

Distribution of dissolved methane in seawater around Keelung's Coast

戴鈺涵、林家加、曾筱君

Introduction

Methane is a potent greenhouse gas - about 28 times more powerful than carbon dioxide at warming the Earth, on a 100-year timescale. Methane deserves more attention in the climate debate as it contributes to 32% of human-made global warming in short term. Here, we used GC-FID to measure the concentration of dissolved methane and YSI ProDSS to measure temperature and pH of seawater. Other data of seawater was provided by Professor Gong's Lab.

Sampling Area (6 sampling stations)

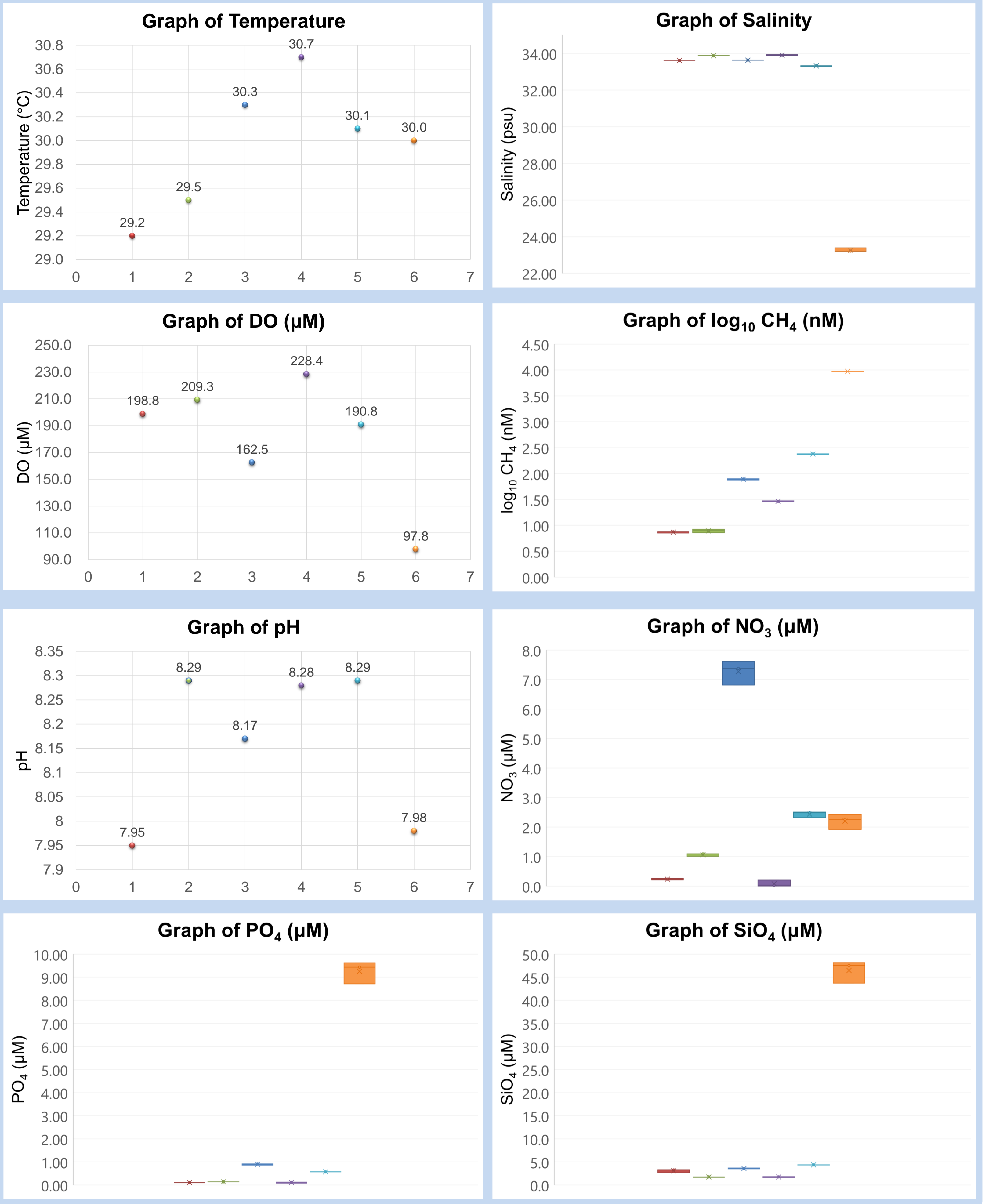


Introduction of sampling stations

Site	About
1. Wanghaixiang Beach	<ul style="list-style-type: none"> Eco-tourism and ecological restoration Open water
2. Daping Shore	<ul style="list-style-type: none"> Near Chaojing Park which is a conservation area designated by the government Eco-tourism and ecological restoration Open water
3. Badouzi Fishing Harbor	<ul style="list-style-type: none"> Harbor for tourist fishing boat Number of tourists increased in June and July due to summer activities
4. Bisha Fishing Harbor	<ul style="list-style-type: none"> Harbor for yachts and sailing boats
5. Zhengbin Fishing Harbor	<ul style="list-style-type: none"> Harbor for fishing boat Colorful rainbow houses - recently become a spot that tourists like to take picture
6. Port of Keelung	<ul style="list-style-type: none"> International Commercial Ports Near-sea shipping line container port Home port for international cruises

Results

- 1. Wanghaixiang Beach
- 2. Daping shore
- 3. Badouzi Fishing Harbor
- 4. Bisha Fishing Harbor
- 5. Zhengbin Fishing Harbor
- 6. Port of Keelung



Discussion

- Wanghaixiang Beach and Daping Shore have low concentrations of dissolved methane, this might be caused by ocean convection of open waters.
- Comparing concentrations of dissolved methane between three fishing harbor: Zhengbin > Badouzi > Bisha. The main function of the fishing harbor might lead to this difference.
- Concentration of dissolved methane in Port of Keelung is about a thousand times higher than in Wanghaixiang Beach. Not only because of it is an international commercial port, domestic sewage of the city that flows into it might be one of the reasons.

Conclusion

- Concentrations of dissolved methane in seawater around Keelung's Coast are ranged from 7.1 to 9416.3 nM
- According to our research, descending order of the concentrations of dissolved methane in seawater around Keelung's Coast is: Port of Keelung > Zhengbin Fishing Harbor > Badouzi Fishing Harbor > Bisha Fishing Harbor > Wanghaixiang Beach and Daping Shore.

Method

On 17 July 2020, 18 seawater samples were collected from 6 sites in triplicate to quantify the distribution of dissolved methane concentration along Keelung's Coast. Dissolved methane concentrations were analyzed by headspace technique and a gas chromatograph coupled with a flame ionization detector (GC-FID). Precision is around ±6.2%. Temperature and pH of seawater were measured by YSI ProDSS in situ. Other data of seawater was provided by Professor Gong's Lab.

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