COLLABORATIVE RESEARCH SURVEY ON MARINE FISHERIES RESOURCES AND ENVIRONMENT IN THE GULF OF THAILAND 2018

Mercury contamination in surface sediment of the Gulf of Thailand

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Outline

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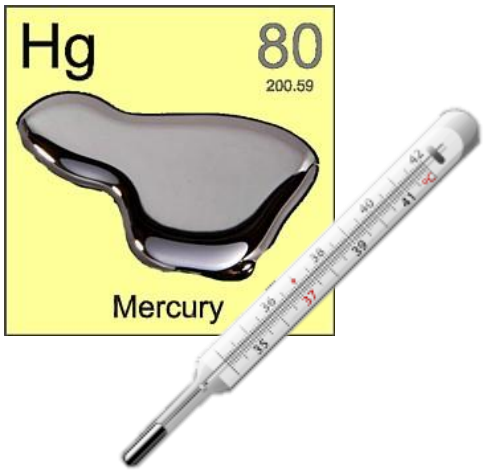
2. Hg cycle
3. Thailand Petroleum Concession Map
4. Purpose
5. Sampling and analysis
6. Results and Discussion
7. Total Hg in Lower GOT (Thai Waters)
8. Conclusions
9. Acknowledgement

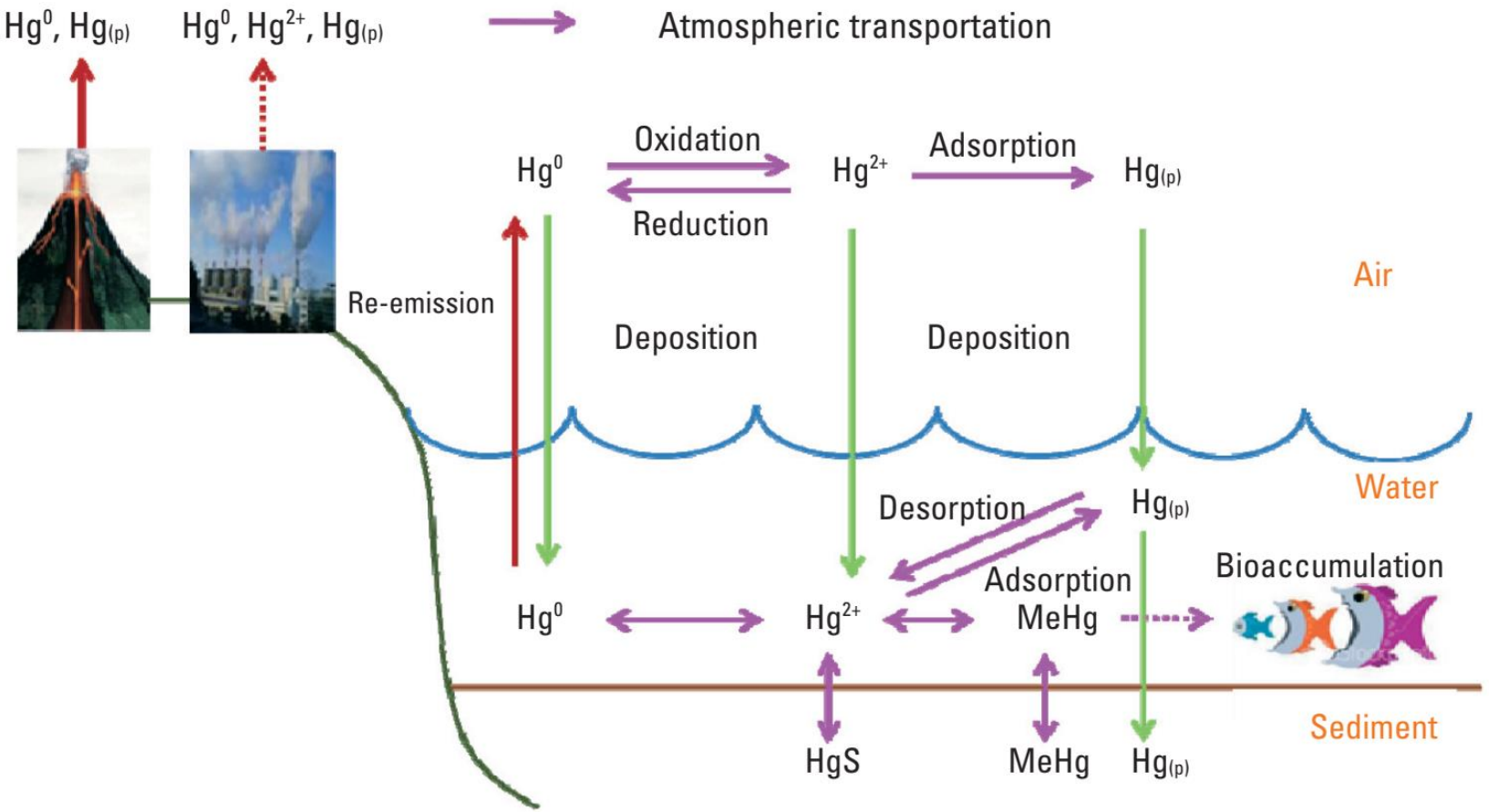
Mercury (Hg) toxicity



Hazard: **Neurogenic toxin**

- Muscle weakness
- Ataxia (cannot control body)
- Damage of brain, kidneys and lungs
- Loss of vision, hearing, speech
- Dead

Hg cycle



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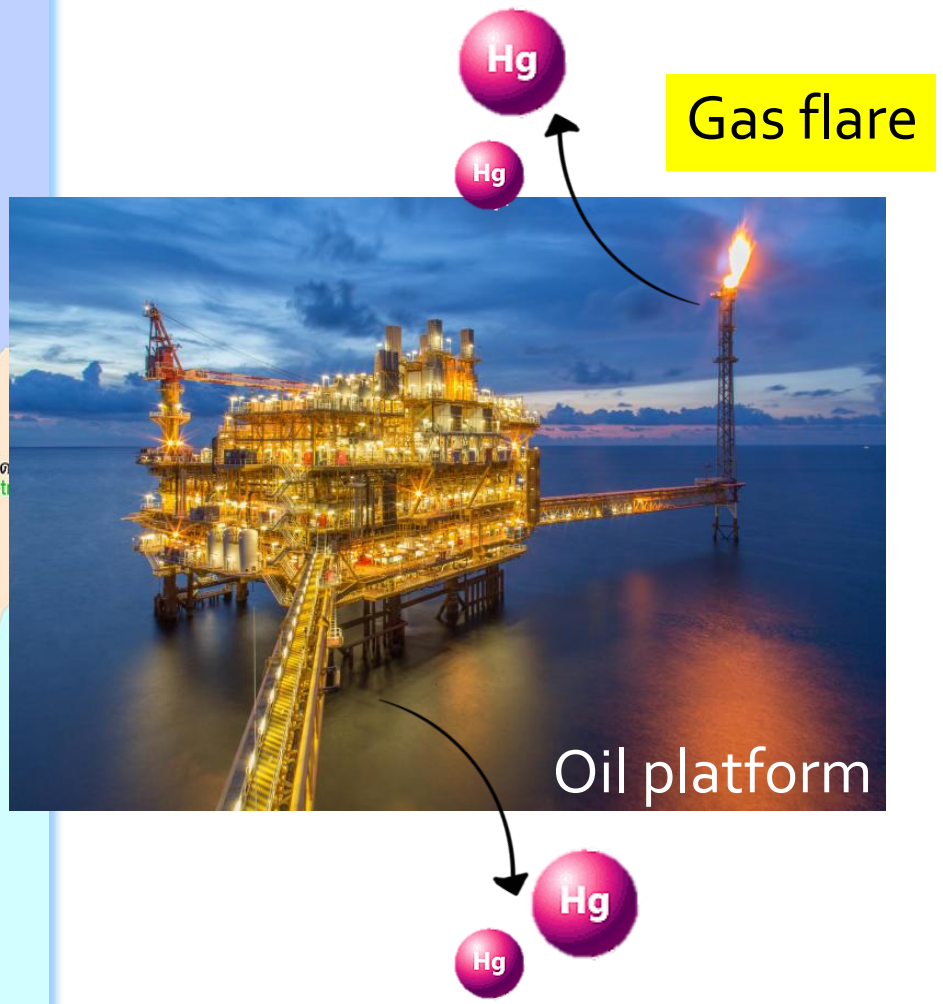
Thailand Petroleum Concession Map

Department of Mineral Fuels (DMF) Thailand. (2018). *ANNUAL REPORT 2018*. Retrieved from https://dmf.go.th/public/list/data/index/menu/668



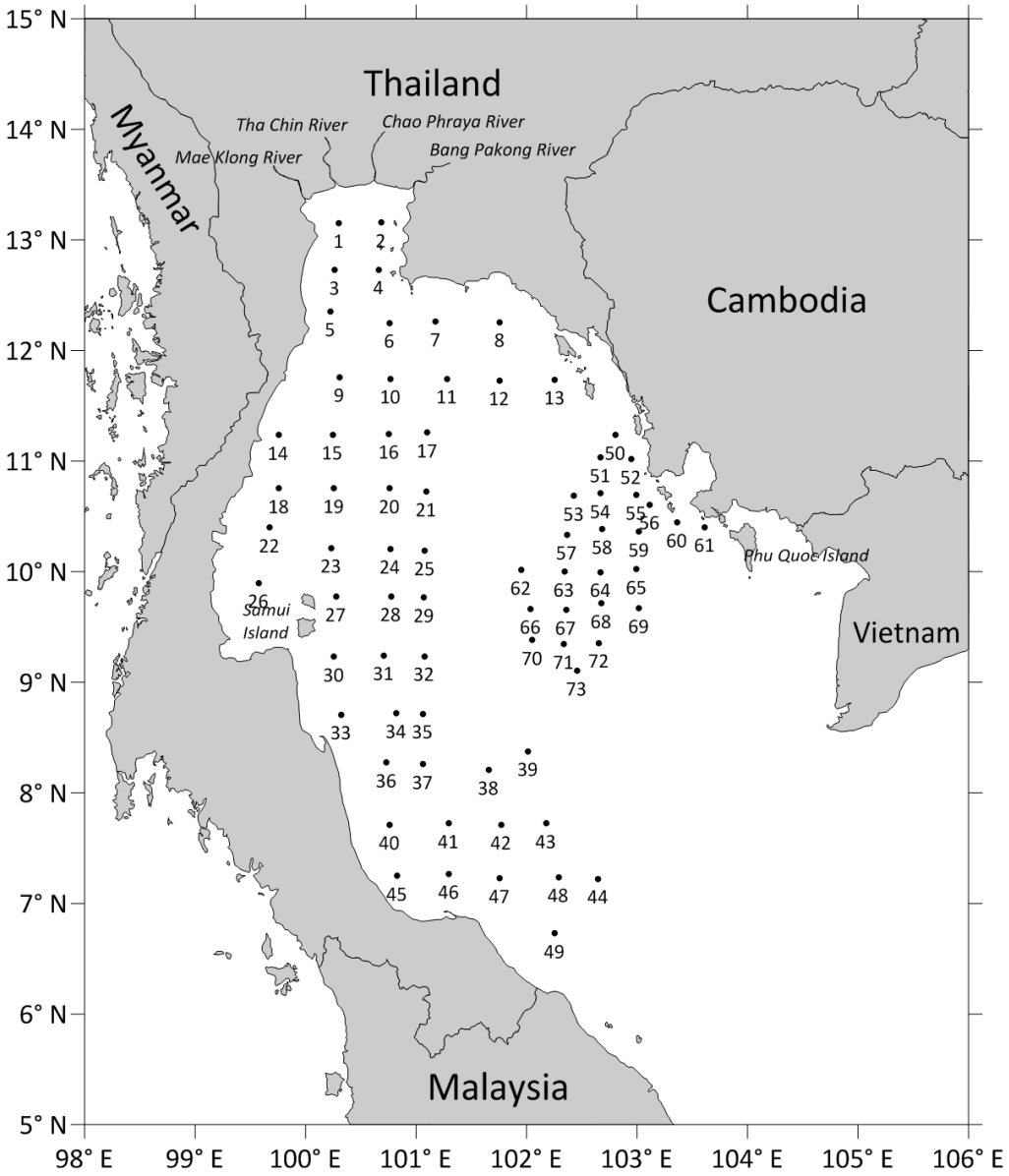
https://www.bangkokpost.com/business/1648680/pttep-acquires-malaysia-oil-firm

Purpose

- To study total Hg concentration and distribution in GOT surface sediment

➢ Samples in 2018	(This work)
➢ Samples in 2013	(Sompongchaiyakul, 2013)
➢ Samples in 2011-2012	(Sansittisakunlird, 2014)
➢ Samples in 2003	(Buakaew, 2007)

Sampling and analysis



M.V. SEAFDEC2

- Aug - Oct 2018
- Total 73 Stations
  - 49 stations in Thai Waters
  - 24 stations in Cambodian Waters

Surface sediment (0 – 3 cm)

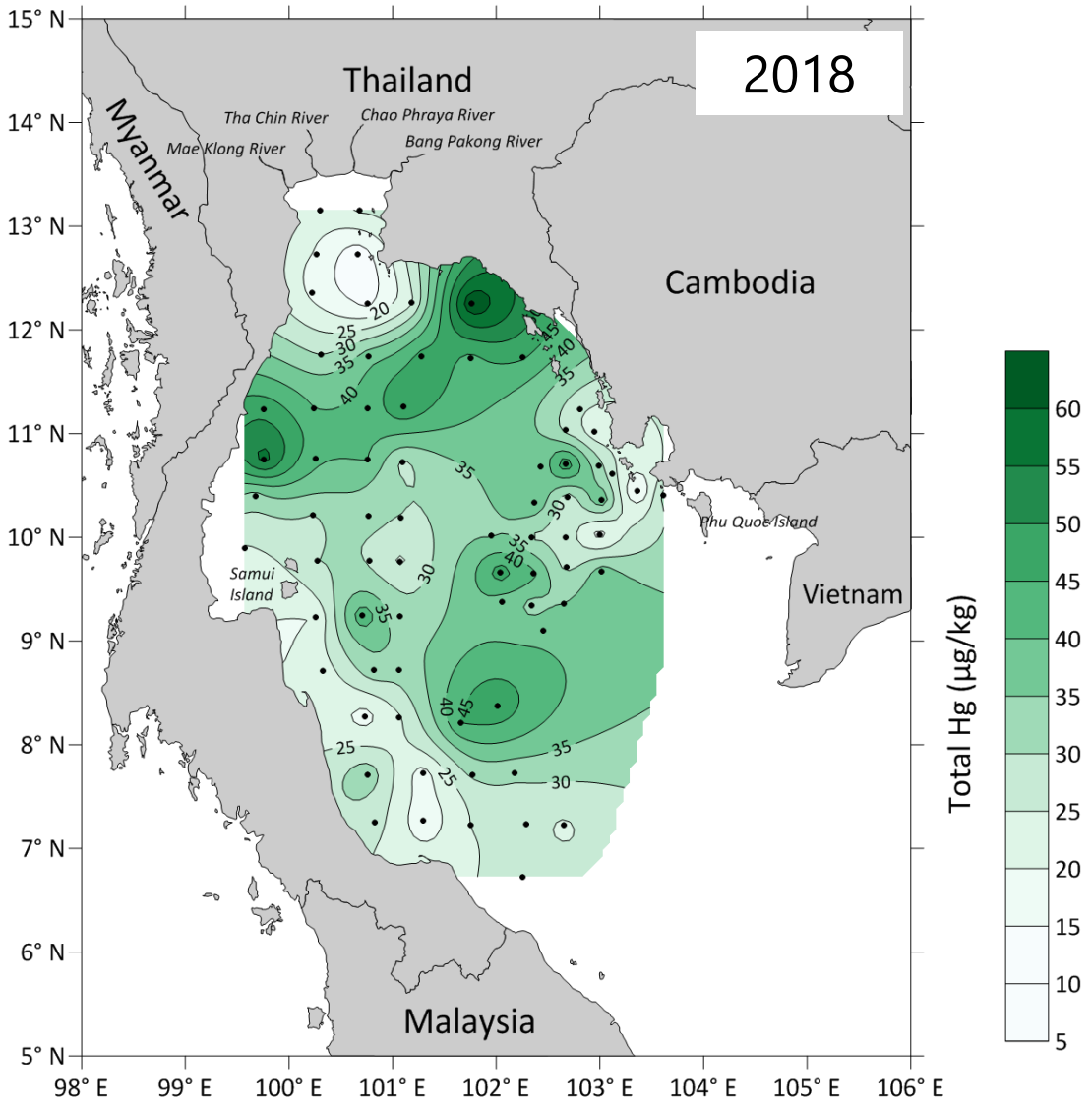
frozen at -20 °C immediately

freeze dried

sieved with 2 mm, and ground

Total Hg analysis

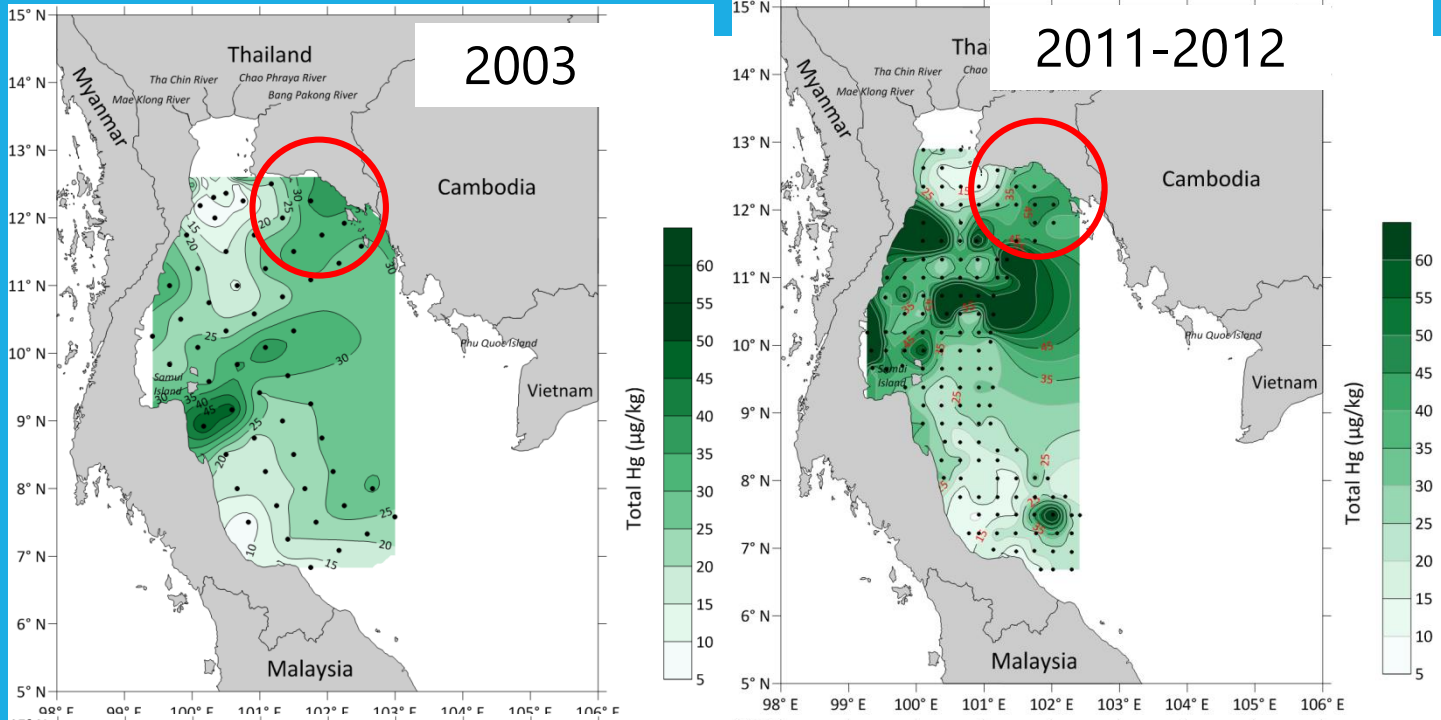
Results and Discussion



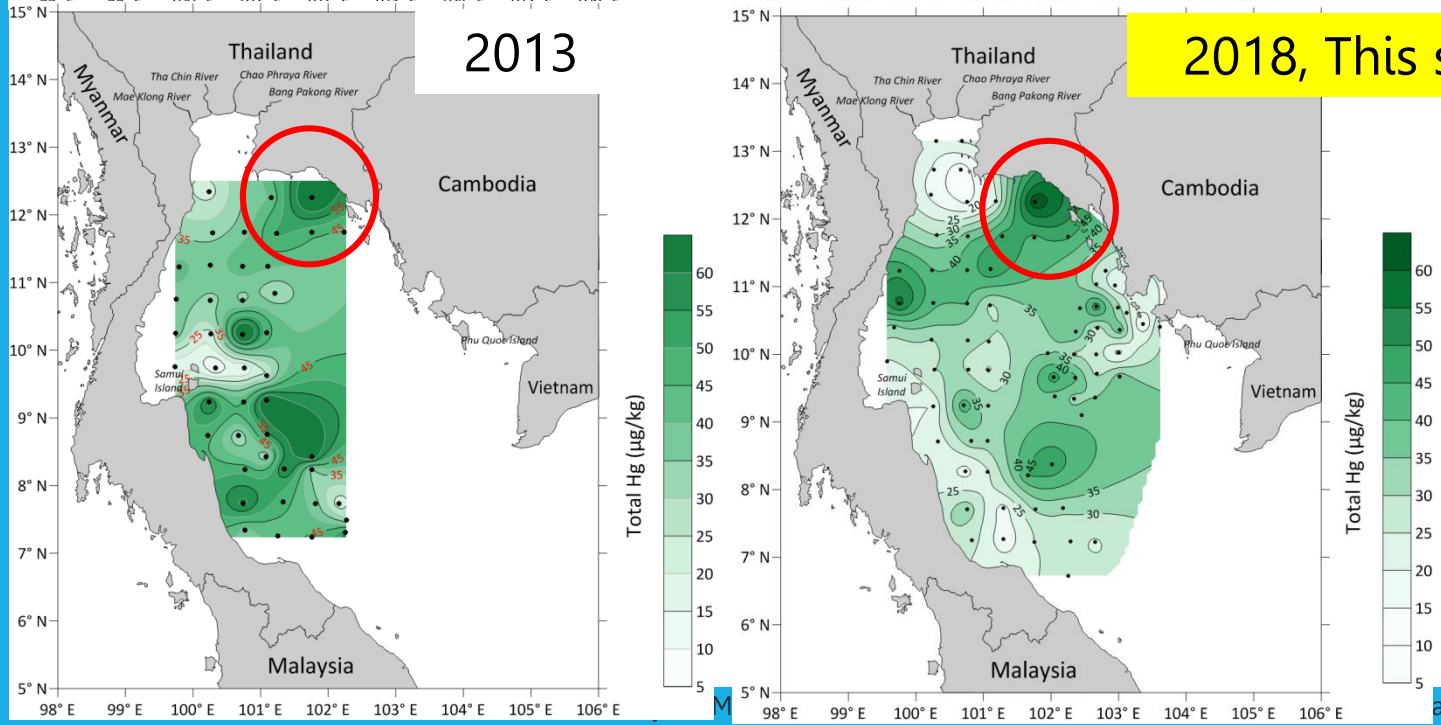
Total Hg
32.1 ± 10.5 µg/kg
$CaCO_3$ free basis
(11.8 - 64.6 µg/kg)

Thai Waters
31.9 ± 11.3 µg/kg
(11.8 - 64.6 µg/kg)

Cambodian Waters
32.4 ± 8.4 µg/kg
(13.1 - 49.3 µg/kg)


2003
Thailand
Myanmar
Cambodia
Vietnam
Malaysia
Tha Chin River
Chao Phraya River
Bang Pakong River
Mae Klong River
Phu Quoc Island
Samui Island
Total Hg (µg/kg)

2011-2012
Cambodia
Vietnam
Malaysia
Mae Klong River
Phu Quoc Island
Samui Island
Total Hg (µg/kg)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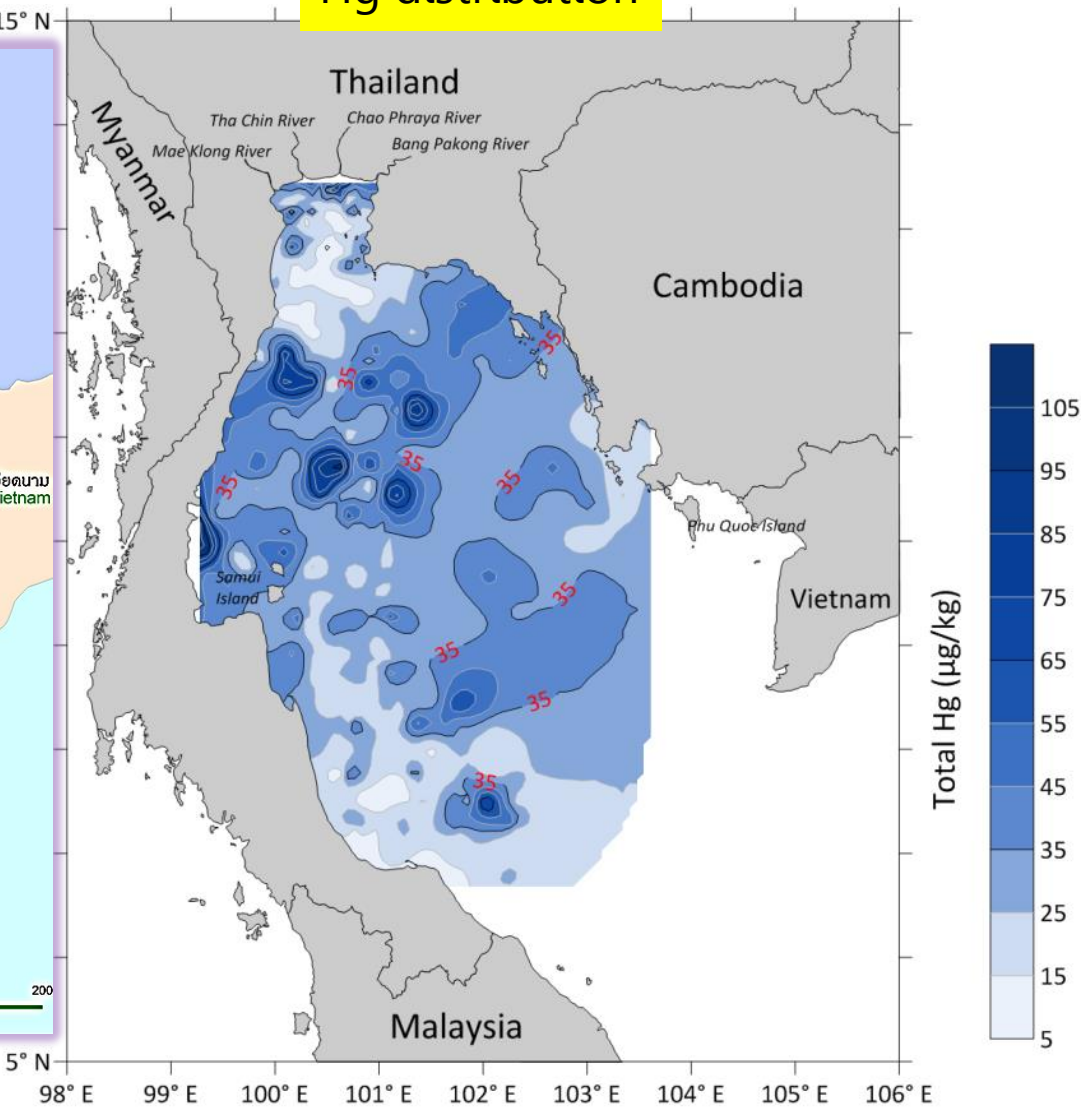
Tha Chin River
Chao Phraya River
Bang Pakong River
Mae Klong River
Phu Quoc Island
Samui Island
Total Hg (µg/kg)

2018, This study
Thailand
Myanmar
Cambodia
Vietnam
Malaysia
Tha Chin River
Chao Phraya River
Bang Pakong River
Mae Klong River
Phu Quoc Island
Samui Island
Total Hg (µg/kg)

Total Hg

Petroleum Concession Map
Feb 2020

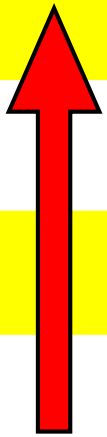
Hg distribution



Department of Mineral Fuels (DMF) Thailand. (2018). *ANNUAL REPORT 2018*. Retrieved from https://dmf.go.th/public/list/data/index/menu/668

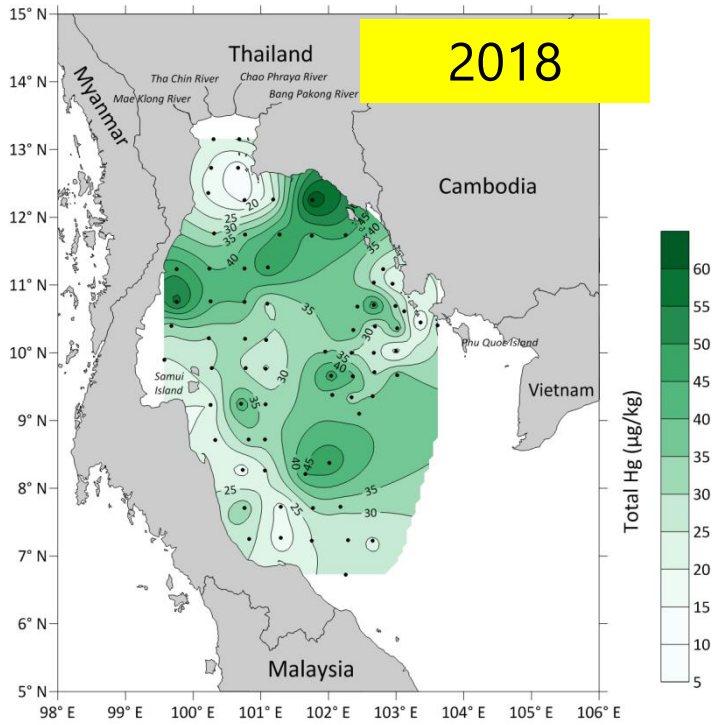
Total Hg in Lower GOT (Thai Waters)

Sampling Year	Average total mercury (µg/kg)	Reference
	Lower GOT **(Thai Waters)**	
2018	32.1 ± 10.5	**This work**
2013	41.4 ± 15.3	Sompongchaiyakul (2013)
2011- 2012	34.9 ± 21.5	Sansittisakunlird (2014)
2003	24.4 ± 9.0	Buakaew (2007)



Conclusions

1) **Similar Total Hg distribution** in the GOT (Thai Waters) during 2003 - 2018 (15 years)



2) **Cambodian Waters**, low in Total Hg content in nearshore stations but it is greater in offshore stations

3) **Total Hg in GOT** doesn't exceed than SQGs (ERL)

4) **Total Hg content seem to increase** through time most likely from human activities

Effects Range Low (ERL) which is a Sediment Quality Guidelines (SQGs) and determined as 150 µg/kg by the Pollution Control Department of Thailand (PCD, 2006).

Acknowledgement

The sediment were obtained from SEAFDEC under the project

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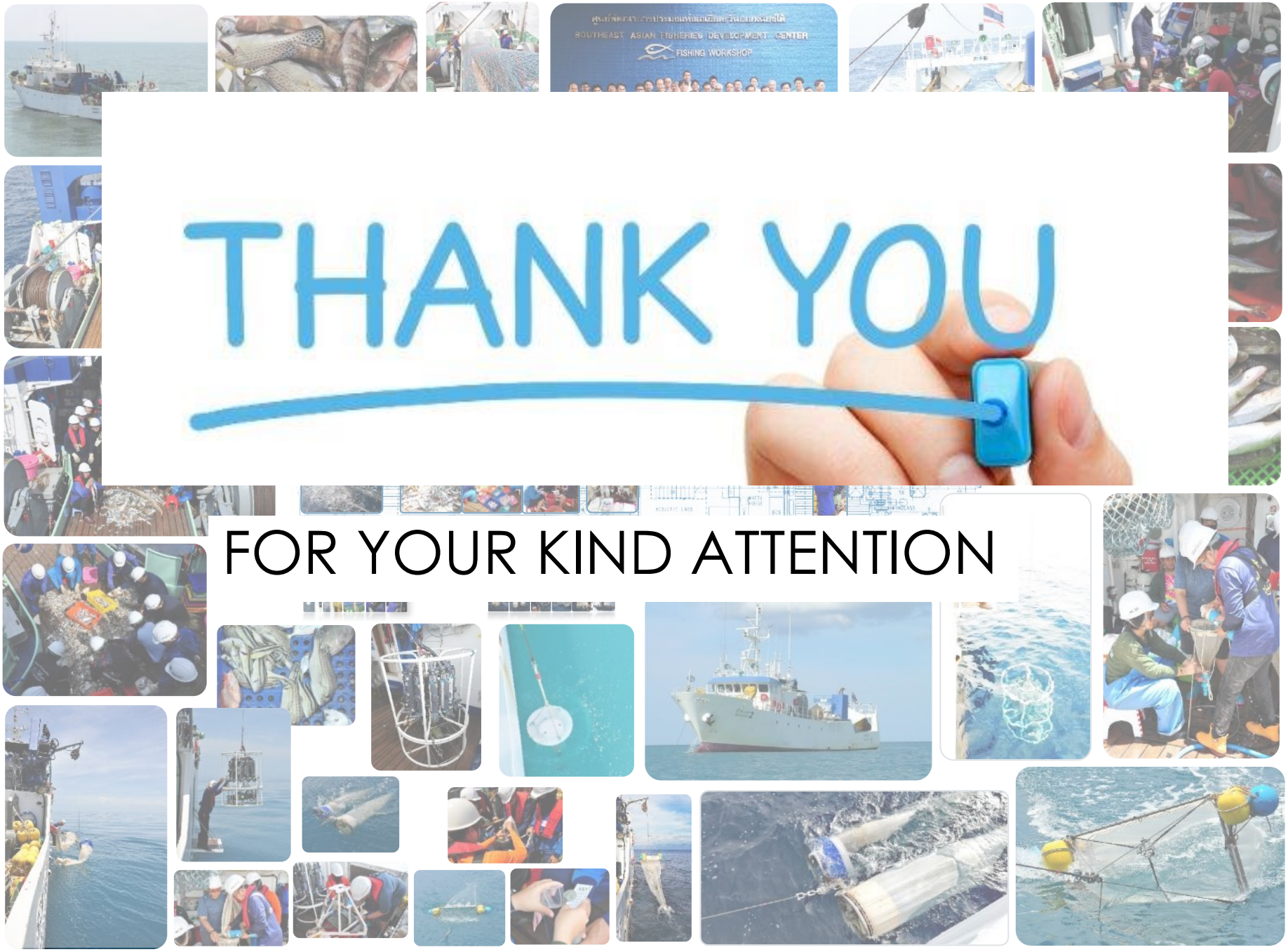
THANK YOU
FOR YOUR KIND ATTENTION