The sediment record of harmful algal blooms (HABs) in Manila Bay and Juag Lagoon, Philippines

Fernando P. Siringan, Joan Reotita, Rhodora Azanza

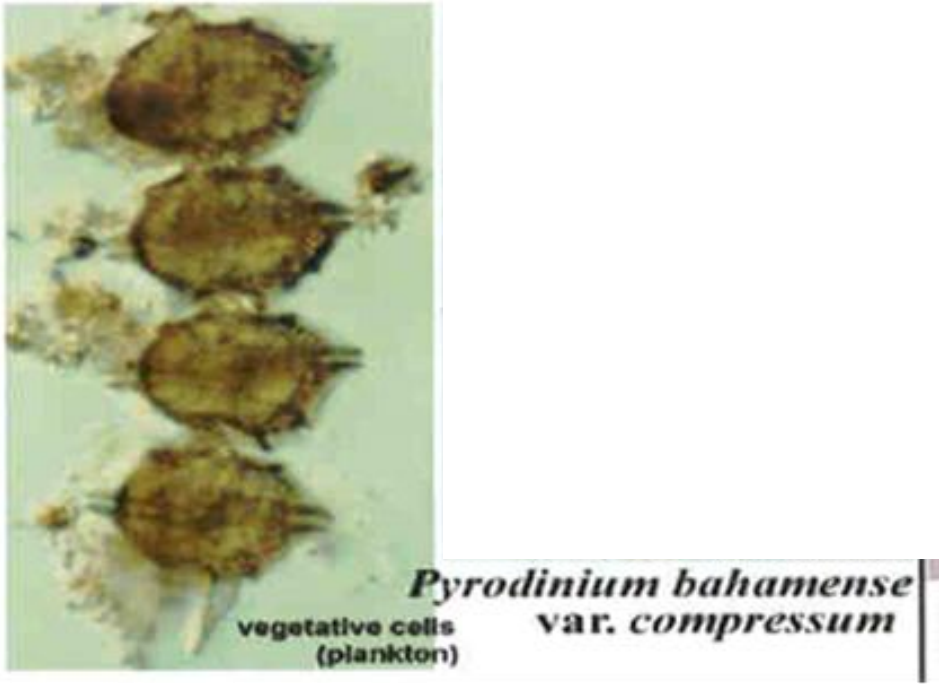
Marine Science Institute
University of the Philippines
Diliman, Quezon City 1101
Philippines

Ecology and Oceanography of Harmful Algal Blooms in the Philippines

At least 32 areas affected by HABs (1983-2011)

1. Masinloc Bay
2. San Antonio
3. Manila Bay
4. Malampaya Sound
5. Honda Bay
6. Sibuguey Bay
7. Dumanquilas Bay
8. Illana Bay
9. Pujada Bay
10. Balete Bay
11. Lianga Bay
12. Hinatuan Bay
13. Benoni Lagoon
14. Bais Bay
15. Ormoc Bay
16. Cancabato Bay
17. San Pedro Bay
18. Carigara Bay
19. Maqueda Bay
20. Villareal Bay
21. Calbayog waters
22. Samar Sea
23. Juag Lagoon
24. Sorsogon Bay
25. Masbate waters
26. Capiz waters
27. Negros Occidental waters
28. Cebu waters
29. Bolinao
30. Murcielagos Bay
31. Nasugbu
32. Balayan

Pyrodinium bahamense var compressum (Pbc), a dinoflagellate, is the most common HAB causing algae in the Philippines.



(from Matuoka and Fukuyo 2000)

During a bloom, many types of algae, such as the *Pyrodinium,* can form a cyst that is fairly resistant to degradation.

The cysts formed during a bloom eventually becomes part of the sediment deposits.

We utilize the sediment deposits to decipher longer records of bloom events and other environmental changes.

To establish the timing of events:

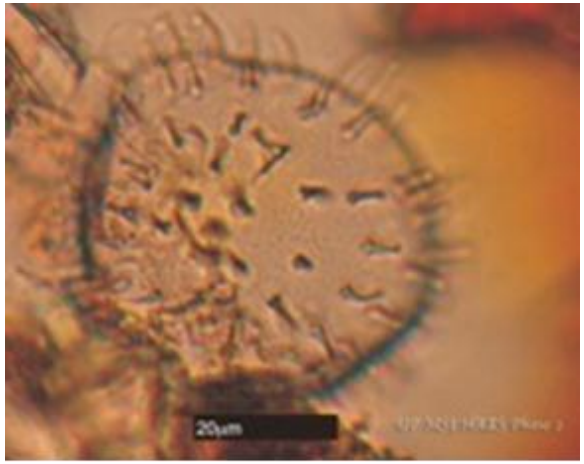
^{137}Cs

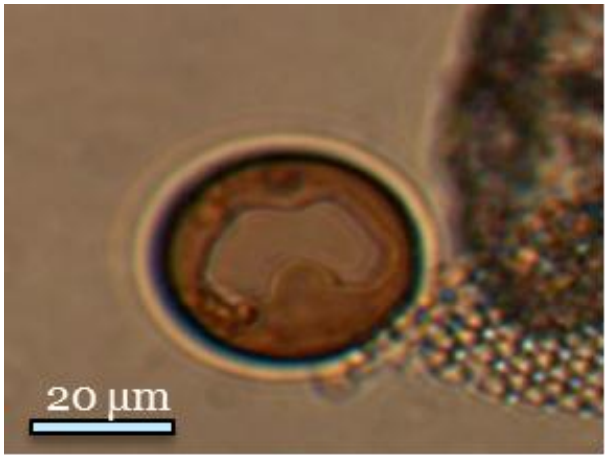
^{210}Pb

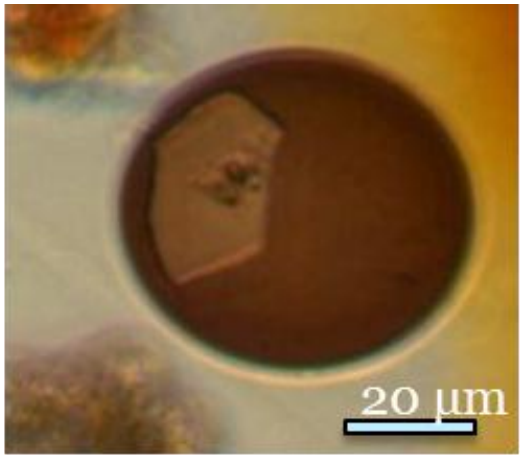
^{14}C

Gravity coring

Subsampling for identification of dinoflagellate cysts through microscopy

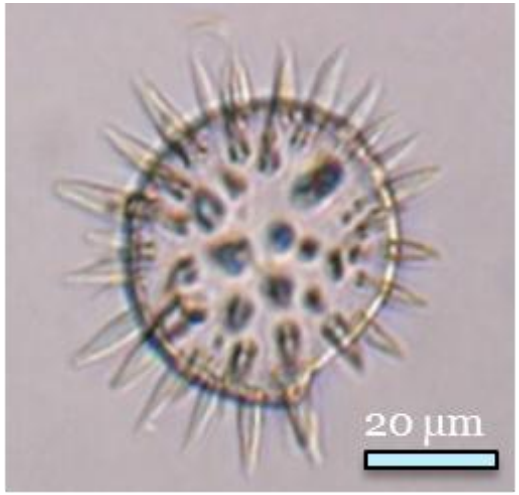






Brigantedinium spp.

P. zoharyi = cysts of *Pbc*

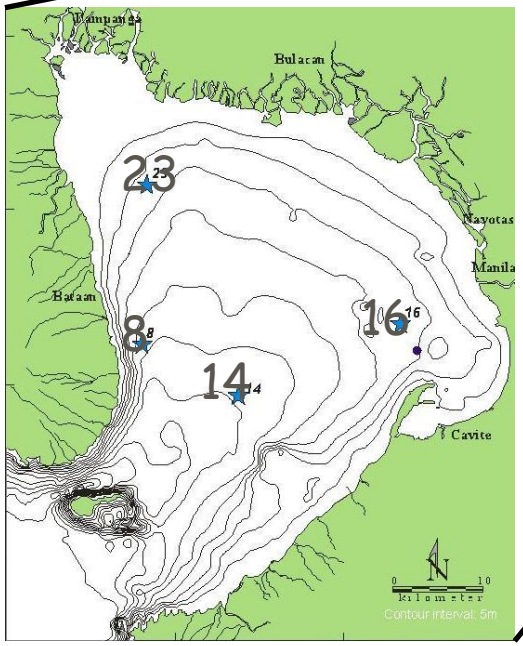


T. vancampoae

L. machaerophorum

In Manila Bay, the first reported bloom of *Pbc* was in 1988.

The first bloom was thought to have been due to the release of ballast waters in the bay.



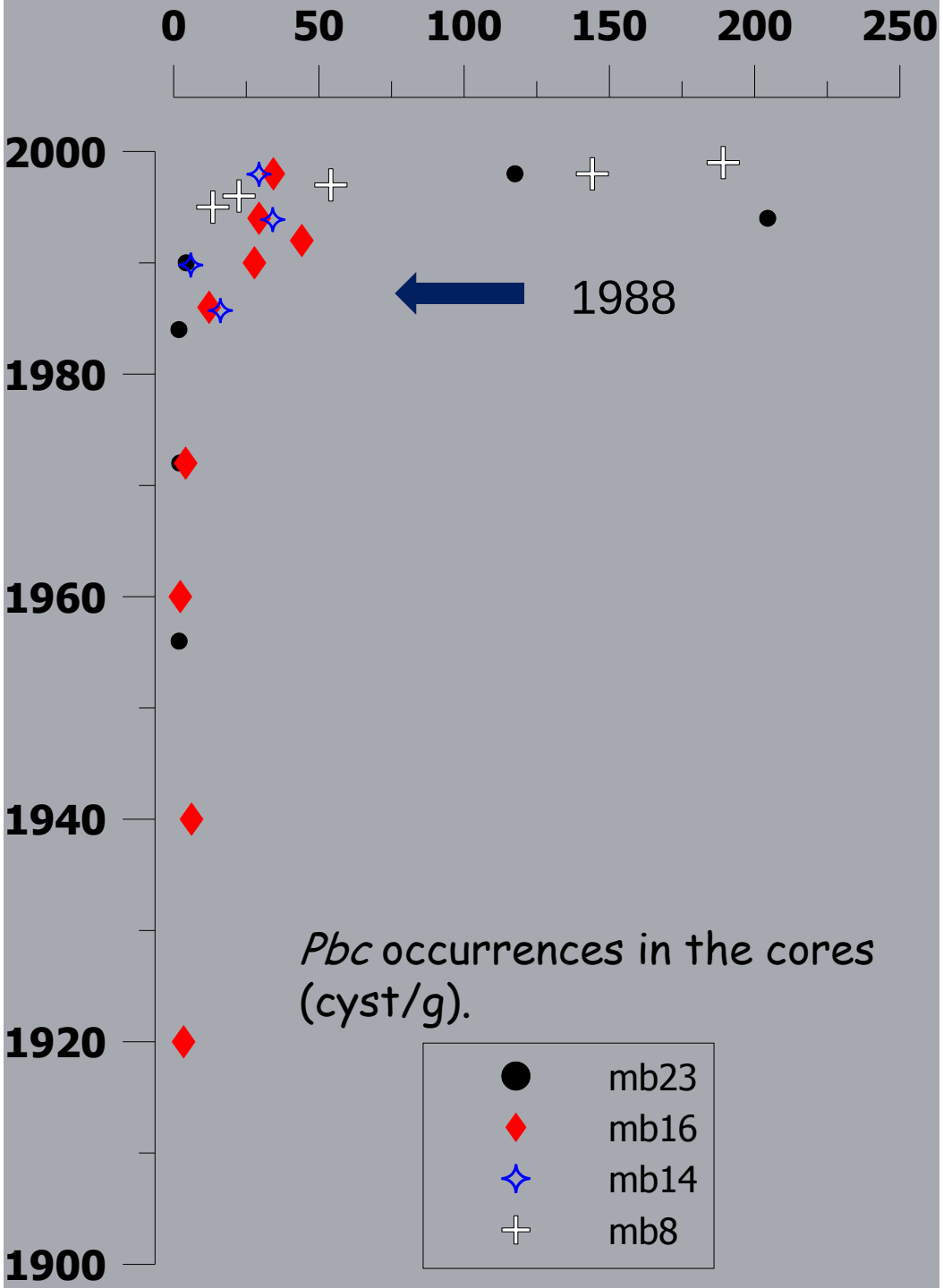
2000 cores

The sediment records show greater occurrences of *Pbc by* 1988.

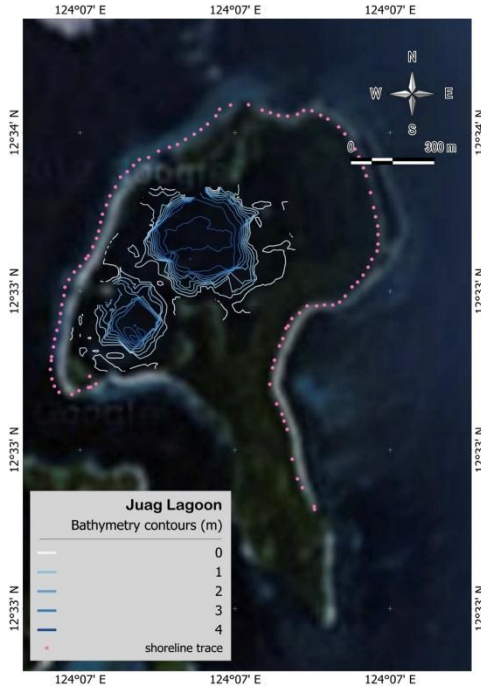
The sediments show that *Pbc* had been present in Manila Bay long before 1988.

This weakens the idea that the initial bloom was caused by the transport of Pbc into the bay.

(Siringan and others 2008)



Juag Lagoon

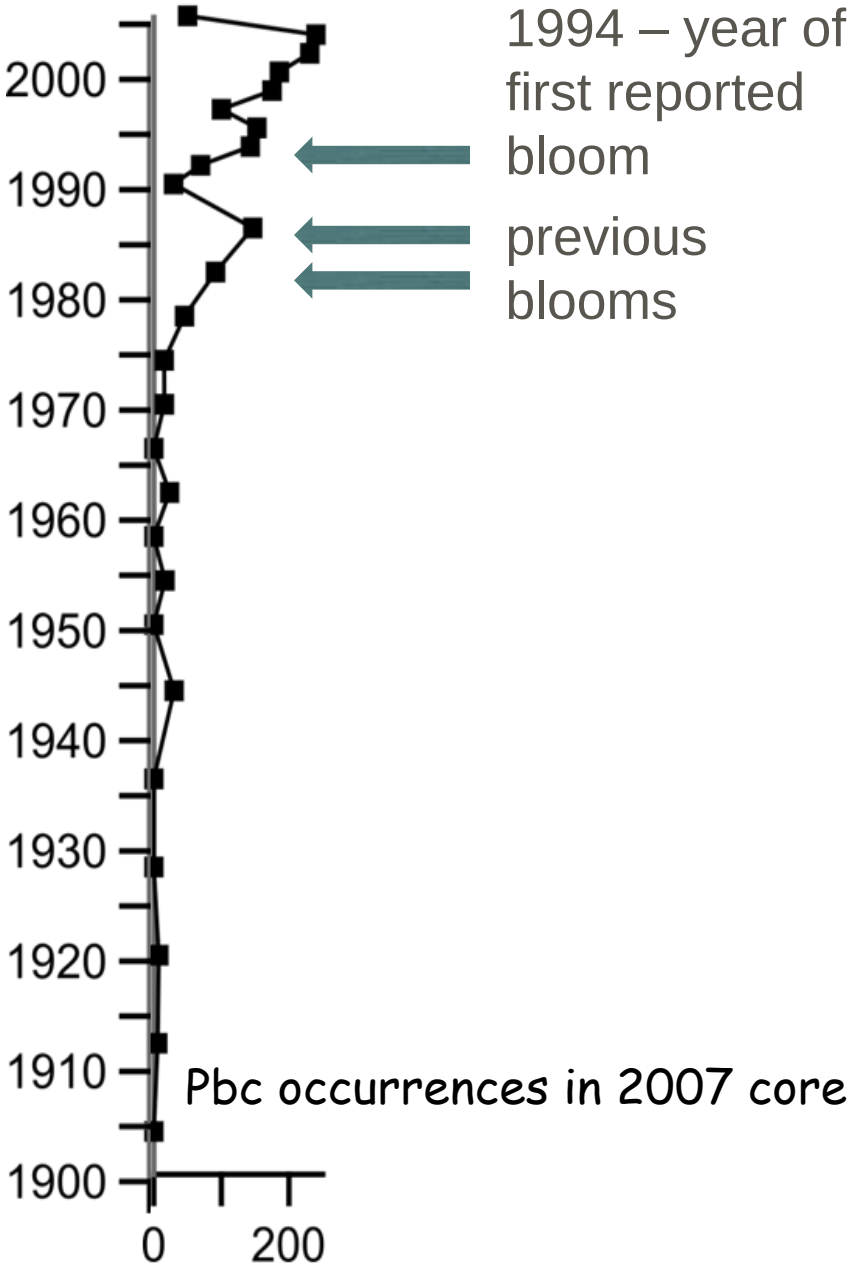


The first reported bloom of *Pbc* was in 1994.

The blooms recurred almost every year until 2011.

Core data indicate that Pbc blooms may have occurred prior to 1994.

Pbc had long been present in the lagoon.

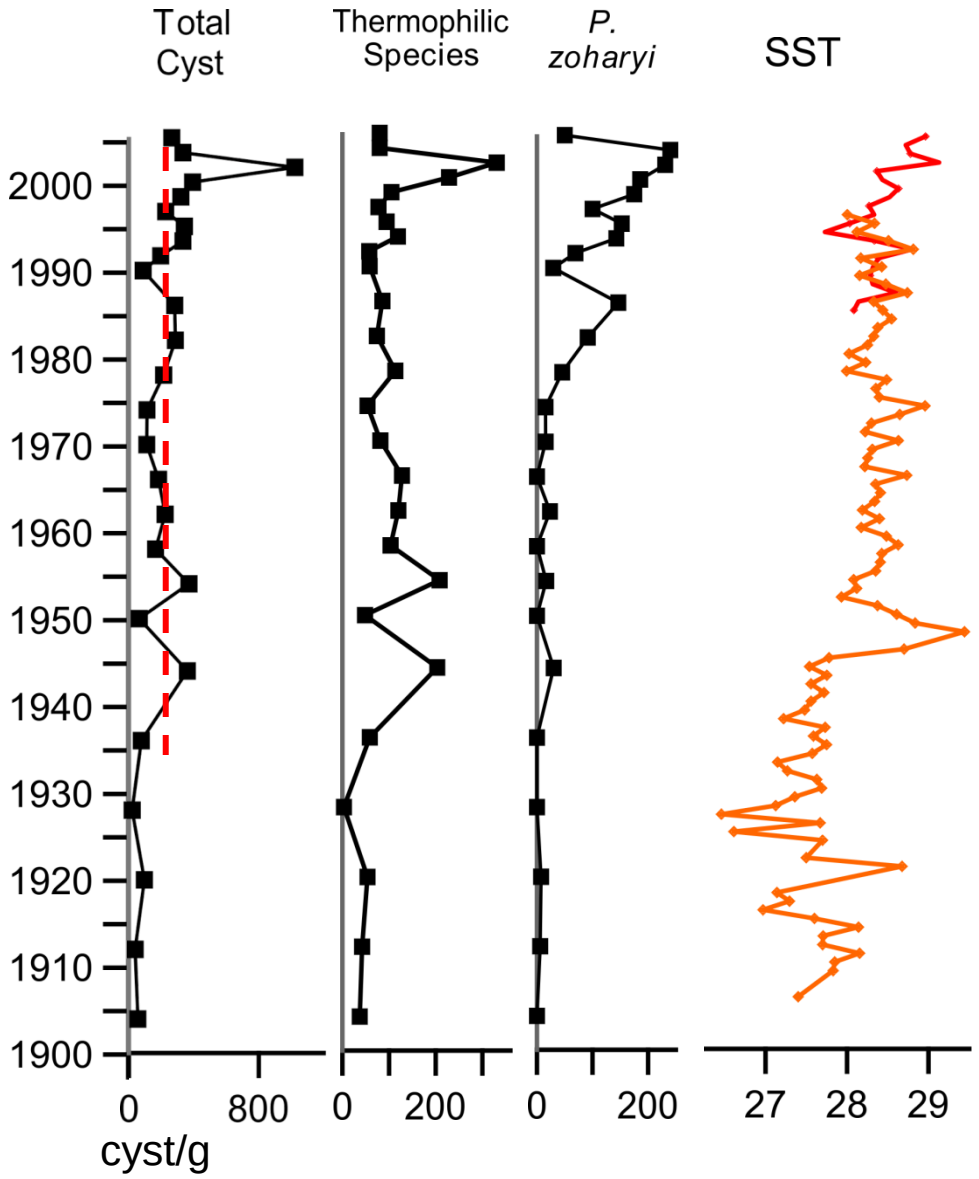


(Reotita and others in prep)

Core data indicate a shift to a greater density of cysts in the mid-1940s.

Shift is driven by an increase of thermophilic dinoflagellates which includes *Pbc*.

Shift correlates with an increase in SST



SST is combined IGOSS and COADSS data

(Reotita and others in prep)