



La contamination globale de l'environnement par le mercure

Die weltweite Verschmutzung der Umwelt mit Quecksilber

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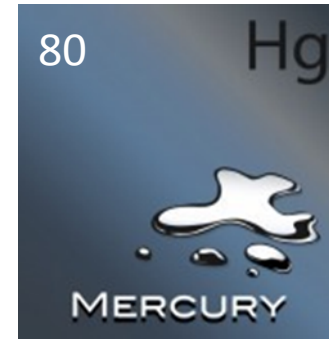
Overview



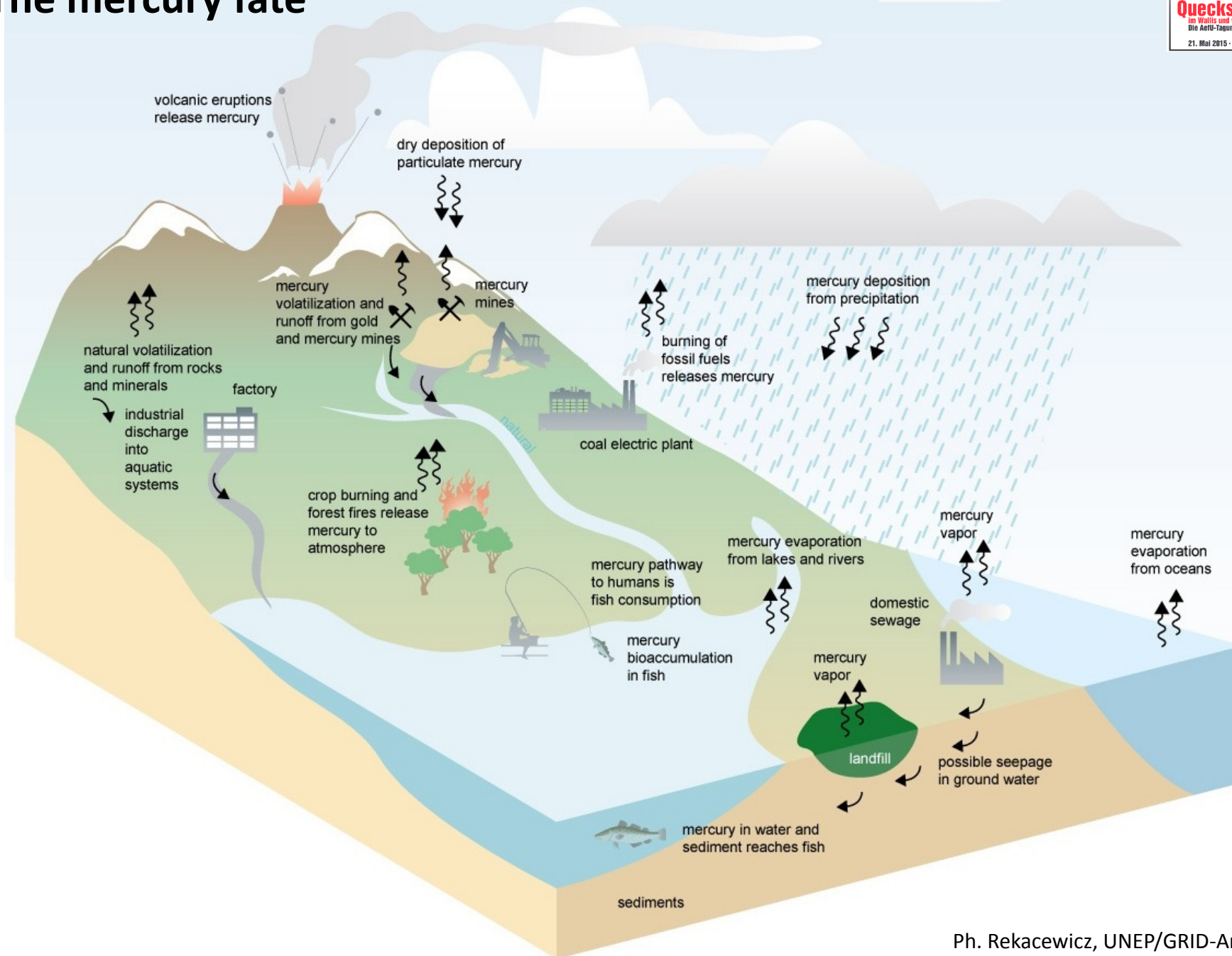
- **Mercury properties and mercury fate**
- **Sources of mercury**
- **Global mercury budget**
- **History of mercury contamination: global and Lake Geneva**
- **Summary**

Mercury properties

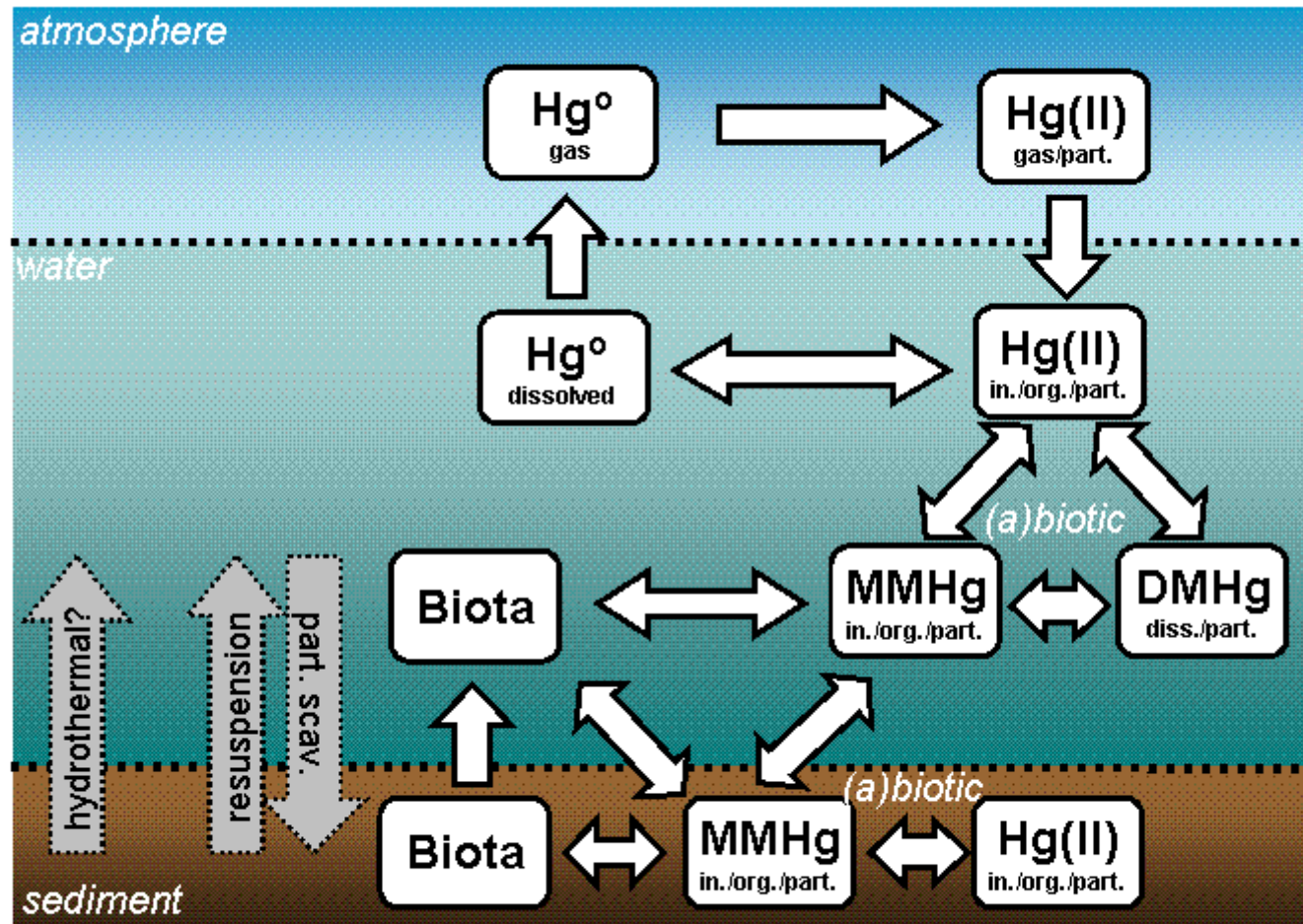
- “Heavy metal” – trace metal
- Density: 13.6 g/cm³
- Liquid at room temperature (melting point -39.8°C)
- Boiling point: 357°C
- Hg⁰ very volatile
- Partition coefficient K_d : 10⁴ -10⁶



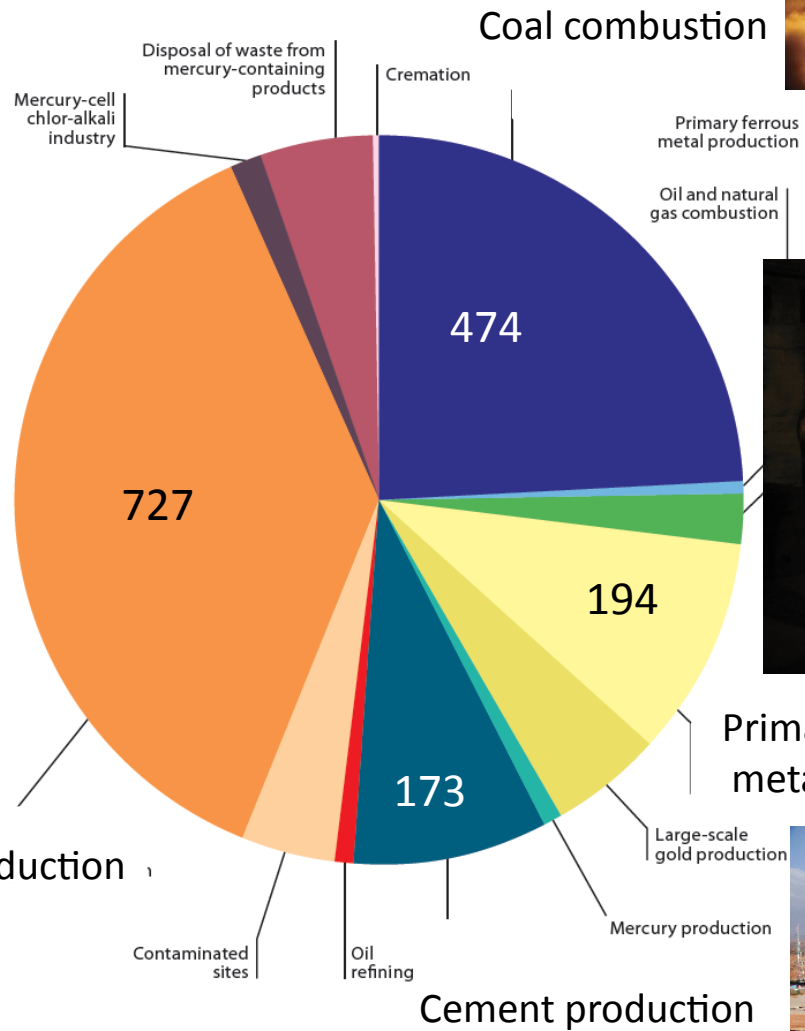
The mercury fate



Mercury cycle

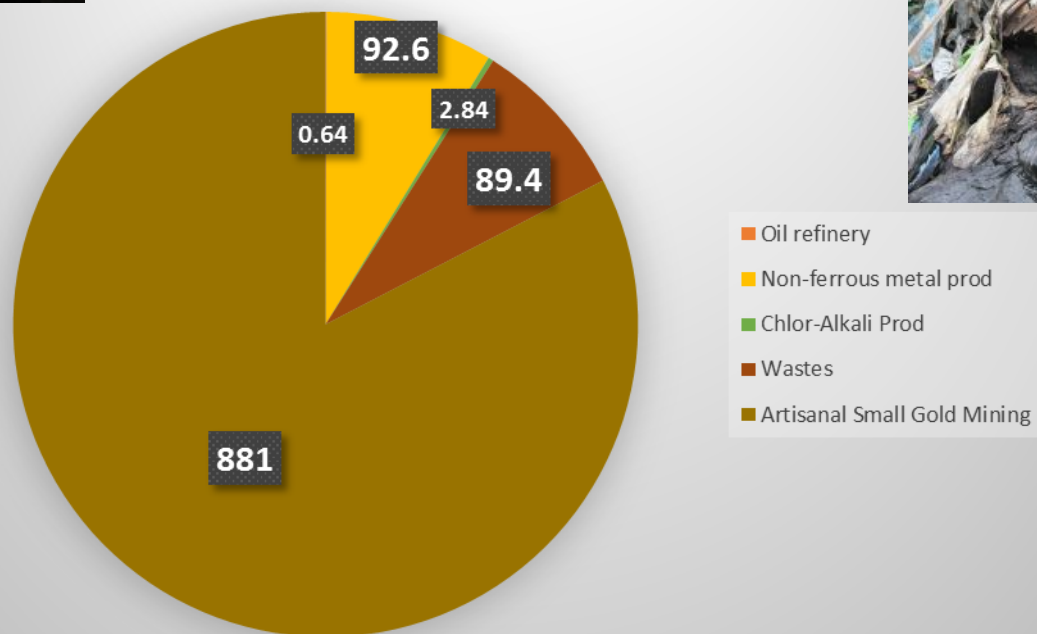


Sources of human emissions in the atmosphere in 2010 (1960 tons)



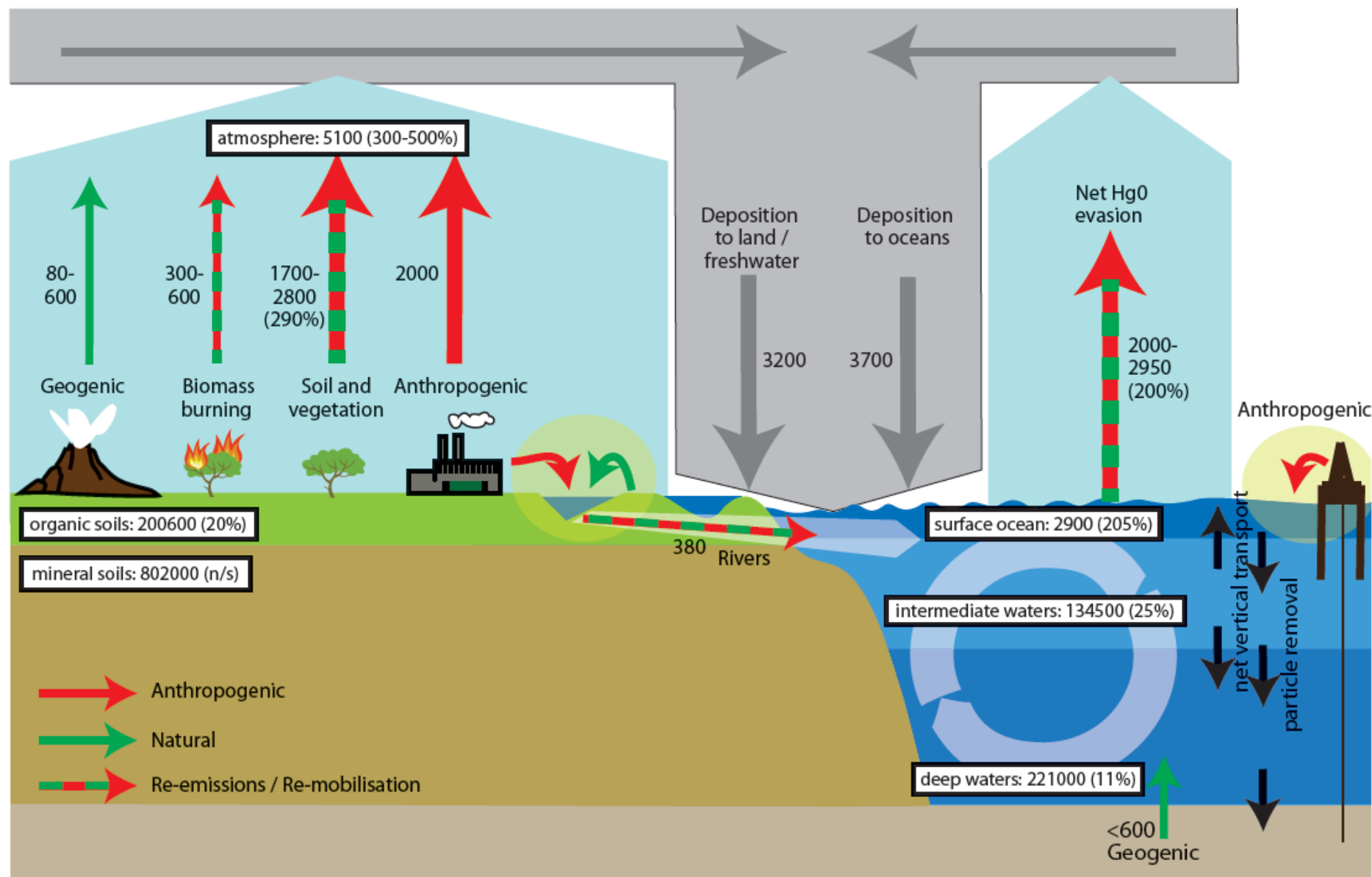


Direct human annual emissions in the aquatic environment (1066 tons)



Rough estimates !

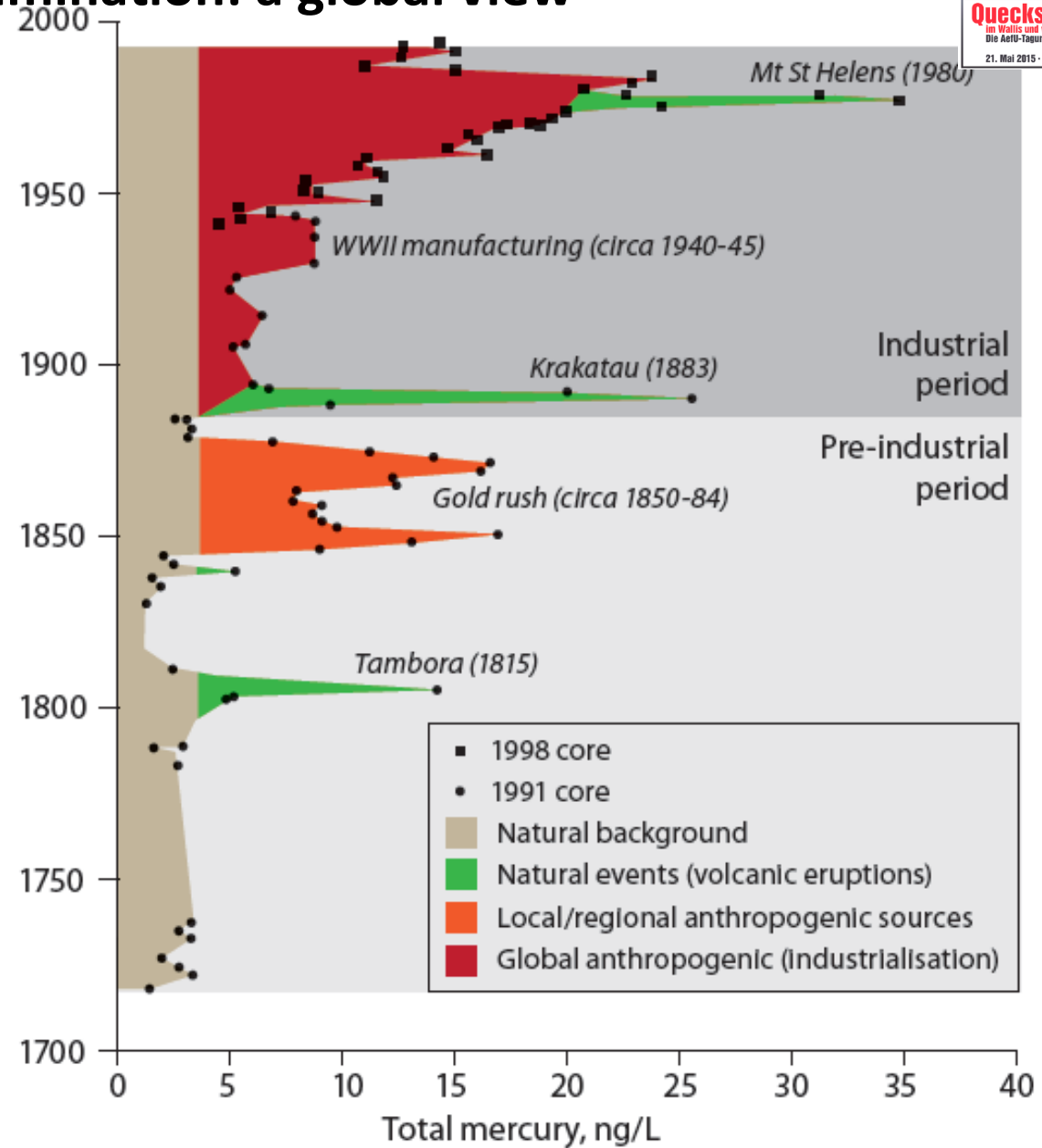
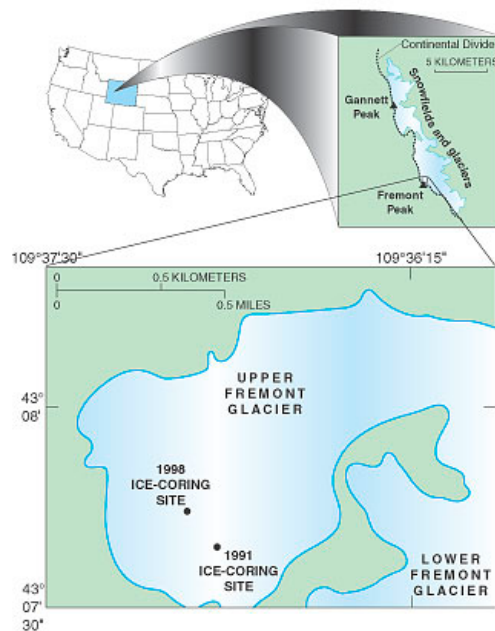
Global mercury budget



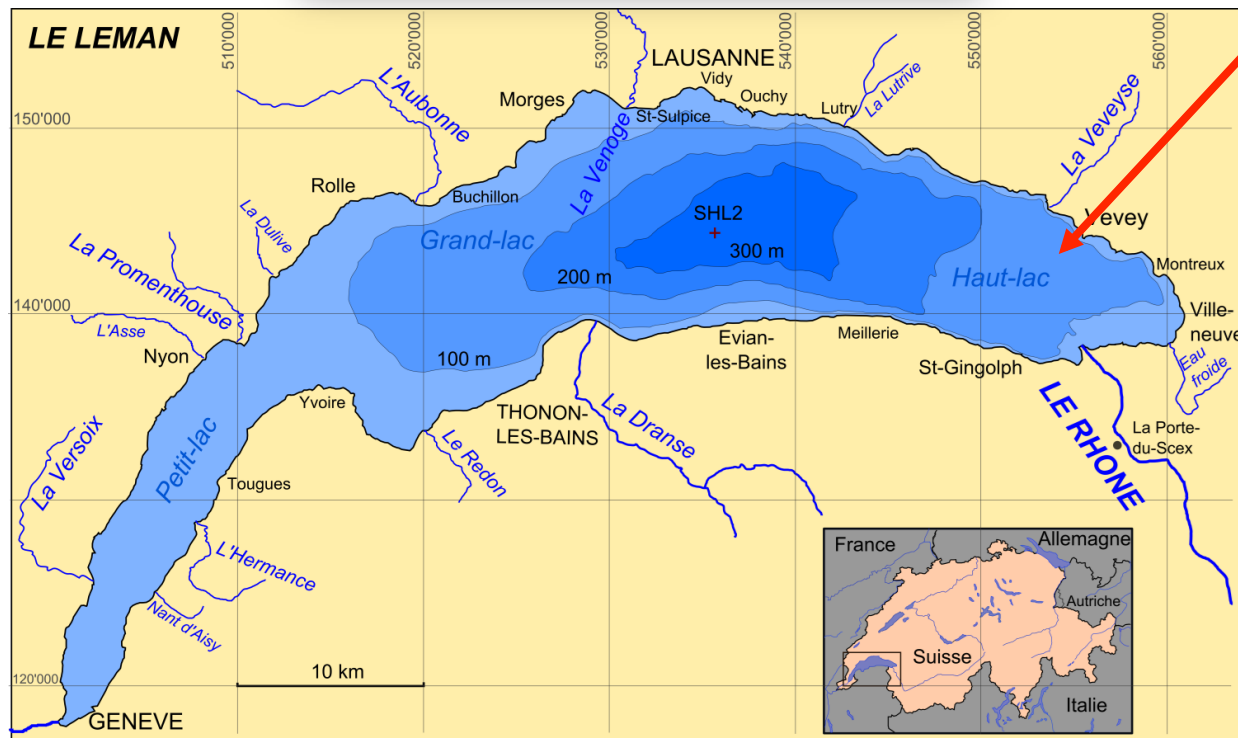
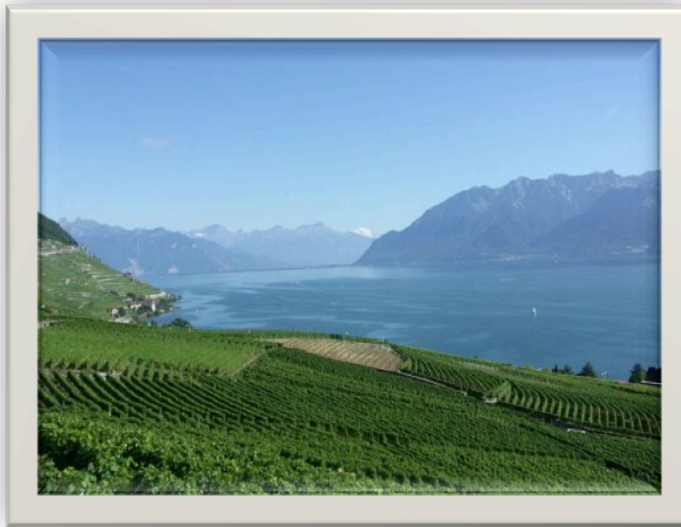
Units: fluxes in tons/year; inventories (white boxes) in tons

AMAP/UNEP, 2013

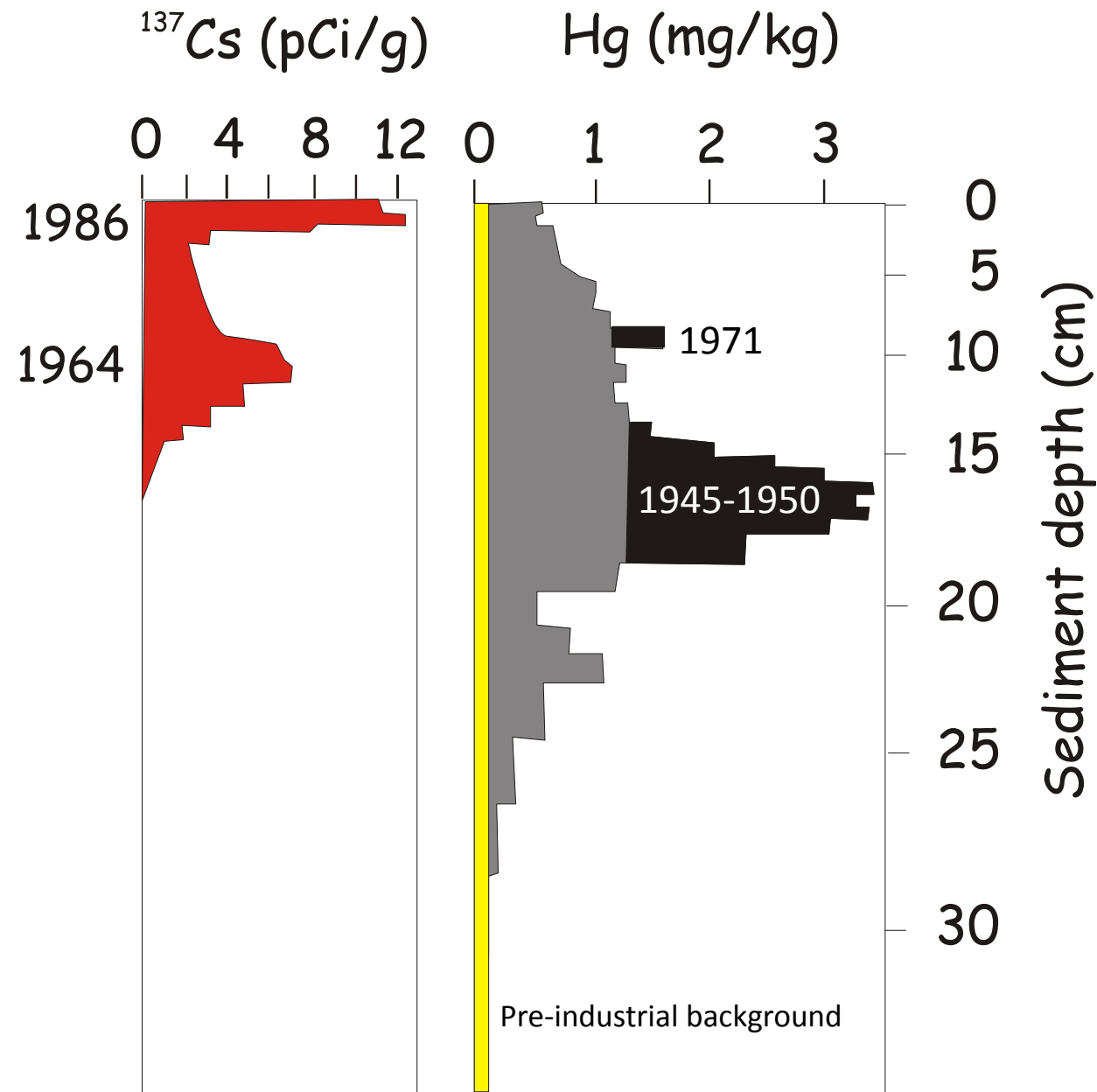
History of mercury contamination: a global view



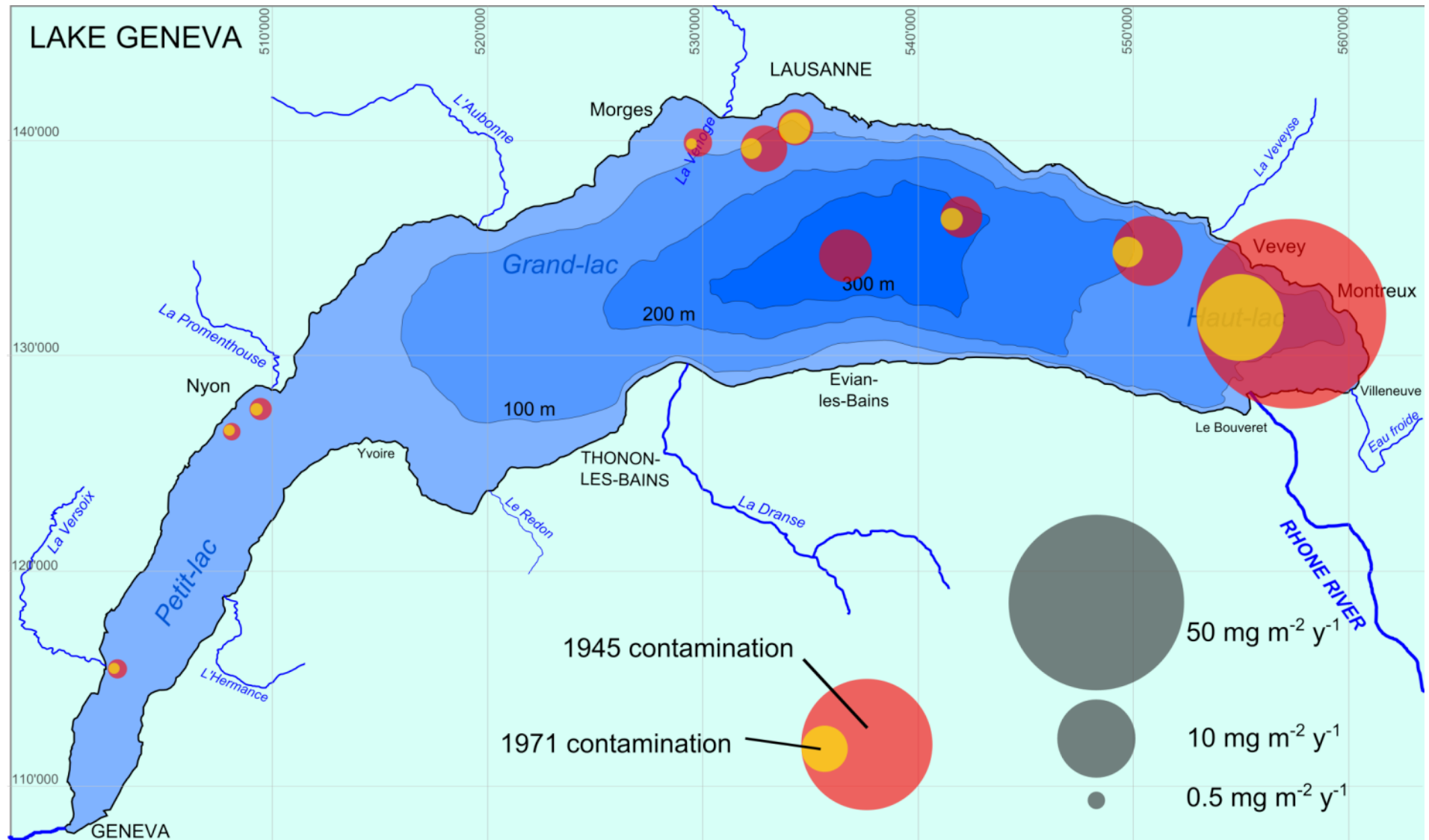
History of mercury contamination: Lake Geneva



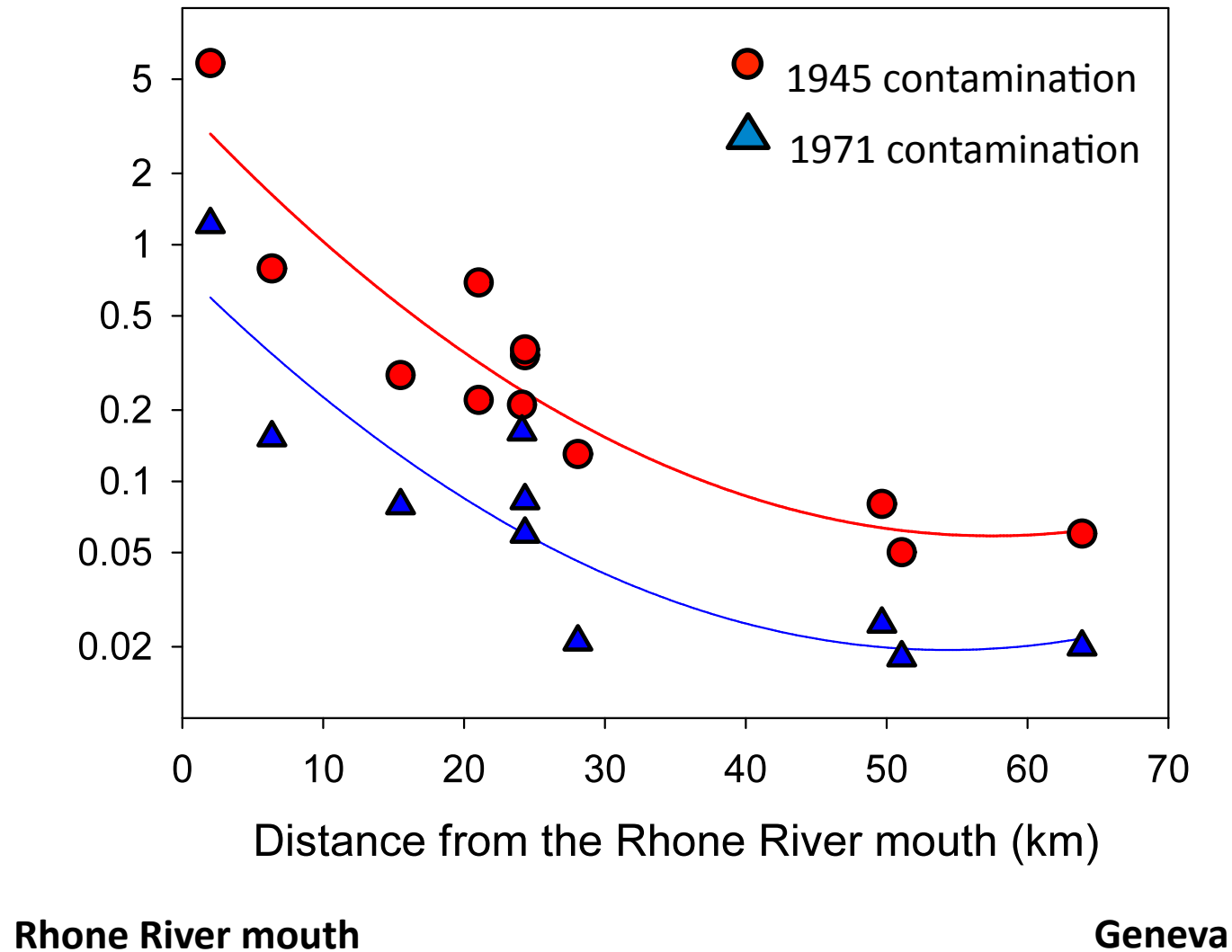
History of mercury contamination: Lake Geneva



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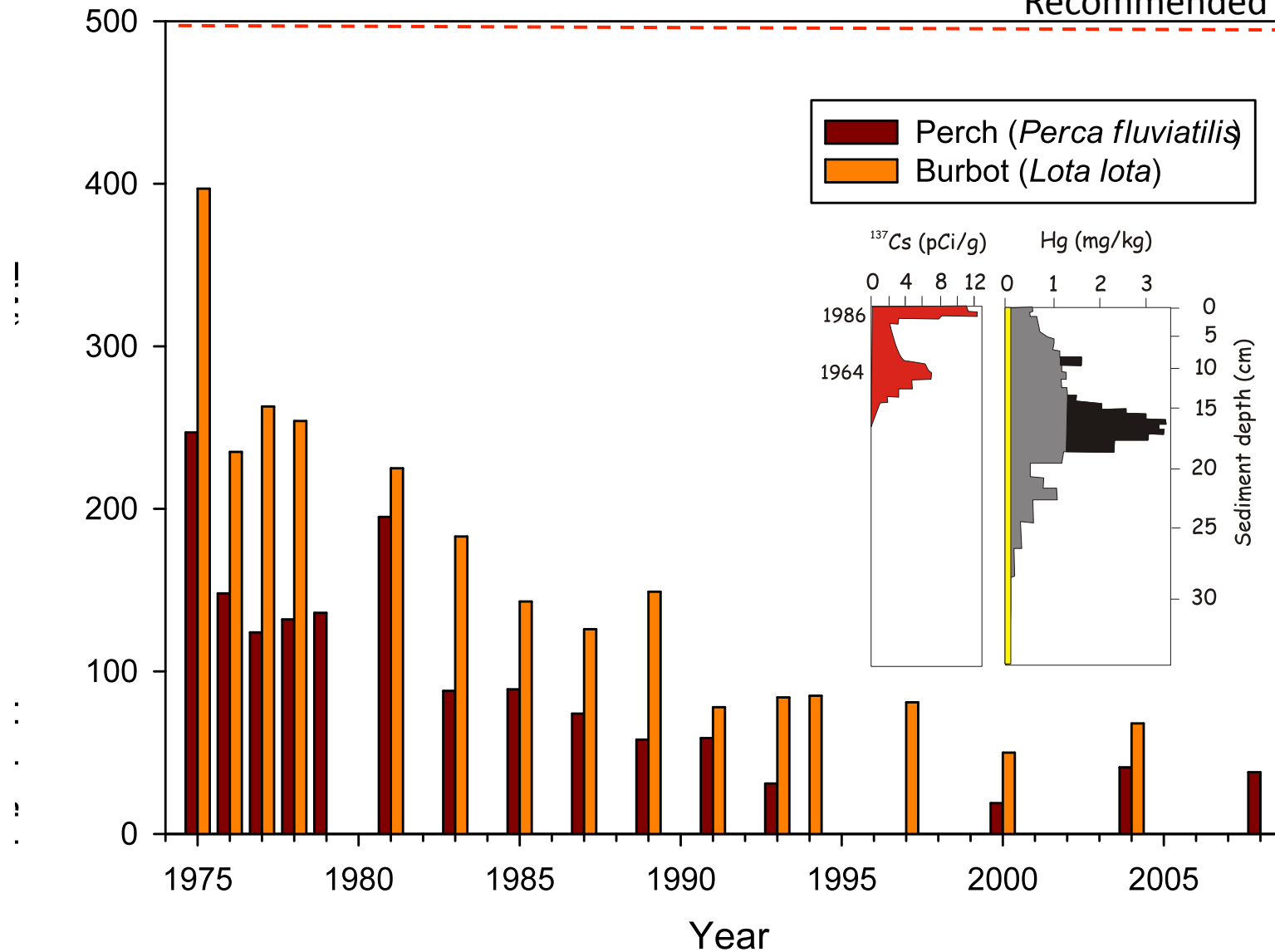


History of mercury contamination: Lake Geneva



WHO

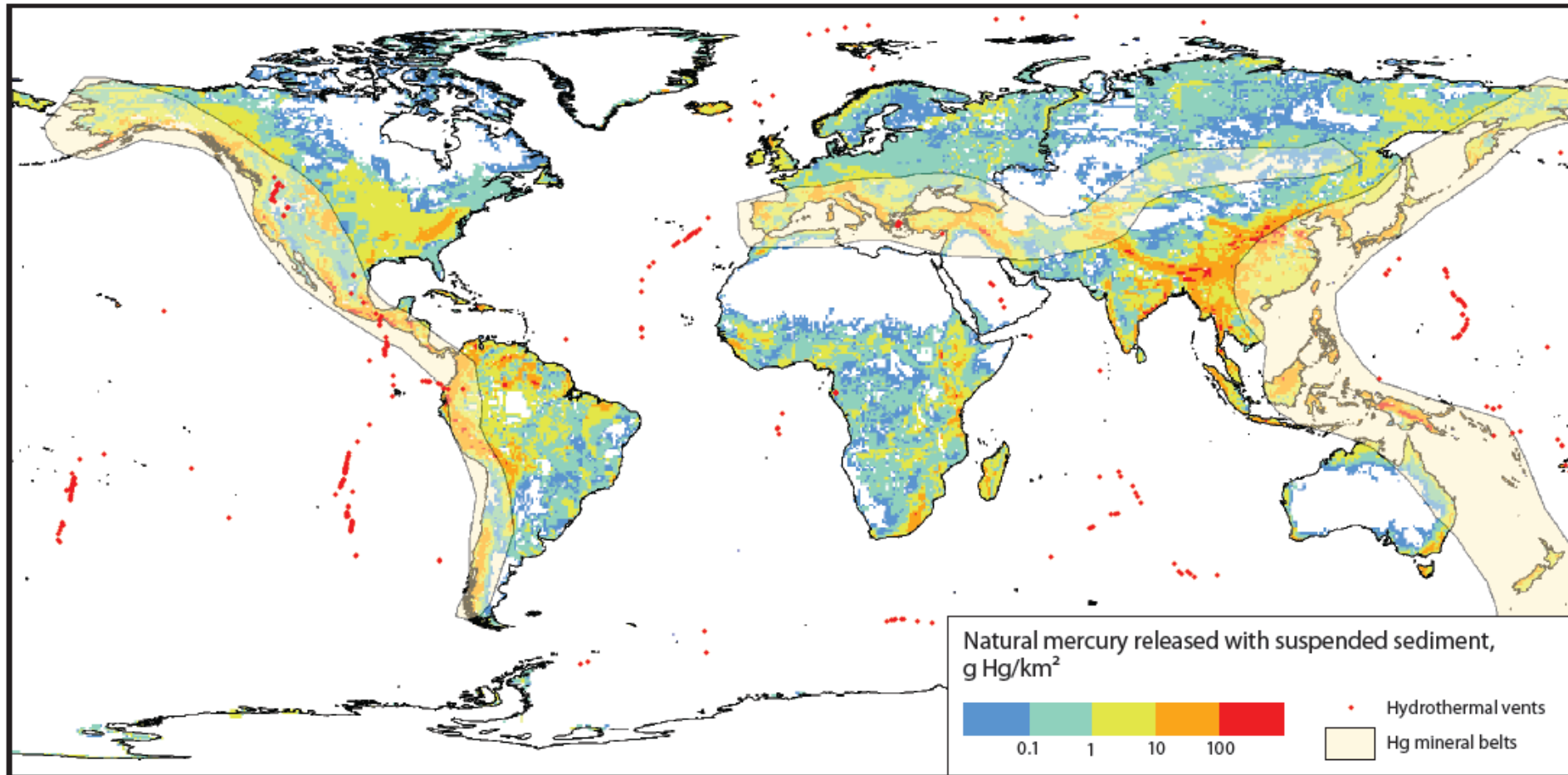
Recommended value



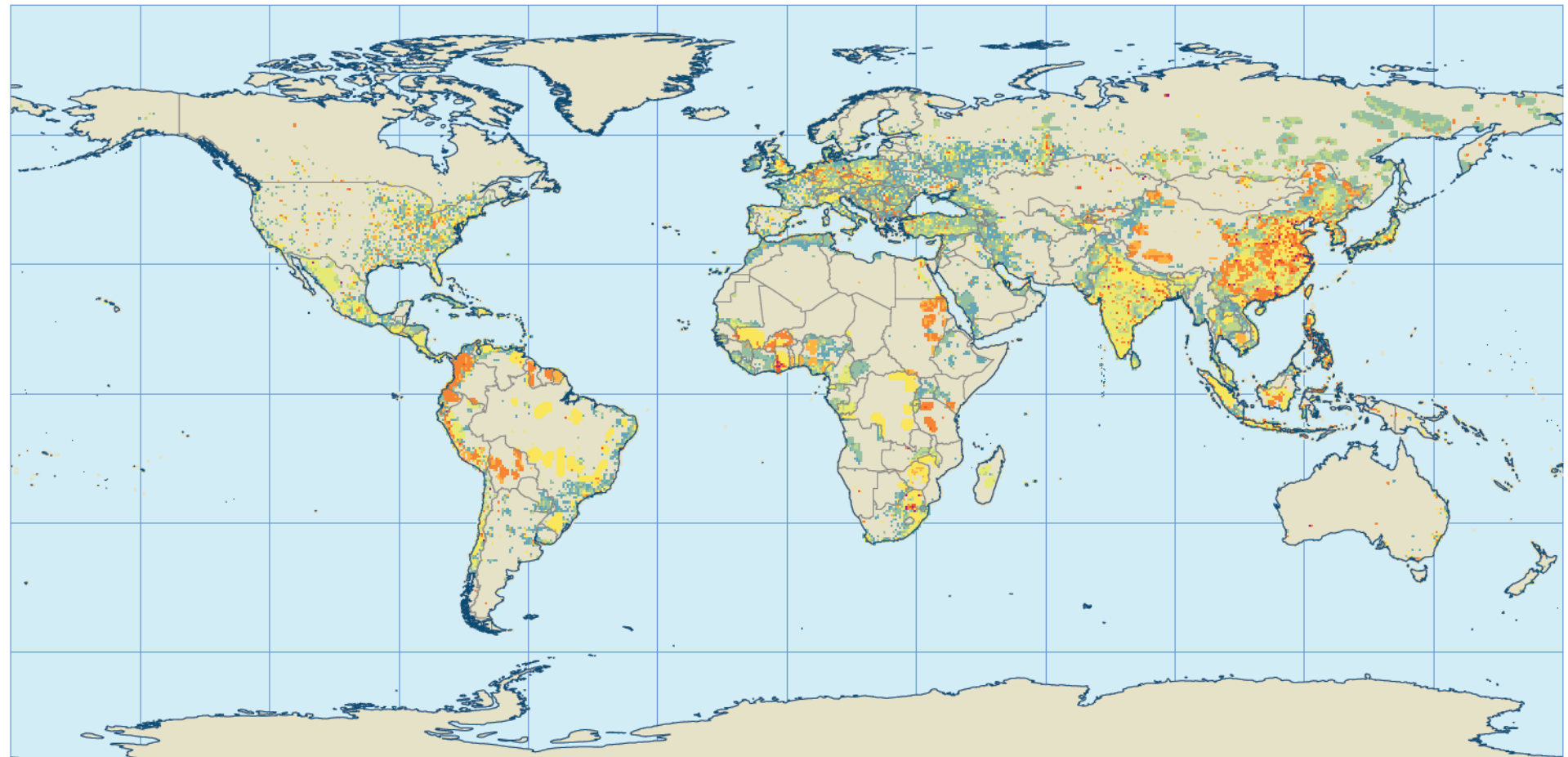
Summary

- Mercury is a global pollutant
- Sediments are potential secondary sources of contaminant
- Local contamination can affect human health, mainly through fish consumption

Sources of natural emissions in the hydrosphere



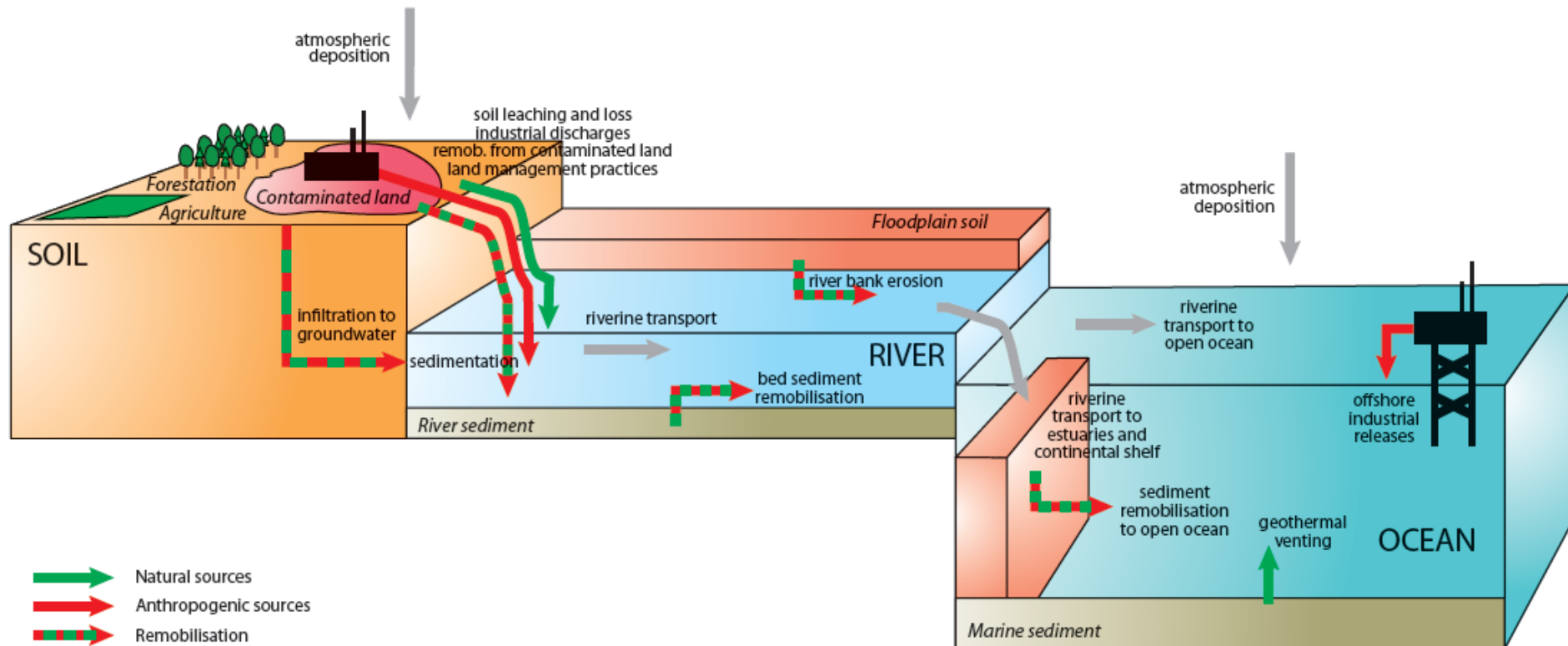
Sources of human emissions in the atmosphere



Total anthropogenic mercury emission to the atmosphere in 2010, g/km²



Sources of human aquatic releases



Contaminated sites

Garcia Bravo et al 2009

Table 4 Polluted lakes and reservoirs by chlor-alkali plant and similar activities

Site	Babeni Reservoir			Lake Balkydak			Lake Vänern			Fukuro Bay			Swedish Estuaries	
	Mean	Max	Surf	Mean	Max	Surf	Mean	Max	Surf	Mean	Max	Surf	Köpmanholmen	Skutskär
Hg concentrations (mg/kg)	5.5	44	2.5	76	617	151	–	<12 ^b	0.5 ^b	2.9 ^a	9 ^a	4.8 ^a	250 ^c	150 ^c
Reference	This study			Ullrich et al. 2007			Wihlborg and Danielsson 2006			Tomiyasu et al. 2006			Skylberg et al. 2007	

^aFukuro Bay core number13 (average and surface values from the most contaminated core in the area)

^bMost contaminated site of the western part of Kattfjorden bay

^cMaximun concentrations found in surface sediments

Minamata Bay (1960)
2000 mg/kg

Idrija Mine (2005-7)
200-1100 mg/kg