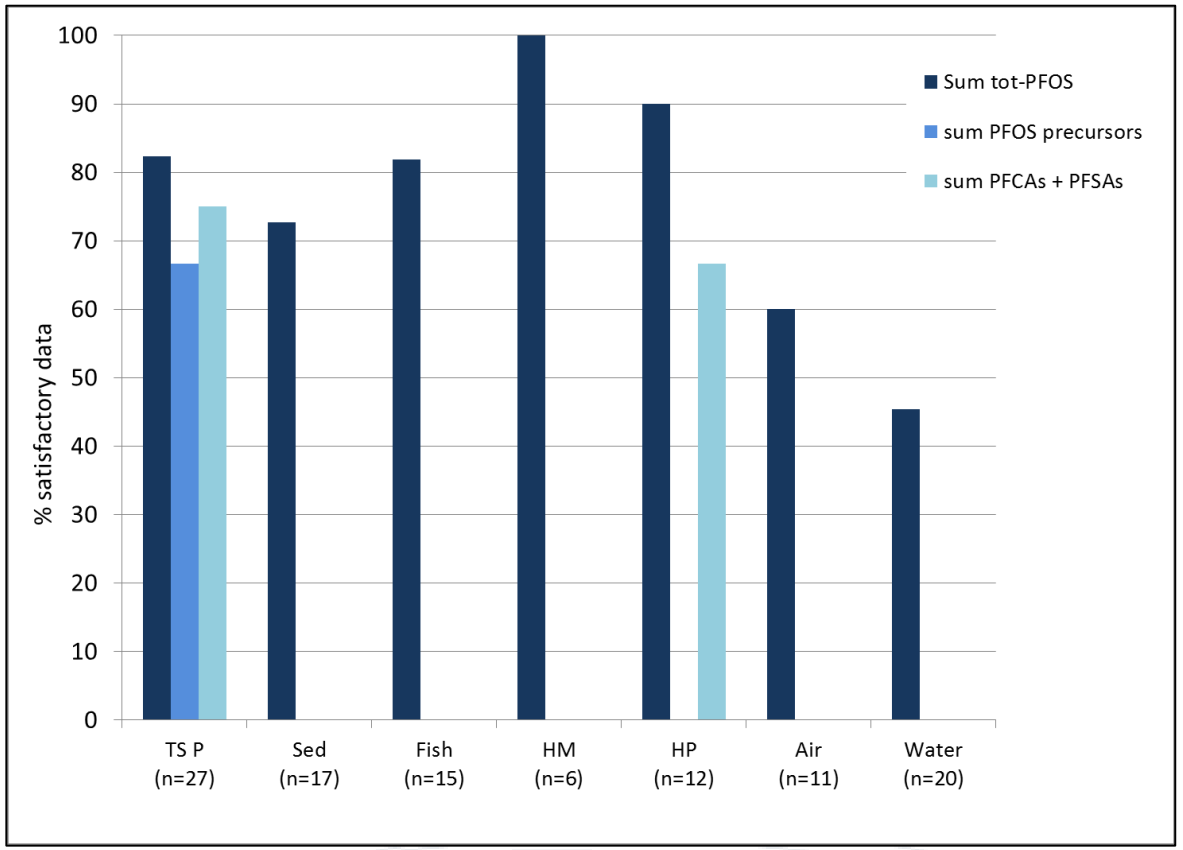
Laboratory code on the x-axis, concentration in pg/g on the y-axis.
The assigned value given by straight line, z = ± 1 (12.5%) and z = ± 2 (25%) are given by the dotted lines.
Blue ♦ symbols represent Asia, green ■ WEOG, red ▲ GRULAC, black ● Africa, orange ■ CEE.

dl-POPs instrumentation and results

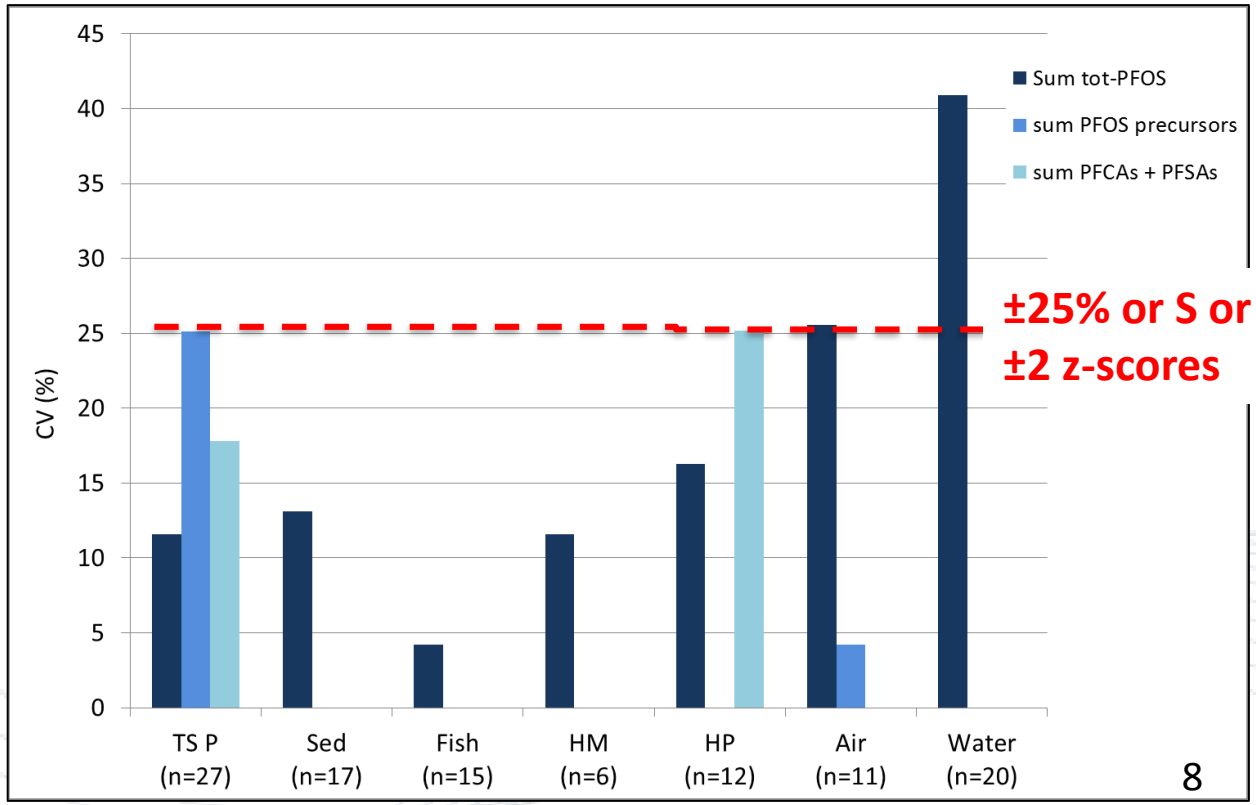
Instrument	# S-dl-POPs	# Q-dl-POPs	# U-dl-POPs	Subtotal	% S of all S
HRMS	3,406	451	612	**4,469**	**84%**
LRMS	322	58	285	**665**	**8%**
ECD	**12**	**3**	**90**	**105**	**0.3%**
NR	300	24	142	**466**	**7%**
GrandTotal	**4,040**	**536**	**1,129**	**5,705**	**100%**

- The majority of the labs used **HRGC/HRMS** (magnetic sector-field instruments) for dl-POPs;
- This combination seems to generate the best results;
- **ECD** detection is not capable to analyze dl-POPs; **not appropriate for dl-PCB**; (two labs from Africa and one from CEE)
- Most laboratories used 60 m long GC columns; some used 30 m long columns;
- Two columns of different polarity hardly used (← EPA methods);
- No laboratory used GCxGC for separation.

Summary performance for PFAS



Whereas 60% of the z-scores for PFOS were satisfactory for the air extract;
No z-scores could be assigned for the precursors (FOSA, Me-/Et-FOSA/FOSE)



Maximum of 29 labs

Lab performance on all POPs (Top 24; total n=133)

Region	Lab#	S All	Q All	U All	C All	I All	B All	%S	n Rep All
Asia	L027	346	21	13	1	0	211	91%	381
WEOG	L117	290	11	19	8	5	259	87%	333
Asia	L190	241	29	42	3	13	264	73%	328
WEOG	L126	229	24	36	0	2	301	79%	291
Asia	L004	225	17	28	3	6	313	81%	279
WEOG	L124	225	12	11	5	0	339	89%	253
Asia	L011	215	11	41	0	0	325	81%	267
GRULAC	L072	210	19	43	2	5	313	75%	279
WEOG	L024	203	29	10	3	3	344	82%	248
WEOG	L034	203	18	18	2	0	351	84%	241
Asia	L030	194	19	14	5	6	354	82%	238
WEOG	L132	189	55	52	5	4	287	62%	305
WEOG	L101	185	7	11	2	1	386	90%	206
WEOG	L145	178	41	26	1	2	344	72%	248
Asia	L207	160	5	3	0	0	424	95%	168
Asia	L173	153	44	40	0	2	353	64%	239
Asia	L025	151	0	4	0	0	437	97%	155
Asia	L137	146	13	59	2	7	365	64%	227
WEOG	L105	141	19	64	10	21	337	55%	255
Asia	L013	140	40	74	3	28	307	49%	285
Asia	L005	138	20	36	2	8	388	68%	204
Asia	L153	133	22	38	0	0	399	69%	193
CEE	L037	129	13	2	0	1	447	89%	145
WEOG	L125	124	3	0	0	0	465	98%	127

- 126 Labs had at least one ”S” z-score
- 7 labs did not achieve any ”S” result

Total z-scores = 592

Best performance and widest spectrum of POPs/matrix analysis is located in Asia (China, Japan) and in WEOG (Europe, AUS, CAN, USA)

Performance on dl-POPs (Top 20, n=65)

Region	Lab#	S-dl-POPs	Q-dl-POPs	U-dl-POPs	C-dl-POPs	I-dl-POPs	B-dl-POPs	%S	n Rep-dl-POPs All
Asia	L207	160	5	3	0	0	7	95%	168
Asia	L027	158	6	3	1	0	7	94%	168
WEOG	L101	154	2	9	2	1	7	92%	168
WEOG	L024	140	19	7	1	1	7	83%	168
Asia	L004	136	7	17	3	5	7	81%	168
WEOG	L126	136	11	21	0	0	7	81%	168
WEOG	L145	127	21	20	0	0	7	76%	168
GRULAC	L072	124	0	9	2	2	38	91%	137
WEOG	L117	124	3	8	0	2	38	91%	137
Asia	L190	123	9	20	2	13	8	74%	167
Asia	L011	122	3	12	0	0	38	89%	137
Asia	L173	113	19	5	0	0	38	82%	137
Asia	L158	105	20	8	0	4	38	77%	137
WEOG	L034	99	2	1	0	0	73	97%	102
WEOG	L124	99	1	0	0	0	75	99%	100
CEE	L037	95	4	1	0	1	74	94%	101
Asia	L022	91	30	16	0	0	38	66%	137
Asia	L005	89	7	7	0	0	72	86%	103
Asia	L153	89	16	28	0	0	42	67%	133
WEOG	L132	81	27	29	0	0	38	59%	137

10 labs in developing countries from: Brazil, China, Kuwait, Vietnam

>90% "S" results

Performance on PFAS (Top 23; n=28)

Region	Lab#	S-PFAS	Q-PFAS	U-PFAS	C-PFAS	I-PFAS	B-PFAS	%S	n Rep-PFAS All
WEOG	L105	41	3	3	0	0	30	87%	47
WEOG	L126	33	4	8	0	2	30	70%	47
WEOG	L183	30	4	2	0	0	41	83%	36
WEOG	L224	30	1	1	0	1	44	91%	33
WEOG	L024	25	8	3	1	2	38	64%	39
Asia	L001	24	2	0	0	0	51	92%	26
Asia	L002	24	2	0	0	0	51	92%	26
Asia	L004	23	4	2	0	1	47	77%	30
WEOG	L034	23	1	4	2	0	47	77%	30
WEOG	L117	22	3	1	1	1	49	79%	28
Asia	L023	21	1	1	1	0	53	88%	24
WEOG	L195	18	2	0	0	0	57	90%	20
CEE	L175	17	1	0	0	0	59	94%	18
Asia	L011	16	5	13	0	0	43	47%	34
Asia	L030	15	0	0	1	0	61	94%	16
WEOG	L035	14	2	4	0	0	57	70%	20
WEOG	L104	14	5	1	0	0	57	70%	20
Asia	L121	13	2	0	0	0	62	87%	15
WEOG	L124	12	0	0	0	0	65	100%	12
WEOG	L129	11	2	5	0	0	59	61%	18
WEOG	L128	10	5	5	0	0	57	50%	20
WEOG	L257	8	0	1	0	0	68	89%	9
Asia	L013	6	0	0	0	0	71	100%	6

7 labs in developing countries from: China and Vietnam

No ”U” results; ~>90% ”S” results

Distribution of capacity in Asian labs (3rd interlab)

- All 53 laboratories have delivered at least 3 results; overall quite impressive capacity:
  - Dioxin-like POPs – total of 62 labs; of these 32 labs from Asia have delivered results;
  - PFAS – total of 28 labs; of these 10 labs from Asia have delivered results;
  - PBDE – total of 42 labs; of these 20 labs from Asia have delivered results
  - HBCD – total of 17 labs; of these 8 labs from Asia have delivered results
- Within the 53 POPs laboratories located in Asian countries
  - OCPs: 31 labs have delivered results
  - Indicator PCB: 31 labs have delivered results
  - HxBB: 10 labs have delivered results
  - Toxaphene: 6 labs have delivered results

Invitation to participation in 4th round

- 4th round of the ”Bi-ennial global interlaboratory assessment of POPs laboratories” to be undertaken in 2018 within the UNEP/GE FGMP2 projects;
- Coordination:
  - E&H VU Amsterdam and MTM Research Centre, Örebro University
- Invitation:
  - All labs that participated in rounds 1-3 (some additional)
  - No costs for laboratories from developing (and UNEP/GEF GMP2) countries
- Schedule:
  - Invitations and registration through MTM Örebro University by e-mail or web-based from March 2018 until end April 2018;
  - Preparation of test materials, confirmation of addresses, in June/July 2018;
  - Shipment of test samples – September 2018;
  - Reporting of results (MsExcel) by 15 January 2019.

Registration at present

- Number of labs registered: 128 (status: 21 July 2018)
  - Africa 18 MAR 4,
  - Asia 38 CHN 20, VNM 4, JPN 2
  - CEE 5 RUS 2
  - GRULAC 36 BRA 10, COL 3
  - WEOG 31 DEU 4, SWE 4, CDN 3
- 34 new laboratories registered:
  - National workshop in Brazil, ”atmosphere” conference in Guangzhou, CWG PFAS of EURL/NRLs

Test solutions	Sediment	Fish	Human milk	Human plasma	Air (TOL)	Air (MeOH)	Water	Total
394	90	90 (122)	80 (114)	19	71	19	30	**858**

- Value of the samples: **USD 403,000**

Example ”confirmation letter”

Dear YYY,

With this email, we wish to confirm your participation in the „4th Round of the interlaboratory assessment of POPs laboratories - IL2018-POP - UNEP Stockholm Convention GMP context” as follows:

Shipment address: **XXX**

Your laboratory’s code for this 4th round is **LXXX**.

To make sure you receive the right solutions and materials, we want to confirm that according to our documents, your laboratory has registered for the following test materials:

- Test solution of analytical standards: OCP, PCB, PCDD/F, dl-PCB,
- Test samples: Sediment, Human milk, Air (toluene)

Shipments will be made from 27 August 2018 according to the following assignments:

- Test solution of analytical standards PCDD/F, dl-PCB, and test samples Human milk, Air (toluene), will be sent by MTM, …
- Test solution of analytical standards OCP, PCB, and test samples Sediment, will be sent by E&H Vrije Universiteit Amsterdam

It is essential to communicate your phone number to us, if not shown above. For all other inquiries – corrections or questions – please contact us by e-mail.
Please confirm to us as soon as possible by email that the above information is correct (both: address and sample registration).
In case of any error or if details are missing in your address registration, please sent us the whole address including telephone number as soon as possible.

Yours sincerely

Please note: “Fish A” is a naturally contaminated fish sample; “Fish toxaphene” is enriched with toxaphene

Historic participation from Asia known

Participating laboratories and laboratories that submitted results

Round 1	Round 2	Round 3	Round 4		Results Round 1	Results Round 2	Results Round 3	Round 4
38	46	67	38	# Total labs				
				# submitted results	**31**	**41**	**53**	
				# registered and no results	**7**	**3**	**14**	

- **Majority of countries are: China, Japan, Vietnam, Syria**
- **From GMP2 countries: Lao PDR does not have POPs lab – no registration**

Historic participation

Round 1	Round 2	Round 3	Round 4	ISO-3	Name of Laboratory	Contact	Submitted results Round 1	Submitted results Round 2	Submitted results Round 3	Submitted results Round 4
		x		IDN	PT ALS Indonesia	Suzanna Lumme	na	na	1	
x	x	x	x	JPN	JESC	Fumio Kaji	1	1	1	
x	x	x		JPN	Shimadzu Techno-Research Inc.	Takumi Takasuga	1	1	1	
x				JPN	TOWA	Yasuhiro Yoneda / Shoji Tenma	1	na	na	
x	x	x	x	JPN	IDEA	Tatsuya Hattori	1	1	1	
		x		JPN	Tohoku Afforestation & Environmental Protection Company, Ltd.	Satoh Tomoyuki	na	na	1	
		x		JPN	Chemicals Evaluation and Research Institute (CERI)	Isamu Kuribara	na	na	1	
			x	KHM	Lab of MOE	Keo Vanthoeun, Siv Kong	na	na	na	
x	x			KOR	Seal	Kim Jongchul	0	na	na	
	x			KOR	UNIST	Sung-Deuk Choi	na	1	na	
	x			KOR	Research Institute of Industrial Science & Technology (RIST)	YongSeon Cho	na	1	na	
			x	MNG	POPs Laboratory Mongolia	Enkhtuul Surenjav	na	na	na	
			x	PHL	EMB-DENR	Ma. Fatima Anneglo R. Molina	na	na	na	

Historic participation (2)

Round 1	Round 2	Round 3	Round 4	ISO-3	Name of Laboratory	Contact	Submitted results Round 1	Submitted results Round 2	Submitted results Round 3
x				THA	Environmental Laboratory	Pannipa Teerajidachol	0	na	na
x	x	x		THA	SECOT Co.,Ltd.	Somrudee Kriengkrai-udom	1	1	1
	x			THA	Central Laboratory (Thailand) Co., Ltd. (Songkhla Branch)	Thanida Pimma	na	1	na
		x	x	THA	UAE Consultant	Piyapat Suttamanutwong	na	na	1
		x		THA	UAE-IDEA Advance Analytical Company	Wongwit Wongwitwichote	na	na	1
			x	THA	Dioxin Laboratory (Thailand)	Ruchaya Boonyatumanond	na	na	na
			x	THA	DMSC	Sirichai Sunya	na	na	na
			x	THA	Ref Lab Tox Center	Netnapa Chingkitti	na	na	na
x	x	x	x	VNM	VRTC	Trinh Khac Sau	1	1	1
x	x	x	x	VNM	CETASD	Pham Hung Viet	1	1	1
x				VNM	IMER	Duong Thanh Nghi	0	na	na
x	x	x		VNM	Dioxin Laboratory	Nguyen Hung Minh	1	1	1
	x			VNM	Center of Analytical Service and Experimentation of HoChiMinh City	Giang Vu Han	na	1	na
		x	x	VNM	CRETECH	Vu Tu	na	na	1
		x		VNM	Laboratory of Environmental Analysis, Ctr Environ. Analysis + Technology Transfer	Le Thi Huong	na	na	0
		x		VNM	Nat'l Working Environment Monitoring Station	Vu Duy Thanh	na	na	1
		x	x	VNM	ENVILAB	Ngoc-Thuan Le	na	na	1
		x		VNM	Centre for Environ. Monitoring + Analysis	Lé Phú Dong	na	na	0
		x		VNM	Environmental Lab, Ctr for Environmental Monit.	Chu Thuoc	na	na	0
		x		VNM	VRTC	Vu Duc Nam	na	na	0
		x		VNM	Laboratory for Research and Development of Environmental Technology	Hien Nguyen Thi Thu	na	na	1
		x		VNM	Laboratory Hoa Sinh	Nguyen Khanh Ngoc	na	na	0
		x		VNM	Chemical Environmental Laboratory	Lam Diang Viet	na	na	1

Thank you very much for your attention