

How Citizen Monitors Can Participate in International Pellet Watch: The Global Monitoring of Persistent Organic Pollutants (POPs) using Beached Plastic



Updated
Jan.
2009

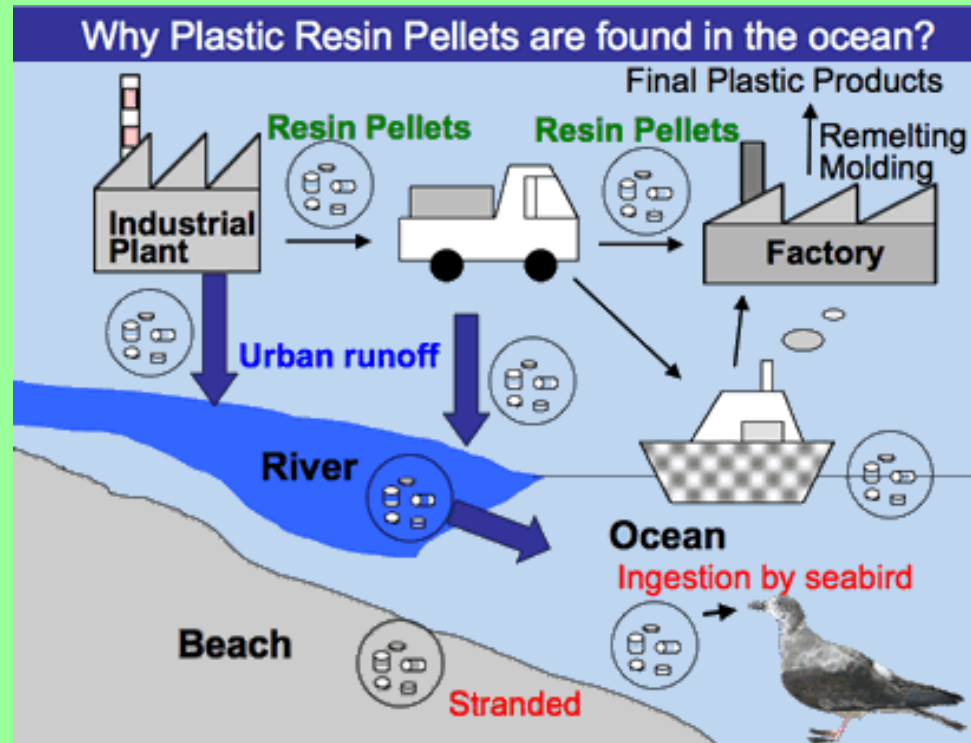
What is a plastic resin pellet?

Plastic resin pellets are small granules generally with shape of a cylinder or a disk with a diameter of a few mm. These plastic particles are industrial raw material transported to manufacturing sites where "user plastics" are made by re-melting and molding into the final products. Resin pellets can be unintentionally released to the environment, both during manufacturing and transport. The released resin pellets are carried by surface run-off, stream, and river waters eventually to the ocean. Resin pellets can also be directly introduced to the ocean through accidental spills during shipping. Because of their environmental persistence, they are distributed widely in our oceans and are found on beaches all over the world.



<http://www.macdonaldproductions.com/hottopic.shtml>

There are 22,000 individual pellets in one pound of plastic resin pellets



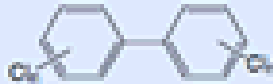
<http://www.tuat.ac.jp/~gaia/ipw/index.html>

Why are plastic resin pellets harmful?

- A growing production of plastic leads to a measurable increase in plastic pollution in the ocean.
- In 2001, we revealed the existence of various organic micropollutants (i.e., polychlorinated biphenyls : PCBs, DDE, and nonylphenol) in plastic resin pellets collected on beaches (Mato et al., 2001). Because the resin pellets accumulate organic pollutants such as PCBs and organochlorine pesticides and the pellets, distributed on world beaches, and collection and shipping of the pellets are easy, we propose Global Monitoring of Persistent Organic Pollutants (POPs) using Beached Plastic Resin Pellets.

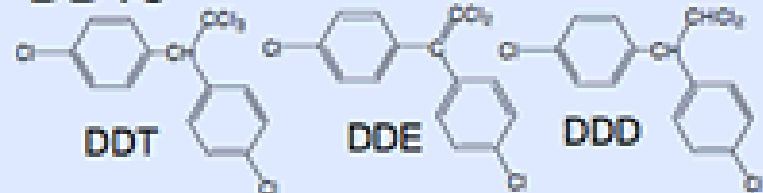
Pollutants and Plastic Resin Pellets

PCBs



- Industrial products for a variety of uses including dielectric fluid, heat medium, and lubricants.
- Endocrine disrupting chemicals

DDTs



- DDT and its metabolites such as DDE and DDD.
- DDT was used as insecticides
- Endocrine disrupting chemicals

adsorption from
ambient seawater

HCH



- Insecticide

Pellet

additives

Nonylphenol (NP)



- Antioxidant (TNP)
- Raw material of plastic additives
- Endocrine disrupting chemicals

Citizen Monitors Can Help A Global Monitoring Program That Is Investigating Persistent Organic Pollutants By Collecting Preproduction Plastic Pellets

This monitoring is based on a finding that marine plastic resin pellets adsorb hydrophobic organic pollutants with concentration factor up to 1,000,000. The purpose of International Pellet watch is to understand the current status of global POPs pollution.

Beached plastic resin pellets collected by Citizen Monitors in California will be sent to the Clean Water Team. Our goal is to receive samples from *ten beaches* located through-out California.

Organic micro-pollutants, PCBs and organochlorine pesticides, in the pellets will then be analyzed Dr. Hideshige Takada's Laboratory of Organic Geochemistry at the Tokyo University of Agriculture and Technology.



Q: How many pellets are needed per location?

A: **Two hundred pellets** per location would be perfect!

Q : What type of pellets are suitable?

A: We prefer **discolored (yellowing;** see picture below) pellets rather than white pellets. This is because discoloration (yellowing) occurs while floating at sea and discolored (yellowed) pellets have longer time to adsorb pollutants



White Pellets



Yellow Discolored Pellets

Pellets usually can be found along the high-tide line This usually can be detected as the wrack of ocean debris (sea weed, trash...) seen along the beach. Even if the beach has been groomed, pellets can be found.



Pick up the pellets
using metal tweezers.



And place the
pellets in an
aluminum
envelope.

Q : How should the pellets be sent?

A: Collected pellets should be wrapped with **aluminum foil and then placed into a **paper envelope**.**

During 2006

CA Monitors

Can send the pellets to:

The Clean Water Team

Attn: Erick Bures

C/O LARWQCB

320 West Fourth Street, Suite 200

Los Angeles, CA 90013



Alternative Mailing

Address:

**Laboratory of Organic
Geochemistry, Dr. Hideshige
Takada,**

**Tokyo University of
Agriculture and Technology,
Fuchu, Tokyo 183-8509, Japan**

Note: If aluminum foil is not available, you can wrap the pellets with paper.

Warning: Do not put pellets in plastic film or in plastic bags as these samples will be rejected.

Q : What kind of information should be enclosed?

A: Please provide your name, contact address, e-mail address.

We also need to know exact location where you collected the pellets. GPS information (latitude and longitude) and/or detailed map is required. Information about area or length of beach where you collect the pellets is also necessary.

Please conduct your sampling within a one day time frame. It only took the Clean Water Team Coordinator 10 minutes to find 200 pellets but it could take longer.

Samples should be mailed to the Clean Water Team by Mid March.

Plastic Resin Pellet Collection Data Sheet

Name: _____

Organization: _____

Address: _____

E-Mail Address: _____

Date of Sample Collection: _____

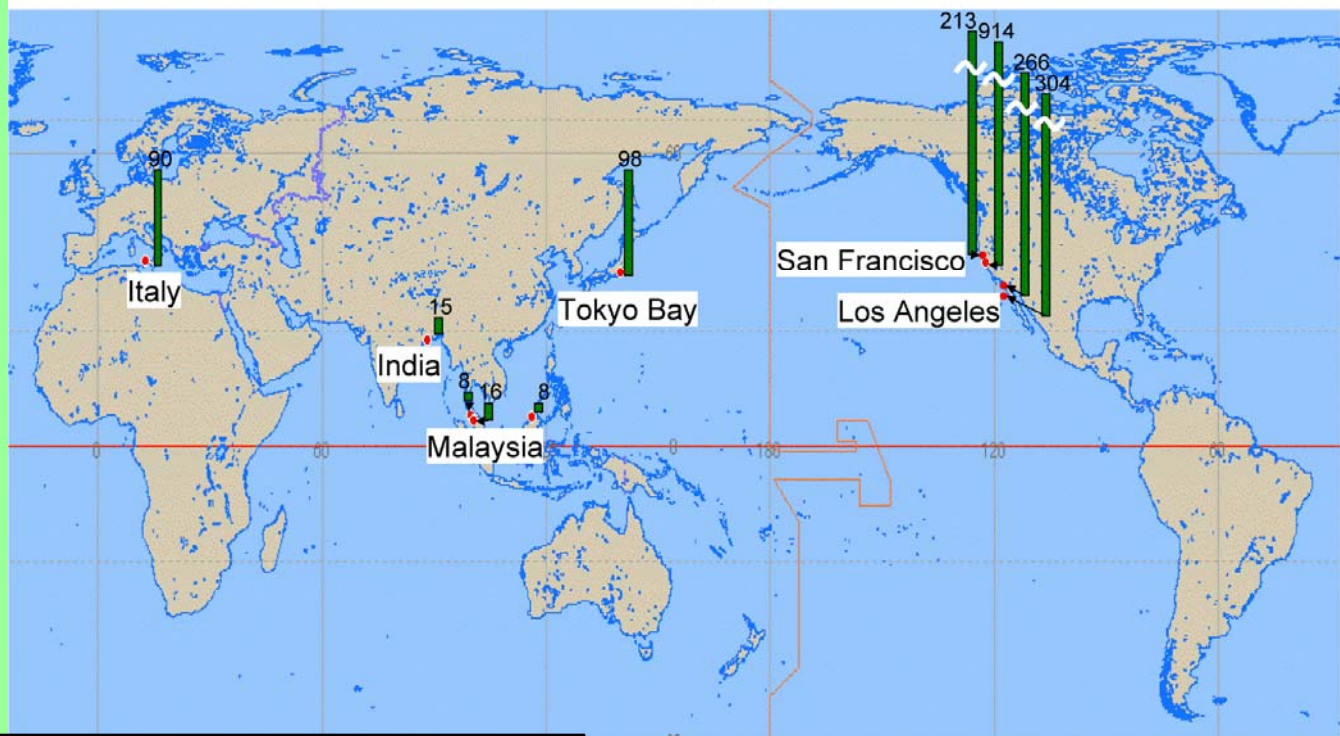
Location Name: _____

Latitude: _____ Longitude: _____

Area (i.e. square ft) or Transit Length of Beach
Sampled: _____

Preliminary Results- March 2007

PCB concentrations in beached resin pellets collected from world beaches



Preliminary Results of PCB Concentrations in Beached Resin Pellets

PCB* concentrations (ng/g-pellet)

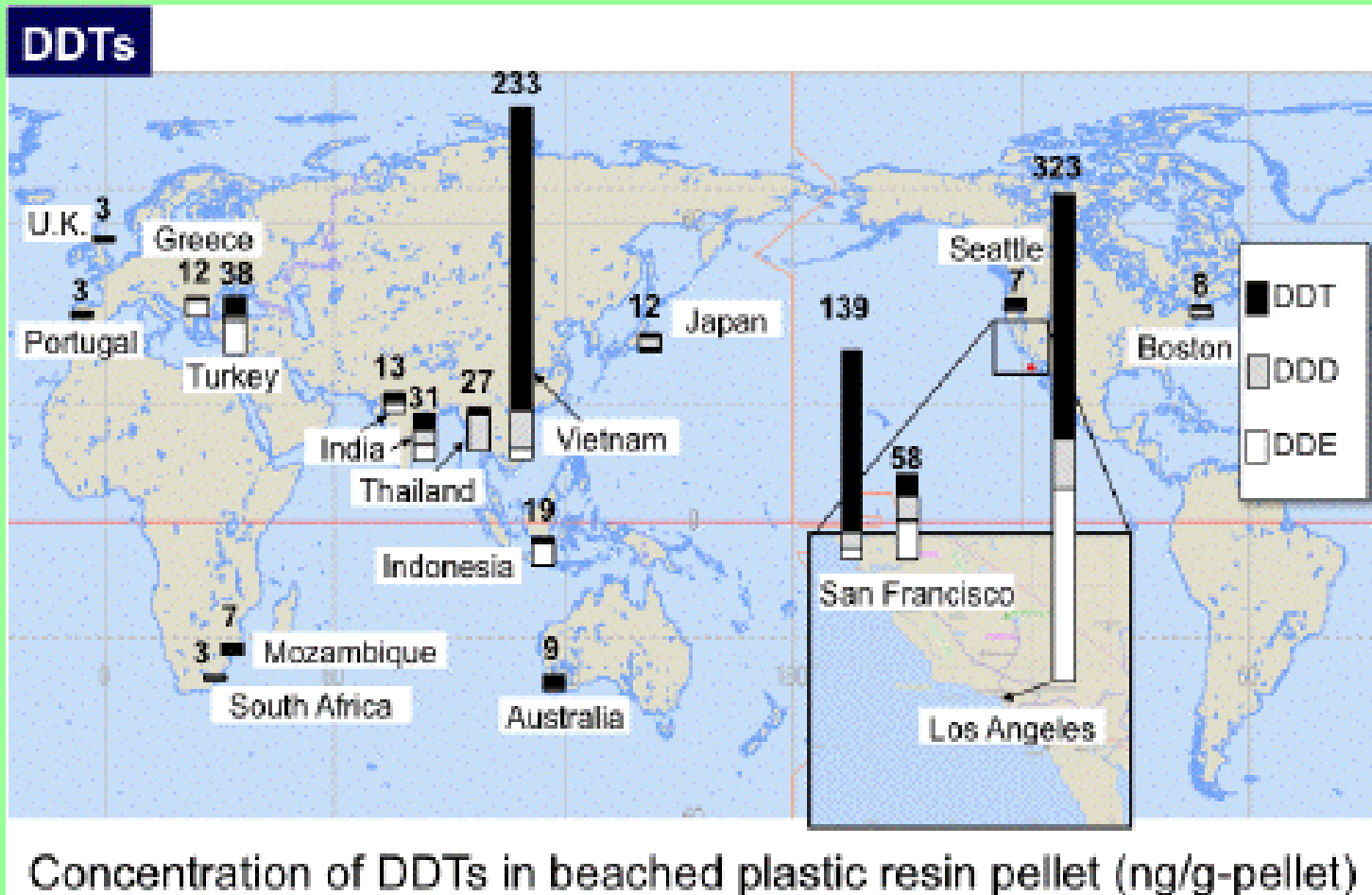
Sum of IUPAC no. 66/95, 90/101, 115/87, 110/77, 149, 118, 132/153, 105, 138/160, 187, 128, 180

Sample ID	Country	Location	PCB conc.(ng/g)
06040500	U.S.A	Ocean Beach, San Francisco	914
06011000	U.S.A	Long Beach, California	266
06012000	U.S.A	Hermosa Beach, California	304
06062601	U.S.A	Drakes Beach, San Francisco	213
06081900	Italy	beach at Trapani, Sicilia	90

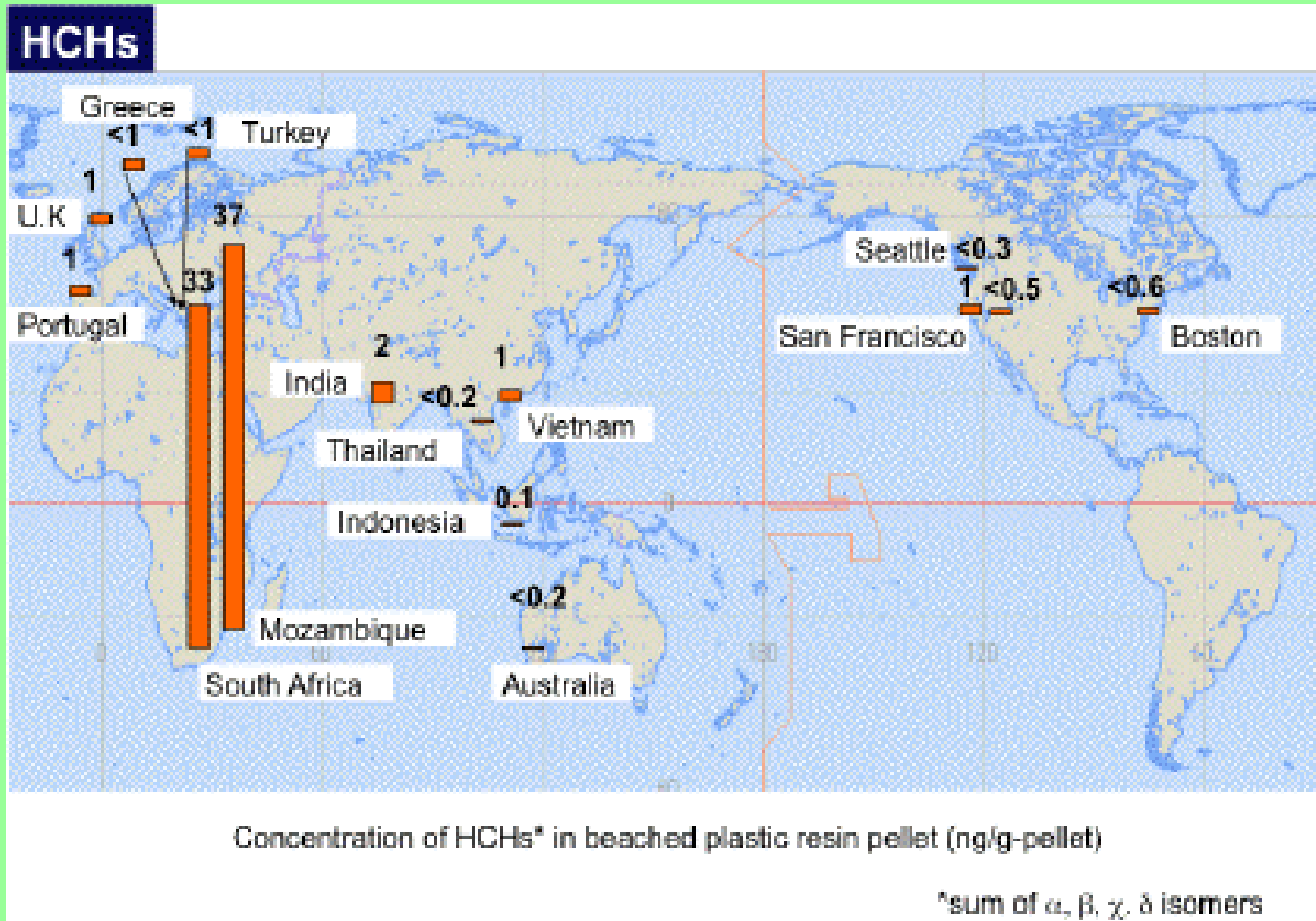
Preliminary Results- January 2009

<http://www.tuat.ac.jp/~gaia/ipw/en/map.html>

DDT



HCH's

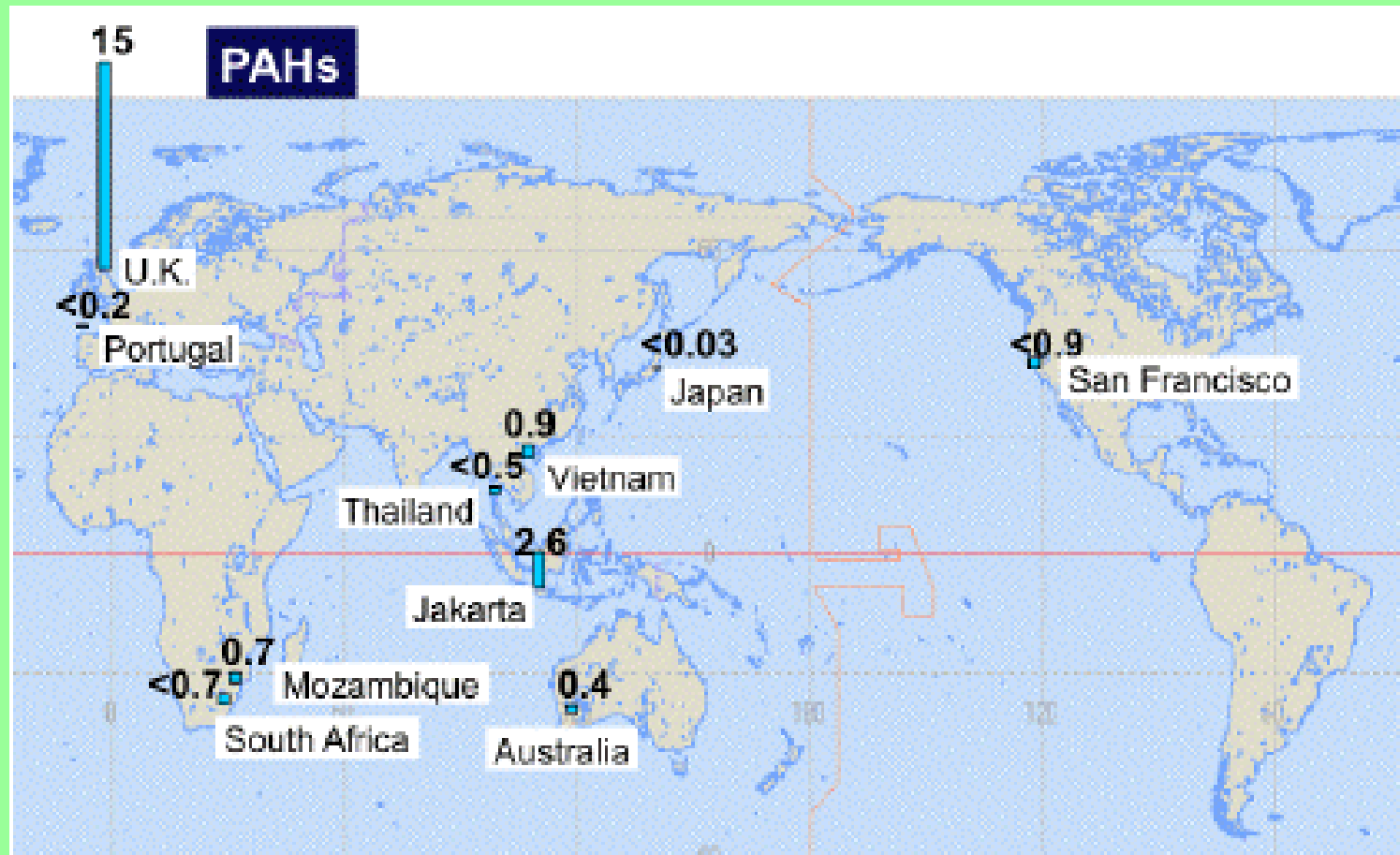


Hopanes



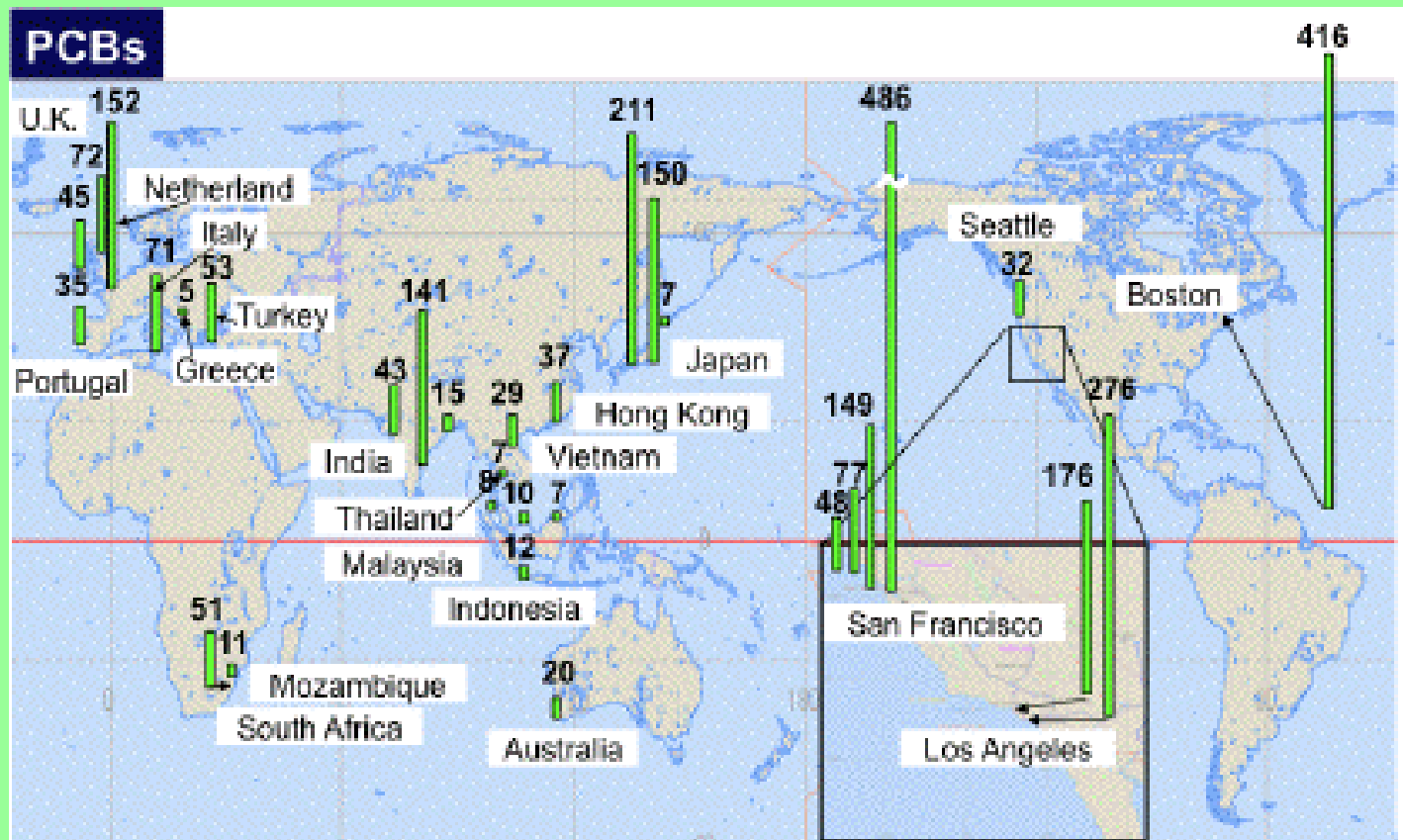
Concentration of Hopanes in beached plastic resin pellet ($\mu\text{g/g-pellet}$)

PAH's



Concentration of PAHs in beached plastic resin pellet ($\mu\text{g/g-pellet}$)

PCB's



Concentration of PCBs* in beached plastic resin pellet (ng/g-pellet)

*sum of concentrations of CB#66, 101, 110, 149, 118, 105, 153, 138, 187, 180, 170, 206

Measured by Polaris Q (Thermo Fisher Scientific)

References

For Additional information about INTERNATIONAL PELLET WATCH you can find a presentation that was made for **The Plastic Debris Rivers to Sea Conference**. [The Plastic Debris Rivers to Sea Conference](#)

Concentration of polychlorinated biphenyls (PCBs) in beached resin pellets: Variability among individual particles and regional differences. Satoshi ENDO, Reiko TAKIZAWA, Keiji OKUDA, Hideshige TAKADA, Kazuhiro CHIBA, Haruyuki KANEHIRO, Haruo OGI, Rei YAMASHITA, Takeshi DATE, *Marine Pollution Bulletin*, in press, 2005.

Plastic Resin Pellets as a Transport Medium of Toxic Chemicals in the Marine Environment. Mato Y., Isobe T., Takada H., Kanehiro H., Ohtake C., and Kaminuma T. , *Environmental Science & Technology*, vol.35.318-325

Ocean and Beach Debris Studies

By CA Citizen Monitors

- Composition and distribution of beach debris in Orange County, California.

http://www.sccwrp.org/pubs/annrpt/99-00/abst09_ar10.htm

- A comparison of plastic and plankton in the North Pacific central gyre.

http://www.sccwrp.org/pubs/annrpt/99-00/abst10_ar11.htm



For Information and Educational
Materials about oceanic and beached
plastic debris visit Algalita Marine
Research Foundation
<http://www.algalita.org>



For additional information and
questions please contact
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or

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