Passive *In Situ* Sampling Technologies for Ultratrace Aqueous Concentrations of Organic Contaminants

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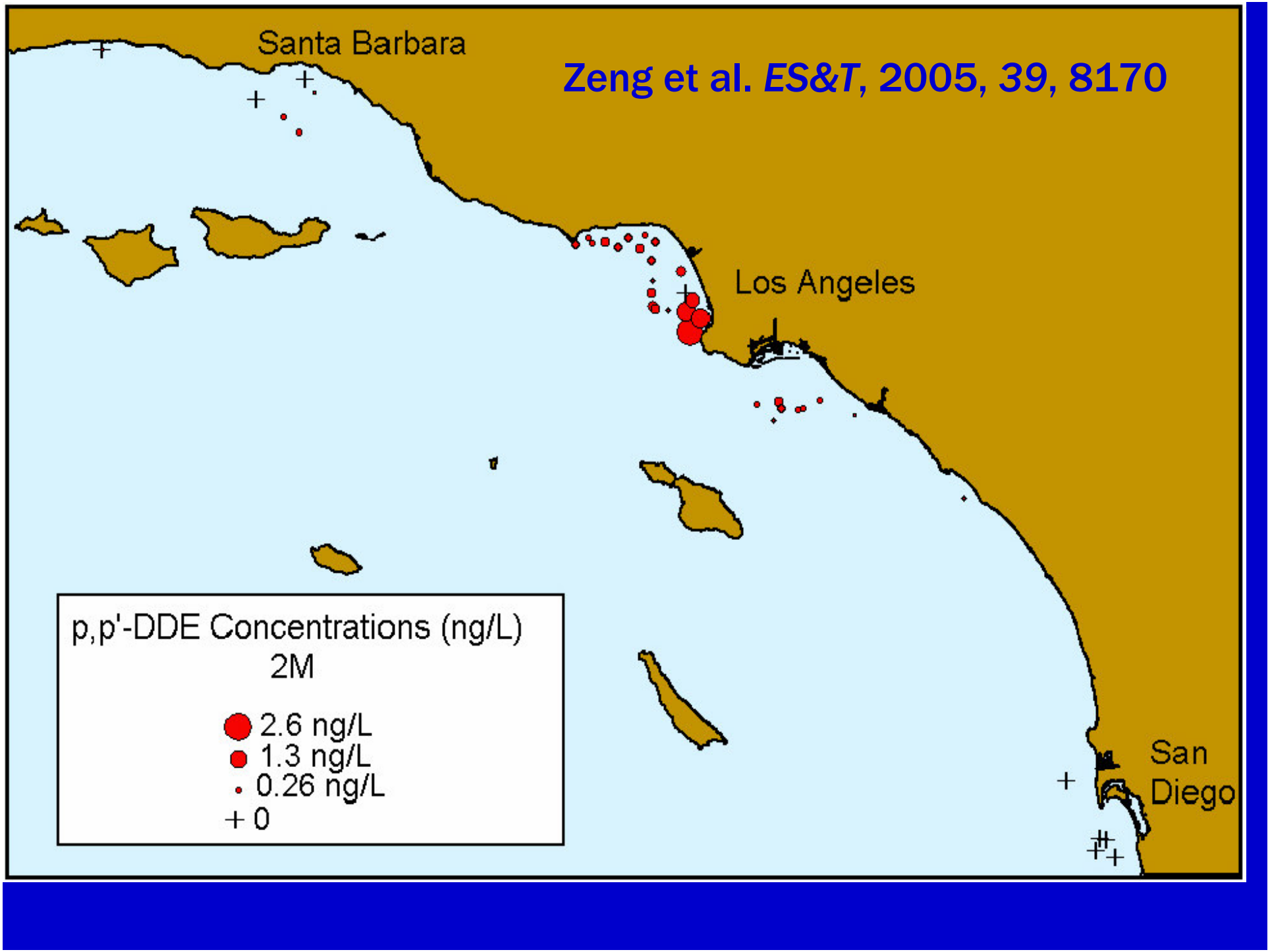
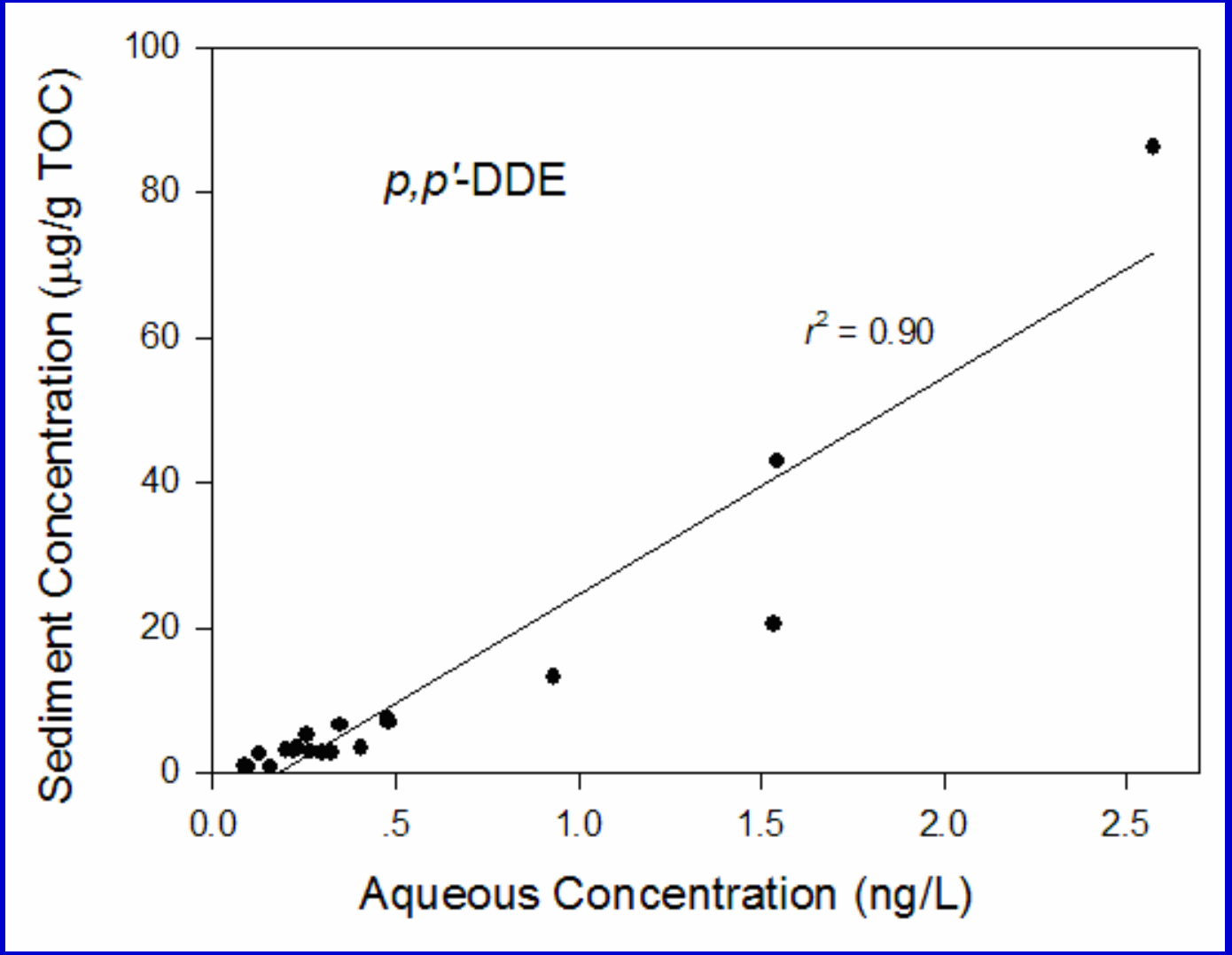
Active vs. passive technologies

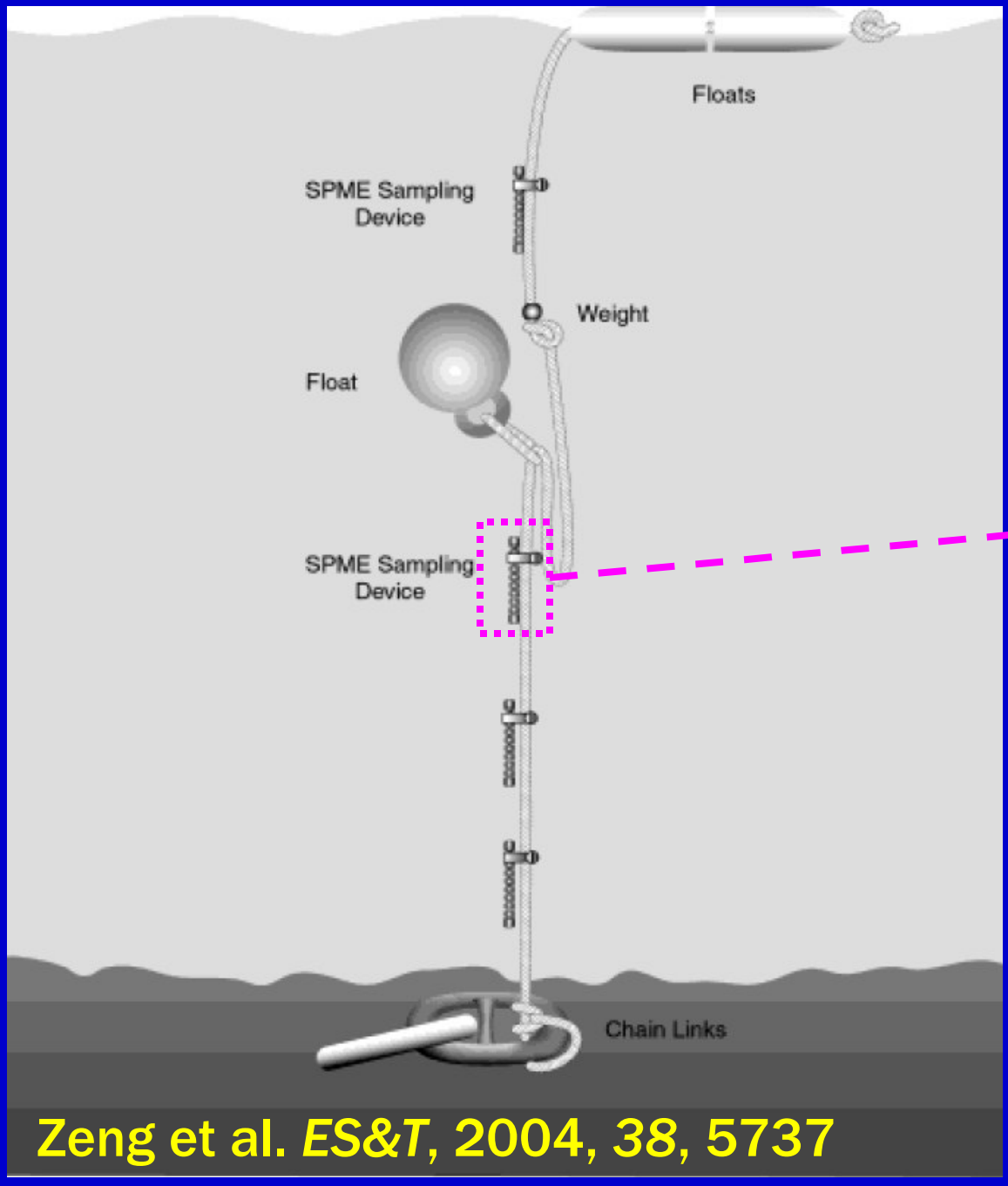
- Large volume water samples
  - Pumped through sorbent in situ
  - Extracted post-collection (e.g LLE)
  - In situ/remote sensing
- Membrane dialysis (SPMDs)
- Passive *sorption* using
  - *Polyoxymethylene (POM) sheets*
  - *Solid phase microextraction (SPME)*
  - *Polyethylene devices (PEDs)*


Santa Barbara
Zeng et al. *ES&T*, 2005, 39, 8170
Los Angeles
San Diego
p,p'-DDE Concentrations (ng/L)
2M
2.6 ng/L
1.3 ng/L
0.26 ng/L
0

Sediment-Water Correlation

Is sediment the source of water column DDTs?





Zeng et al. *ES&T*, 2004, *38*, 5737

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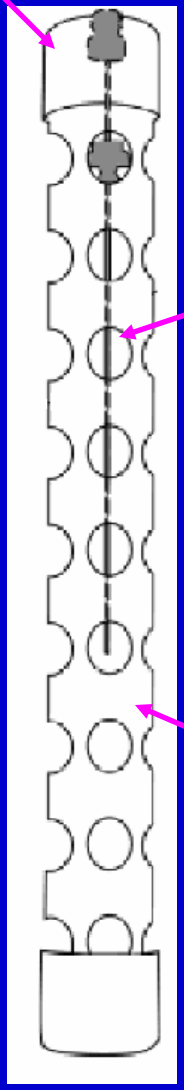
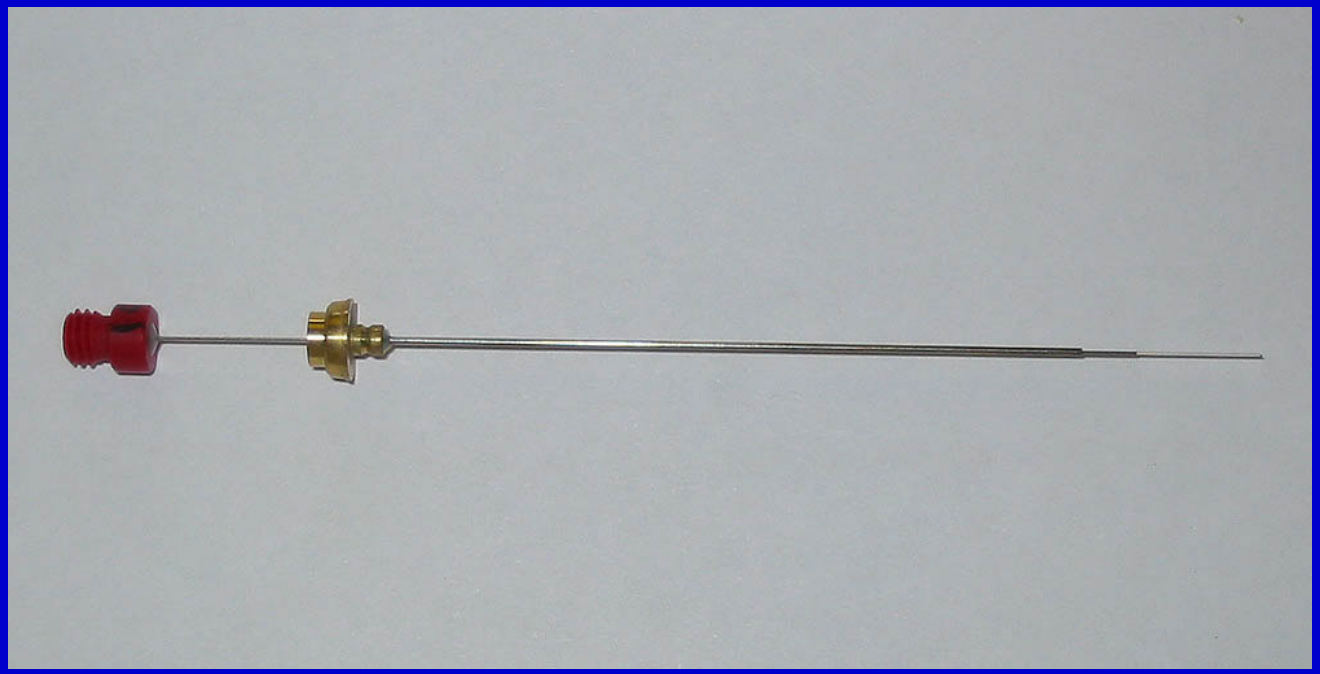


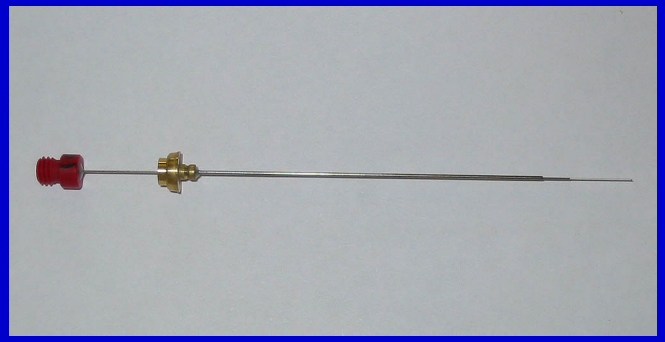
SPME fiber (100 μm PDMS)

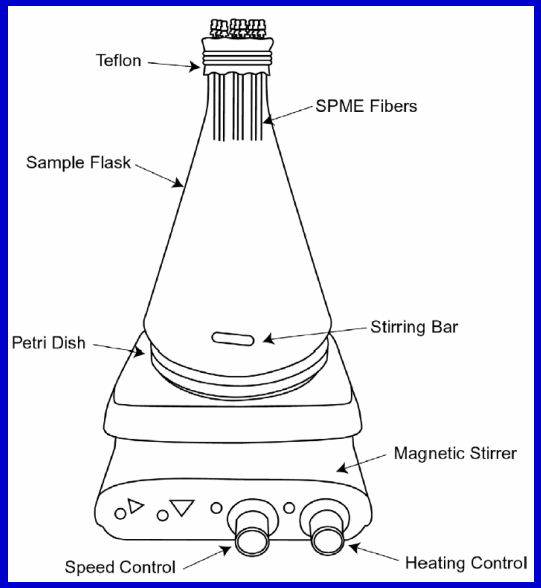
Copper casing

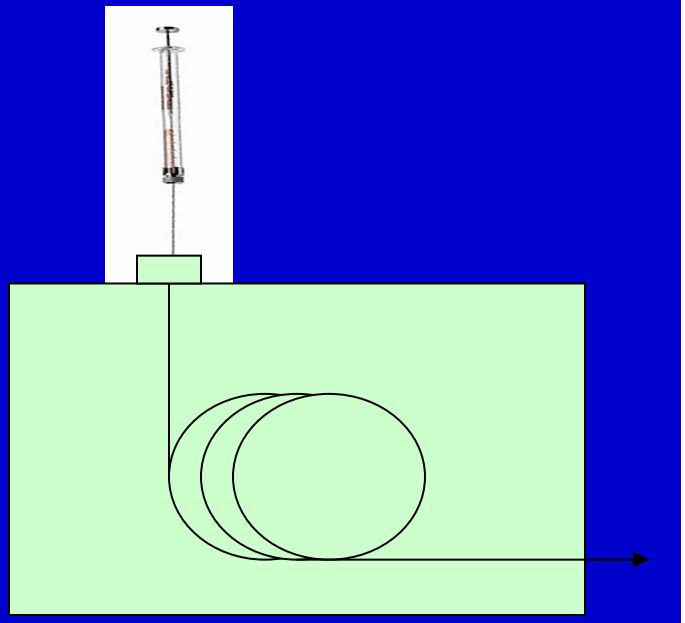
Solid Phase Microextraction (SPME)



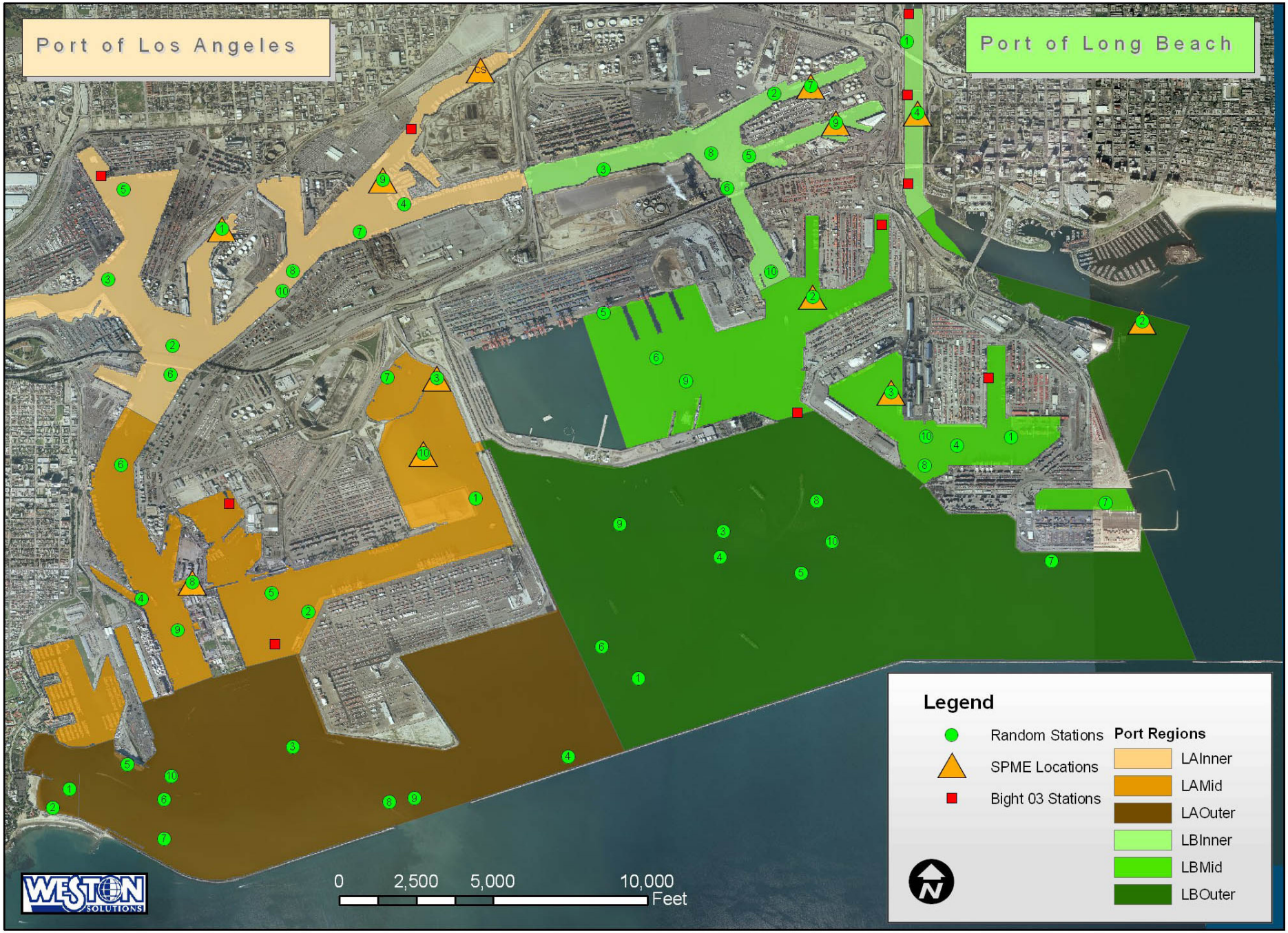
- Polymer coated glass fiber (Arthur & Pawliszyn 1990)
- Selective sorptive coatings (e.g. PDMS for HOCs)
- *Multimedia applications*, minimal processing, direct analysis by thermal desorption GC-MS







- PDMS coating thicknesses: 7, 30 and 100 μm
- $N_f = (K_f V_f) * C_w$ -→ *pre-determine* K_f , t_{eq}
- ***Sub-ppb*** C_w w/o extraction solvents/processing
- *Temp, thickness dependence,* Precision


Port of Los Angeles
Port of Long Beach
Legend
Random Stations
SPME Locations
Bight 03 Stations
Port Regions
LAInner
LAMid
LAOuter
LBInner
LBMid
LBOuter
0
2,500
5,000
10,000
Feet
WESTON SOLUTIONS