

POPs in the preen gland oil of Streaked Shearwaters breeding on the islands in Japan reflect marine pollution in western North Pacific

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Acknowledgement: JSPS for funding support

Background

- Seabirds bio-magnify marine pollutants and so can be a useful indicator (Furness and Camphuysen 1977)
- Inter-colony (regional) differences in POPs in seabird tissue reflect the ocean scale pattern of marine pollution level (Roscales et al. 2010).
- New techniques (tracking and non-invasive tissue sampling) enable us to know more about spatial pattern.

Streaked Shearwaters breeds on many islands around Japan and Korea, can be indicator of POPs spatial pattern in Western North Pacific

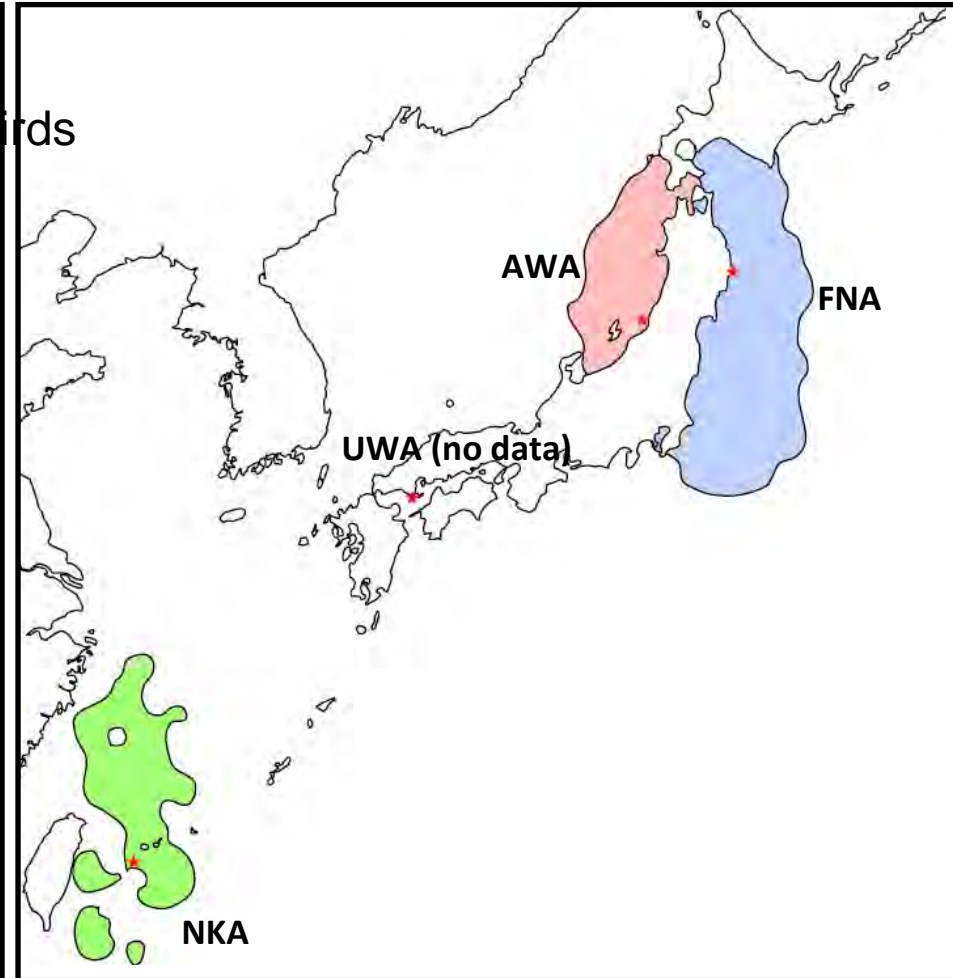


Preen gland oil from GPS tracked birds
Geolocator tracking

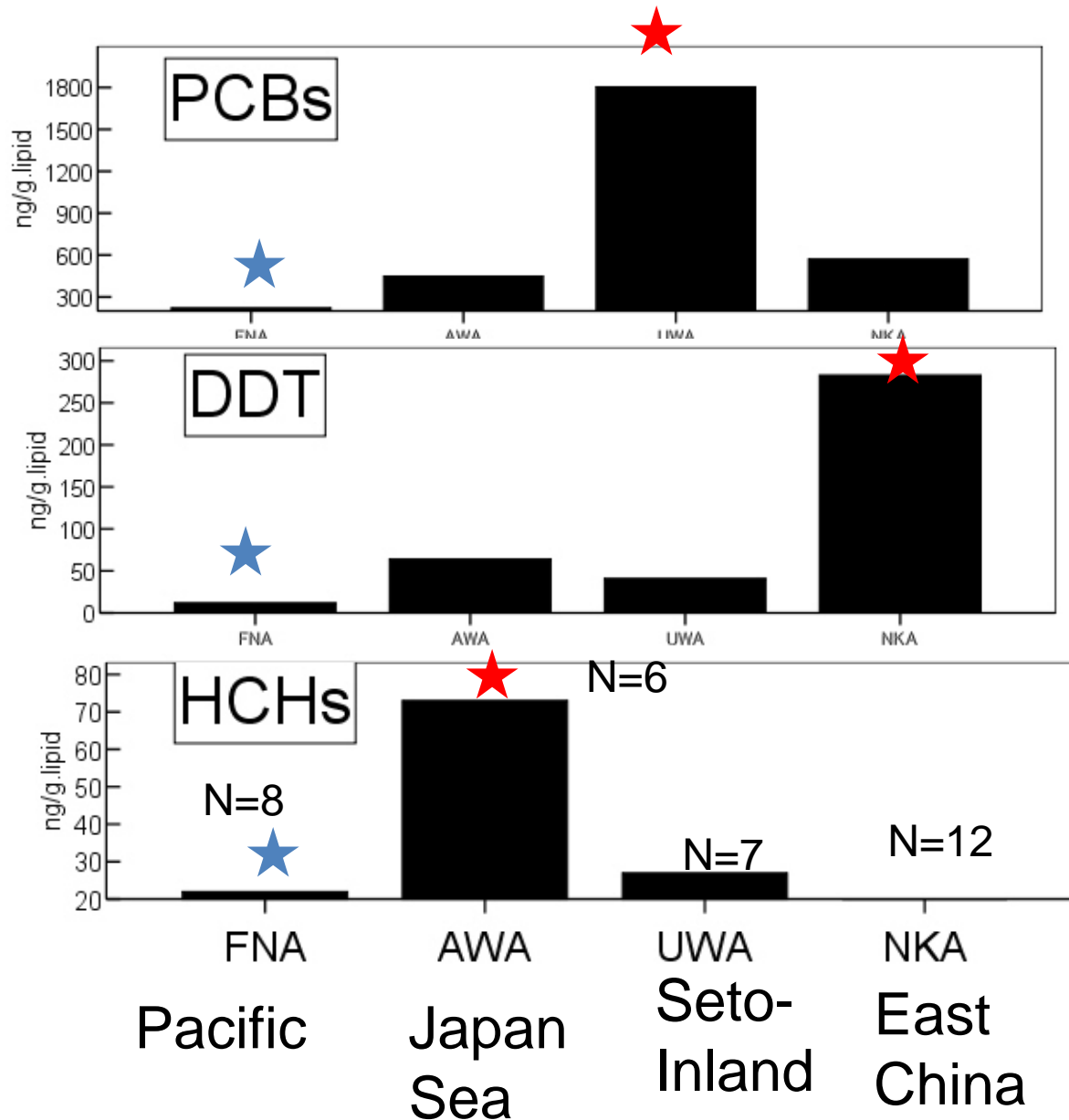
Foraging range of the shearwaters from four islands during breeding season

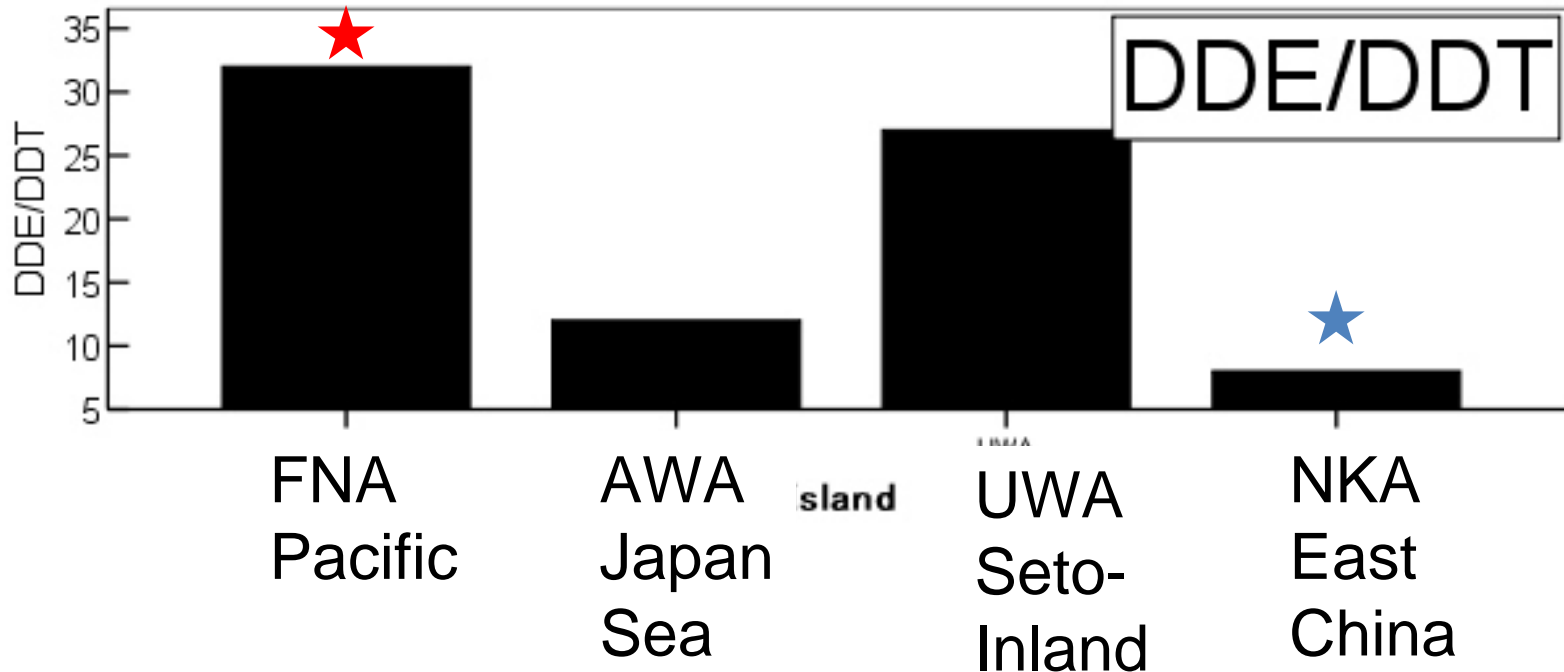
a) GPS track (Sep to Oct)

b) GL track (Apr to Oct)



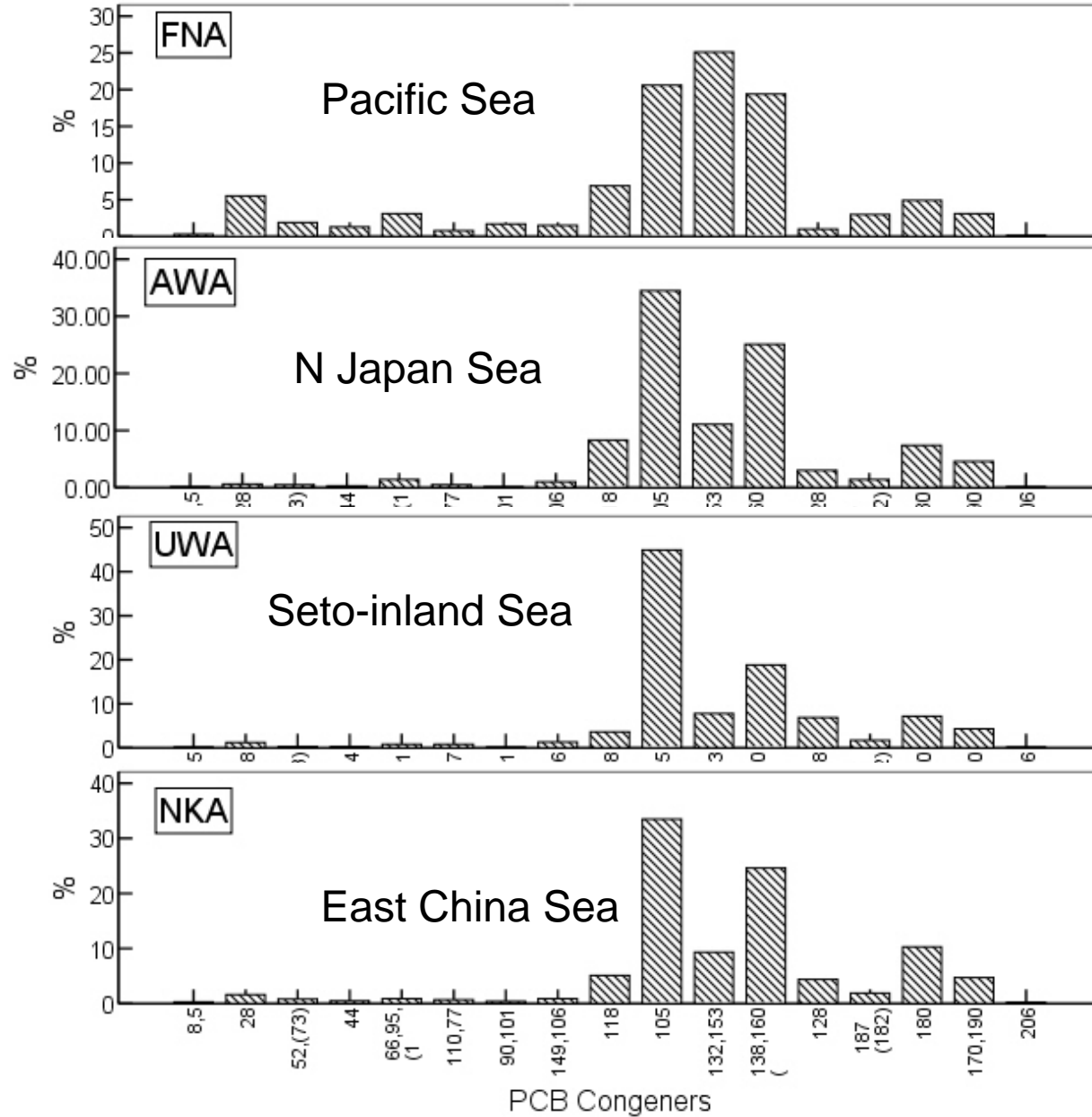
Inter-colony differences in POPs





Proportion of metabolite of DDT(DDE) to DDT was high in FNA where POPs levels were lowest and low in NKA where DDT was highest

PCB Congeners



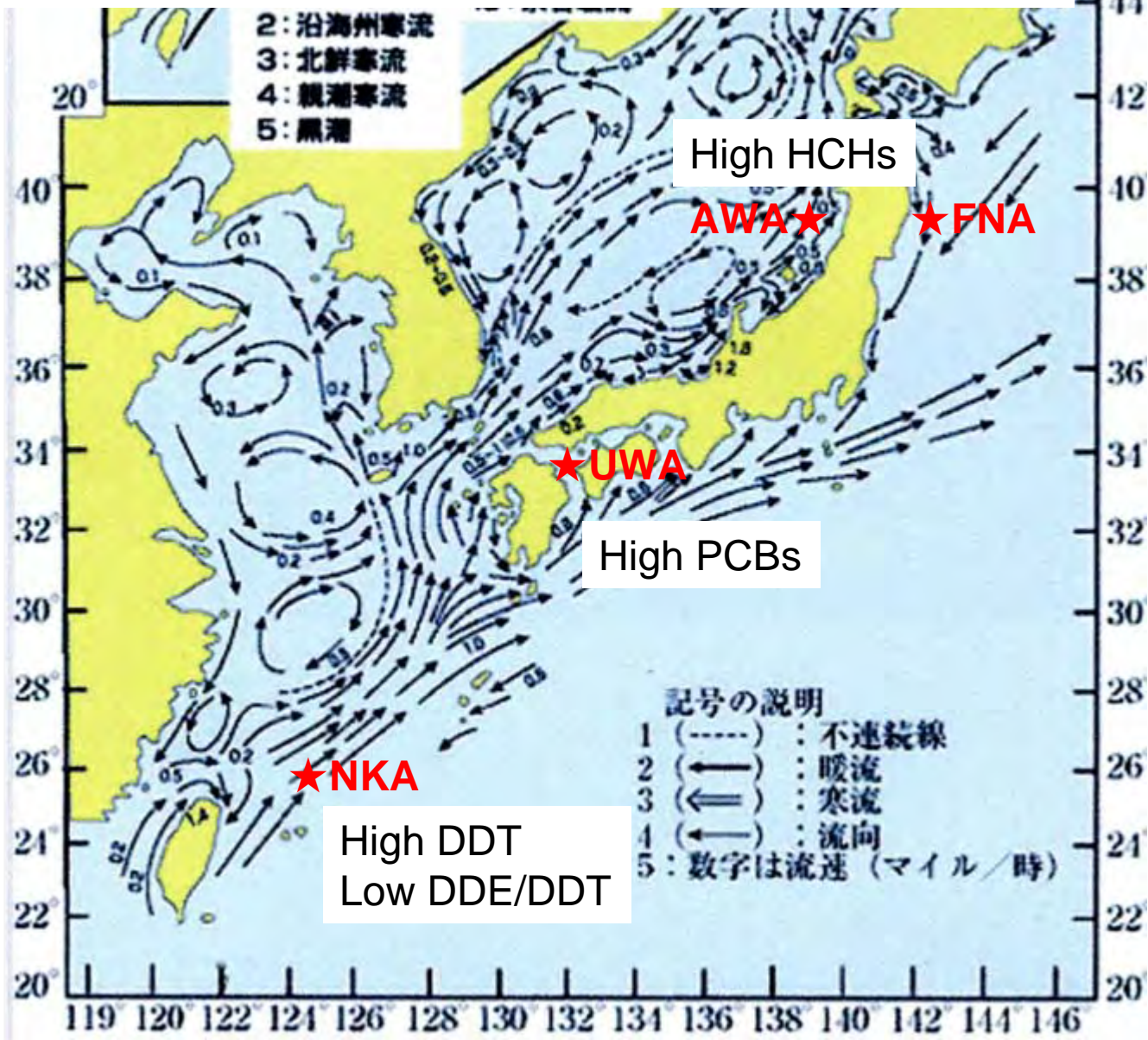
Summary

- Total PCBs was highest in birds foraging in Seto-inland Sea
- DDT was highest and DDE/DDT ratio was low in birds foraging in East China Sea
- Total HCHs was highest in birds foraging in Japan Sea off northern Japan.
- All POPs were lowest and %lower-Chl PCB congeners was high in birds foraging in Pacific Ocean off northern Japan

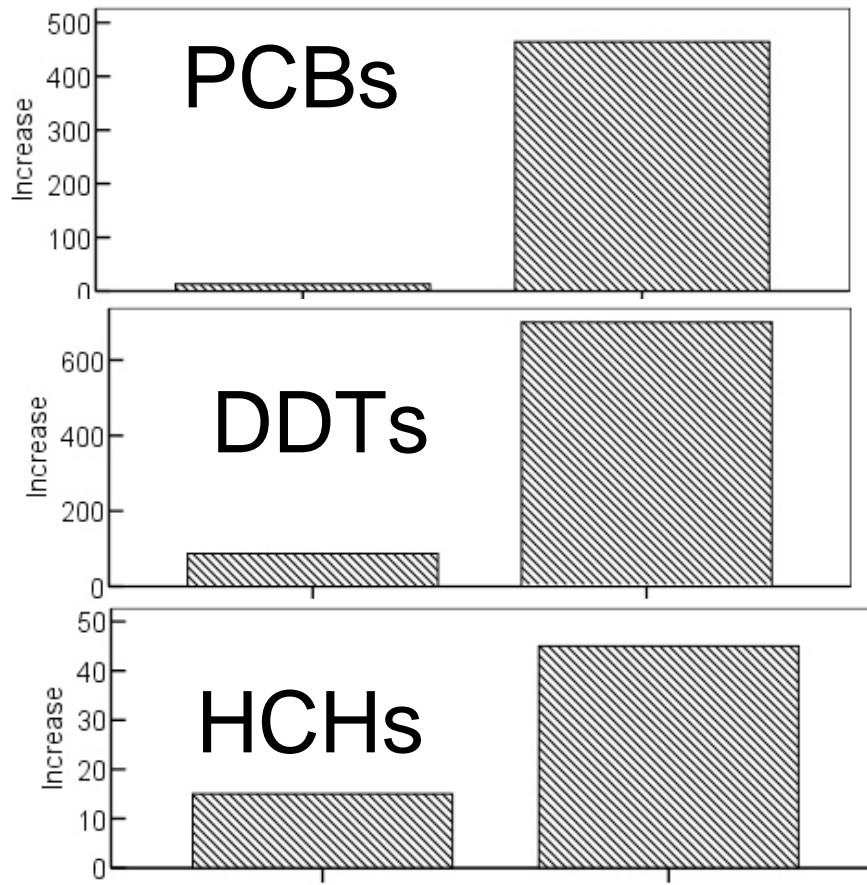
This pattern resembles those reported in marine organisms collected in the Western North Pacific

POPs	Material	High	Low	References
PCBs	Mussel	Seto-inland Sea, Tokyo Bay, South China Sea	N Pacific coast, Japan Sea coast	Raum et al. 2007, Department of Environment 2010
PCBs	Coastal fish	Tokyo Bay, Seto- inland Sea,	N Pacific coast	Department of Environment 2010
PCBs	Dolphins	Seto-inland-Sea	N Pacific Ocean	Minh et al. 2000
DDTs	Mussels	South China Sea, Tokyo Bay	N Pacific coast	Raum et al. 2007, Department of Environment 2010
DDTs	Coastal fish	Tokyo Bay, Seto- inland Sea	N Pacific coast	Department of Environment 2010
HCHs	Mussels	Japan Sea coast, Seto-inland Sea	South China Sea, Japan Sea coast	Raum et al. 2007, Department of Environment 2010
HCHs	Coastal fish	Seto-inland Sea,	N Pacific Sea, East China Sea,	Department of Environment 2010

Emission and transportation might explain this spatial pattern



For AWA birds, the oil was sampled at capture and recapture. Increase of POPs (ng/g lipid) was greater for 4 birds foraging in Japan Sea/Tsugaru Strait/Pacific coast than 6 birds foraging in Japan Sea only



Japan Sea
only

Japan Sea, Tsugaru Strait,
and Pacific coast

Conclusion

- Range data and POPs in the preen gland oil of seabirds give us useful information of spatial pattern of marine pollution, especially in the off shore area, but measurement of the range of individuals is essential.
- Data from tracked birds from multiple species and colonies complements ongoing marine pollutant monitoring program in western North Pacific.