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# CHEMICAL POLLUTION AND ITS SOURCES

## CHALLENGE FOR THE BLACK SEA

EMBLAS-Plus  
Environmental Monitoring in the Black Sea



### Pollution by hazardous chemical substances:

substances toxic to living marine organisms already at very low concentration levels ( $\mu\text{g/L}$ ); chemicals with potential to accumulate in fish and mussels used for human consumption can cause adverse effects on human health.

### 5 MAIN SOURCES OF CHEMICAL POLLUTION:

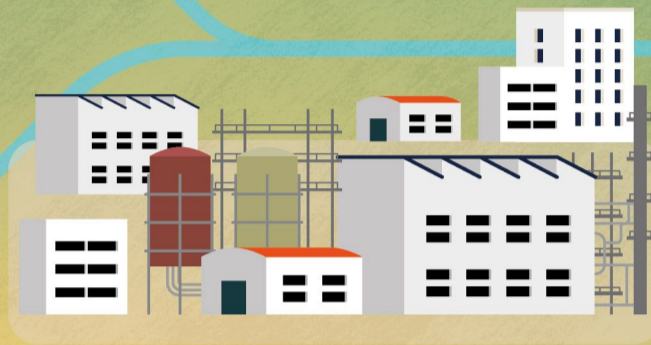
#### 1. Municipal waste waters

e.g. antibiotics, biocides, plasticisers, flame retardants, personal care products



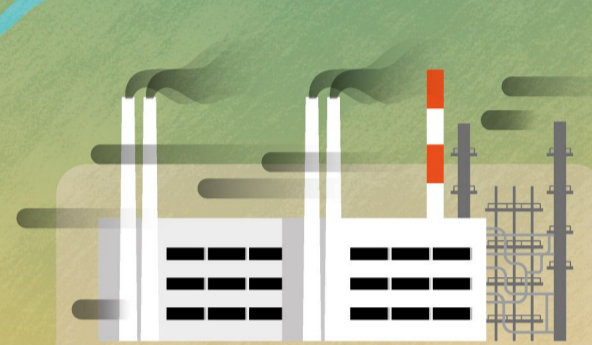
#### 2. Industrial waste waters

wide variety of chemicals



#### 3. Long-range air transport

e.g. mercury from combustion of coal in power plants



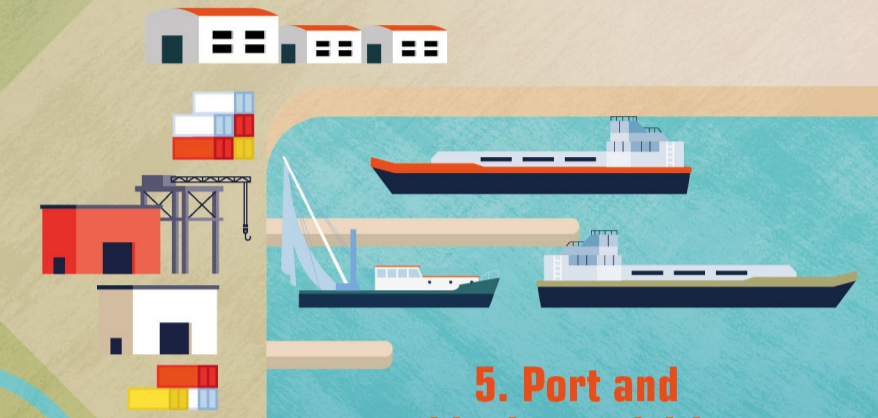
#### 4. Agriculture

e.g. pesticides, veterinary pharmaceuticals



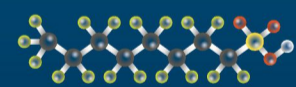
#### 5. Port and shipping activities

e.g. oil spills (polyaromatic hydrocarbons), antifouling chemicals in ships' paints (e.g. irgarol)

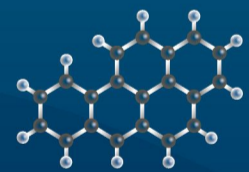


### EMBLAS-II achievements\*

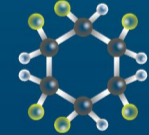
Compliance with European Union (EU) Water Framework Directive – all **45 priority substances** regulated at the EU level analysed in Black Sea water and biota samples. Widespread exceedance of toxicity threshold values (Environmental Quality Standards; EQS) by:



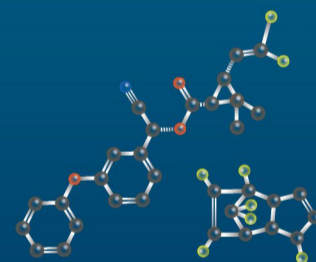
PFOS  
Anthropogenic fluorosurfactant and global pollutant



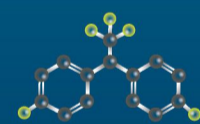
Benzo(a)pyrene  
Indicator of oil pollution



Hexachloro-cyclohexane  
Pesticide

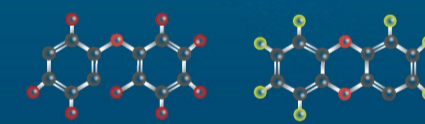


Cypermethrin, heptachlor and heptachlor epoxide  
Insecticides



#### Found in dead dolphin

Extremely high contamination by PBDEs, organochlorine pesticides (e.g. DDT - banned for several decades), dioxin-like compounds and mercury



#### Found in fish and molluscs

Mercury, polybrominated diphenylethers (PBDEs; flame retardants), dioxins and dioxin-like compounds



### Black Sea Specific Pollutants

Non-regulated chemicals dangerous for the sea ecosystem and human health. Screening was done for more than 40,000 potential pollutants in each sample of water, sediments and biota. Out of them, **124 pollutants** identified, including persistent organic pollutants, pesticides, flame retardants, sunscreen agents etc.



### Digital Sample Freezing Platform

A globally unique computer database allowing for retrospective search of tens of thousands chemical compounds  
<https://norman-data.net/Verification/>

### Black Sea Water Quality Database

More than 208,000 data entries from the EMBLAS surveys out of which 150,000 on chemical contaminants in water, sediment and biota  
<http://blackseadb.org/>

### WHAT CAN WE DO ABOUT IT?

We can all act to make things better!

**As a citizen:** select eco-friendly products to reduce your chemical footprint on the environment. Use durable products. Do not throw unused pharmaceuticals into the toilet.

**As a decision maker:** Ensure establishment of a proper joint monitoring programme to identify and reduce sources of Black Sea Specific Pollutants; develop Programme of Measures to reduce the pollution by:

- improvement of municipal and industrial wastewater treatment facilities,
- reducing the use of pesticides in agriculture,
- banning of the most hazardous substances from use in the Black Sea basin using EU legislative tools.

More information at [emblasproject.org](http://emblasproject.org)

\* More information at [http://emblasproject.org/wp-content/uploads/2019/07/EMBLAS-II\\_NPMS\\_JOSS\\_2017\\_ScReport\\_FinDraft2.pdf](http://emblasproject.org/wp-content/uploads/2019/07/EMBLAS-II_NPMS_JOSS_2017_ScReport_FinDraft2.pdf)

