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MEDPOL

Regional Activity Centre for Cleaner Production

Diagnosis of mercury in the Mediterranean countries:

Key points

Workshop on Mercury Management and Decontamination

Almadén, December 2012

Methodology

Questionnaires sent to RAC/CP and **MEDPOL National Focal Points**

Submissions from Governments for the first session of the Intergovernmental Negotiating Committee to prepare a global legally binding instrument on Mercury (INC1).

Regional emission inventories and **environmental quality networks**: UNEP Hg Programme, UNEP/MAP NBB, UNECE-EMEP, EU-PRTR, and MEDPOL Programme.

Bibliography search: UNEP, EMEP, Basel Convention, OSPAR Commission, European Commission - DG Environment, Eurochlor, MAP/MEDPOL

Scientific literature.

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- Legal and Institutional Framework
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International Framework

- **UNEP :** An initiative for an **internationally legal instrument** to control Mercury was launched in 2009. Also UNEP develop activities on mercury through the **UNEP Global Mercury Partnership.**
- **Land-Based Sources (LBS) Protocol of the Barcelona Convention**. The Parties undertake to **eliminate inputs of 19 categories of substances** using CPs, and to implement **national and regional plans**.
- **Hazardous Waste Protocol of the Barcelona Convention** . If possible, **to eliminate movements** of HW in the Mediterranean Sea.
  - All Parties shall prohibit the **export and transit** of HW to developing countries,
  - Non-EU Parties shall prohibit **all imports and transit** of HW.
- UNEP/ **MAP Regional Plan on Mercury**.
  - ELV of 50 µg/litre for 2015 and 5 µg/litre as target value for 2019
  - ELV of 50 µg/Nm3 for waste incineration
  - Ban of chlor-alkali mercury cells in 2020

International Framework

EU Regulatory Framework

•Regulations whit ELV for Chlor-alkali sector and non-Chlor-alkali sector (50 µg/litre)

•Mercury from primary and secondary production will be considered as **waste**

•Ban on **exports** from the EU of

- metallic mercury,
- alloys (>95%),
- cinnabar ore,
- HgO and HgCl

•Restrictions on the sale of measuring devices containing mercury, and new rules on mercury safe storage.

International Framework

Other multilateral agreements:

- **Rotterdam Convention**, on trade of hazardous chemicals (pesticides and industrial chemicals).
- **Basel Convention**, on the Control of Transboundary Movements of Hazardous Wastes and their Disposal.
- **LRTAP Convention (+Protocol on Heavy Metals)**, on the limitation and gradual reduction and prevention of long-range transboundary air pollution. **EMEP** (European monitoring and evaluation programme) gives support with monitoring , including heavy metals.
- **OSPAR Convention**, on the protection of the marine environment of the North-East Atlantic.

•Other players: WHO, Mercury Policy Project and Zero Mercury working group

Legal framework in Mediterranean countries

- 4 Mediterranean countries (Algeria, Croatia, Morocco and Spain) have developed (2010) a **National Assessment on Mercury and/or a National Mercury Plan or Strategy**

- Measures **most implemented** for the management of mercury are:
  - –Inventory initiatives,
  - –Monitoring networks,
  - –Control of mercury use, production and emissions.

- Measures **less implemented** in the strategies are:
  - –Implementation of mercury substitution initiatives
  - –Control of mercury levels in population
  - –Development of mercury contaminated soil inventories.

Legal framework in Mediterranean countries

Most implemented regulations:

- water discharges.
- air emissions.
- waste incineration.

Regulations still in progress:

- restriction of mercury containing products.
- separate collection of mercury-containing wastes.
- trade of mercury.
- safe storage.

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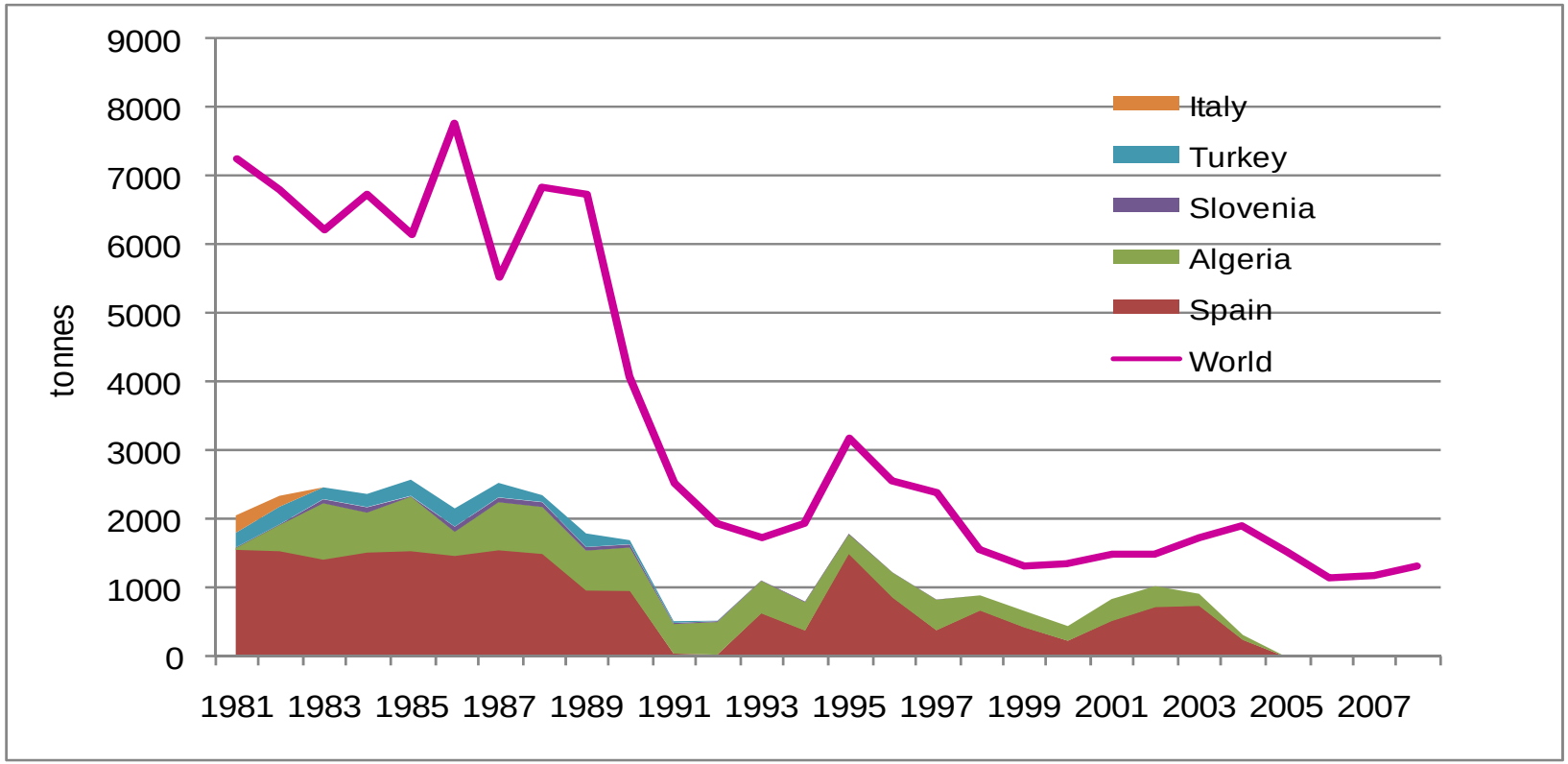
Primary production

- The Mediterranean region (mainly **Algeria and Spain**) provided roughly **half of global mercury supply** from 90s until 2003.
- Since 2003**, mercury is no longer mined in the region**
- **Currently China** and **Kyrgyzstan** are the two major primary producers of mercury.



Secondary production

- Mercury can be obtained in the Mediterranean region from the following sources:

  - Chlor-alkali industry.
  - Extracted from cinnabar ore
  - As by-product from non-ferrous metals mining, such as zinc, copper, lead, gold and silver.
  - From natural gas cleaning.

  - Recycling of mercury containing products.
  - Other stocks and inventories.

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Trade of mercury (data since 2011)

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COMTRADE data-base: UN Commodity Trade Statistics Division

Trade of mercury and mercury compounds worldwide: data available for 15 MAP countries:

- The only net exporters (since 2011) were Spain (221 tonnes), Italy (62 tonnes) and Turkey (20 tonnes).
- The other Mediterranean countries are net mercury importers

•**Basel Convention data-base**: trade of mercury containing wastes worldwide: data available for 6 MAP countries:

- Germany and France receive major mercury containing wastes from the Mediterranean region.
- Italy and France are the Mediterranean countries exporting more mercury containing wastes.

•**COMEXT data-base** :: Trade of mercury and mercury compounds for EU countries

Storage of mercury and mercury containing wastes

- **Mercury from decommissioned chlor-alkali cells** in EU was temporary stored in **Almadén** (Spain) since 2011. Currently Almadén has no stocks of mercury and doesn't trade anymore.
- The EC developed a report on the **requirements for facilities and acceptance criteria for the disposal of metallic mercury:**
  - **Sulphur inertization** of metallic mercury presents the highest level of environmental protection and acceptable costs.
- **No permanent facilities have been authorised** for the safe storage of mercury in the EU or in the Mediterranean region so far (2012)

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Mercury uses in Mediterranean region

- Main mercury uses are:
  1. **Chlor-alkali production**,
  2. **Batteries,**
  3. **Dental amalgams,**
  4. **Measuring and control devices,**
  5. **Light sources,**
  6. **Electrical and electronic devices,**
  7. **Mercury chemicals:** COD analyses, catalyst, preservative, disinfectant, reagent, pigment, etc.
  8. **Other applications:** porosimetry and pycnometry, calibration, etc.

Chlor-alkali plants in Mediterranean countries I

Country	Mercury cells	Use of mercury (t)	Comments
Spain	YES	Flix: 347 Martorell: 243 Vilaseca: 197 Sabiñánigo: 46 ~~Monzón: 40.~~	4 more plants in Atlantic basin
France	YES	Tavaux: 574 Lavera: 255 ~~St. Auban: n.a.~~	4 more plants in Atlantic basin Tavaux in conversion to membrane
Italy	YES	Pieve Vergonte: 74 Porto Marghera: 3 Priolo: n.a. ~~Bussi~~ ~~Rosignano: 5~~ ~~Picinisco: 0~~ ~~Torviscosa: 0~~	Picinisco and Torviscosa no longer operating Bussi was downsized to 80kt/cl2
Greece	YES	Thessaloniki: 48	
Syria	YES	10	
Israel	YES	1.5	

Country	Mercury cells	Use of mercury (t)	Comments
Morocco	YES	1 Plant: 4.5	1 plant in Atlantic basin with membrane
Algeria	**YES**	Baba Ali (Alger): 0.68-0.85.* Mostaghanem (west Algeria): 0.69.*	*mercury losses per year Switching to mercury-free process.(2010)
Slovenia	NO		
Tunisia	NO		One chlor-alkali plant adopted in 1998 a mercury-free membrane process.
Croatia	NO		Chlor-alkali plant (Kaštela) no longer operating.
Cyprus	NO		
Egypt	NO		All chlor–alkali mercury cells were phased out.

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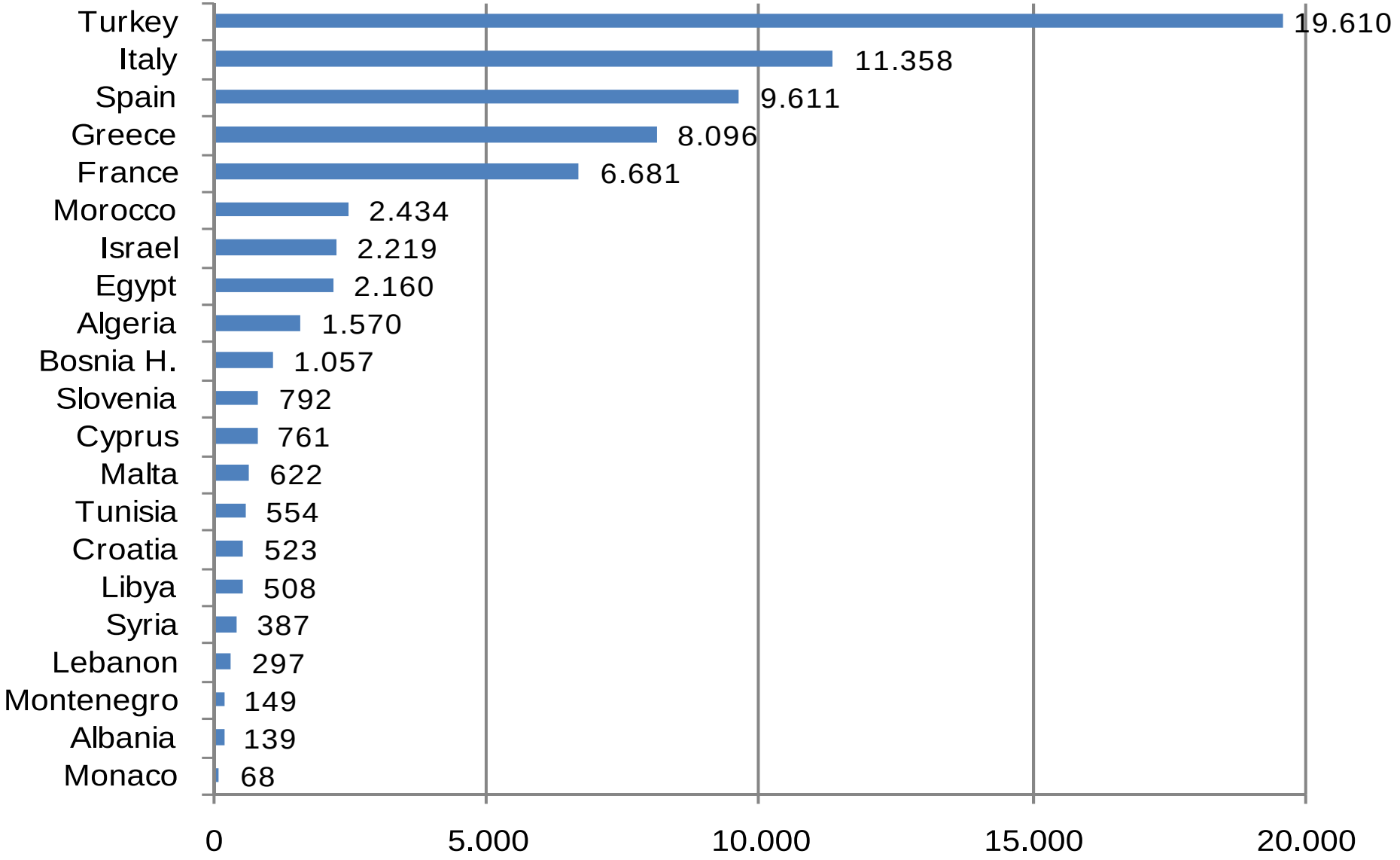
Mercury emission sources

- **Industrial processes**, mainly **chlor-alkali plants**
- **Unintentional mercury emissions**:
  - **Coal combustion (power plant),**
  - **Production of pig iron and steel,**
  - **Production of non-ferrous metals,**
  - **Cement production,**
  - **Waste treatment.**
- **Intentional use of mercury containing products (**dental amalgams, batteries, measuring and control devices, mercury light sources, electrical and electronic devices, mercury chemicals).

Emissions from the different stages:

- **From production,**
- **By breakage or loss of the products during use,**
- **During disposal of the products after their use (directly to soil or landfill and subsequently to water and air).**

Estimated mercury atmospheric emissions in Mediterranean countries (kg yr-1).



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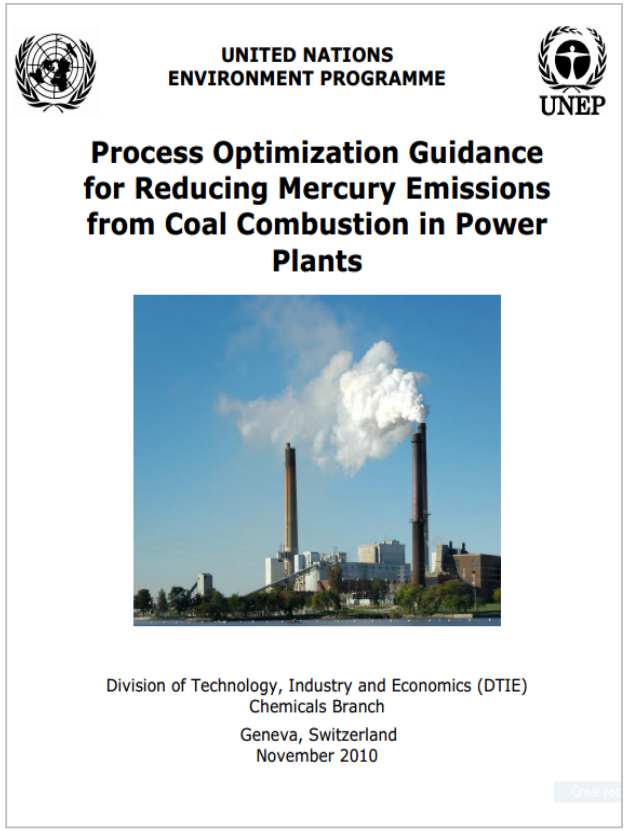
•**Technologies** for **<u>reducing</u>** mercury emissions from the combustion of **fossil fuels**, **cement**, **non-ferrous metal industries**, **pulp and paper industry** and **iron foundries** are **technically and economically feasible**.



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Mercury substitution

- **Mercury-based chlor alkali production** can be substituted by the **membrane cell technology** (considered as **BAT**).

- **Mercury-free alternatives** are available and currently used for:
  - **Thermometers,**
  - **Dental amalgams,**
  - **Sphygmomanometers,**
  - **Thermostats,**
  - **Batteries (except button batteries),**
  - **Switches and relays**
  - **High Intensity Discharge (HID) automobile lamps.**

- There are still no market alternatives for:
  - **Button cell batteries**
  - **Mercury containing lamps (e.g. fluorescent tubes, compact fluorescent and HID lamps)**

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UNITED NATIONS
ENVIRONMENT PROGRAMME
CHEMICALS

UNEP

Guide for Reducing Major Uses and Releases of Mercury

June 2006

IOMC INTER-ORGANIZATION PROGRAMME FOR THE SOUND MANAGEMENT OF CHEMICALS
A cooperative agreement among UNEP, ILO, FAO, WHO, UNIDO, UNITAR and OECD

European Commission
Directorate-General Environment
Contract: ENV.G.2/ETU/2007/0021

Options for reducing mercury use in products and applications, and the fate of mercury already circulating in society

FINAL REPORT

December 2008

EAWEST

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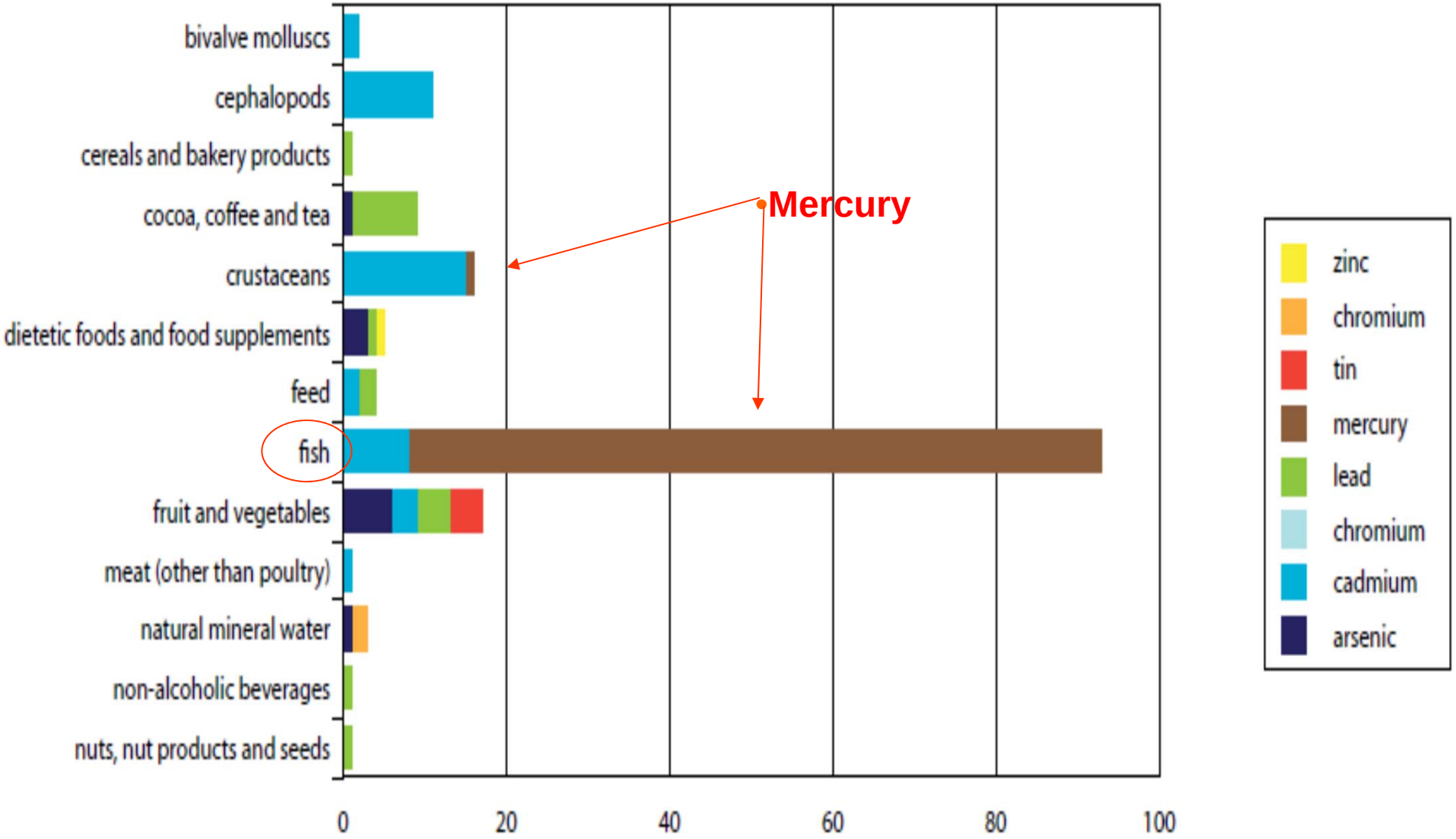
Monitoring networks

- **Marine environment**: regional (MEDPOL) and some national programmes (e.g. RNO-FR; SI.DI.MAR-IT).
- **Air**: regional (UNECE/EMEP, EEA/ AIRBASE) and national monitoring networks in 10 mediterranean countries
- **Inland waters**: information at national level for 12 countries, and in EU countries compiled by WISE (*Water Information System for Europe*).

- **Human blood / breast milk**: very few information available
- **Food & Feed**: Hg monitored in EU and other med countries,

Notifications of heavy metals under the EU Rapid Alert System for Food and Feed (RASFF) in 2008



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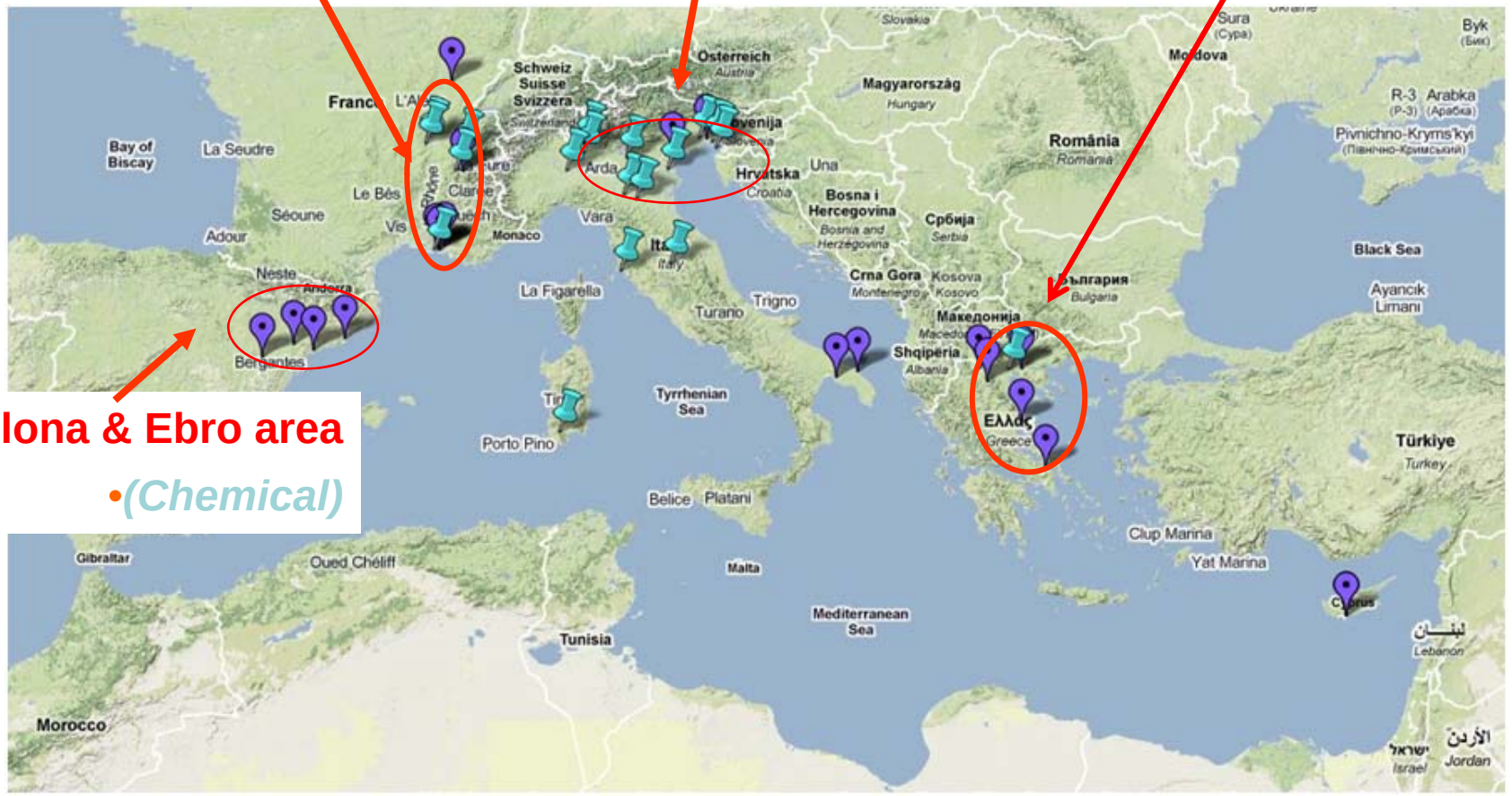
Top 20 Atmospheric and Water mercury emission hot spots (PRTR - EU), 2007

- **Gulf of Fos & Rhone area**
- *(Chemical, oil refining)*
- *(Chemical, WWTPs)*

- **Gulf of Trieste & Po area**
- *(Chemical, energy)*
- *(Energy, WWTPs)*

- **Aegean**
- *(Cement, energy)*

- **Barcelona & Ebro area**
- *(Chemical)*



Hot spots – mining areas

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Old mercury mining sites in the Mediterranean region

- ***Enriched levels of Hg have been reported in the surrounding environment of all mining areas***
- ***In Spain, only Valle del Azogue (Almeria) drains to Mediterranean basin***

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Recommendations

Separate collection and mercury recovery from mercury containing wastes such as batteries, end-of-life vehicles and electrical and electronic equipment must be encouraged and regulated.

•The future surplus in the Mediterranean region and the potential needs for **safe storage of metallic mercury** should be further explored.

•The **environmentally sound management of mercury-containing wastes** must be ensured

•As an intermediate stage, the development of an exhaustive and detailed **data-base on trade of mercury-containing products** of Mediterranean countries would be highly recommended.

•For all products for which a **mercury-alternative** is safe, available and economically competitive, **enforcement measures** should be contemplated (measure instruments and dental amalgams).

Recommendations

- For heavily polluting industries, like **coal combustion plants, waste incineration and cement production**, legislation should require the use of less polluting production methods and pollution prevention technologies or "**Best Available Techniques**" (BAT) with **associated emission limit values** (ELV).

- Monitoring networks of mercury in the different compartments (air, water, soil) need to be reinforced, especially in eastern and southern Mediterranean countries

- Follow-up actions should be taken to ensure that **mercury hot spots** are properly **remediated** and the surrounding environment evolves positively.

- **It is strongly recommended that a comprehensive and multidisciplinary analysis (National Assessment and/or a National Plan) is done in every Mediterranean country.**

Thank you very much !

Frederic Gallo
Project Manager
RAC / CP