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# **Comparative Analysis of pCO<sub>2</sub> by On-site Headspace and Laboratory Methods**

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# **INTRODUCTION**

 $CO_2$  is a colorless, odorless gas that is naturally present in Earth's atmosphere. It plays a crucial role in the Earth's carbon cycle. The role of the oceans in the worldwide climate system is crucial due to their substantial capacity to store heat and carbon.

## **RESULTS & DISCUSSION**

The comparison plot between the two techniques is linear. It represents a perfect agreement between the two methods. The range of values for both methods is substantial, suggesting significant variability in the dataset.

This project aims to analyze and compare the Headspace method and the  $CO_2$  sys method for the determination of  $CO_2$  in water.

# **METHODOLOGY**

There methods used in this research project are –

- Headspace Method (On-site) Ι.
- 2. CO<sub>2</sub> sys Method (Laboratory)

DIC

The total dissolved inorganic carbon content of sea water is defined as

 $C_{\rm T} = [{\rm CO}_2^*] + [{\rm HCO}_3^-] + [{\rm CO}_3^{2-}]$ 





#### Comparison plot





**DIC Analyzer Model AS-C3** 

**AS-ALK2** Total **Alkalinity Titrator** 

## TA

Total alkalinity (TA) of seawater refers to its capacity to neutralize acids.

 $A_{T} = [HCO_{3}^{-}] + 2[CO_{3}^{2-}] + [B(OH)_{4}^{-}] + [OH^{-}] + [HPO_{4}^{2-}]$  $+2[PO_4^{3-}]+[SiO(OH)_3^{-}]+[NH_3]+[HS^{-}]+...$  $-[H^+]_F - [HSO_4^-] - [HF] - [H_3PO_4] - ...$ 





**Earthen Pond** 





#### **Concrete Pond**





# **CONCLUSION**

The comparison between the two methods suggests that there is some variability in the  $pCO_2$  values calculated using the both methods. Headspace analysis relies on achieving equilibrium between the dissolved gases in the liquid sample and the gas phase in the headspace.

Headspace Method	CO <sub>2</sub> Sys Method
Simple and straightforward technique.	It is very time consuming and . involves more complex calculations.
Non-destructive method.	The parameters of the water

samples can change.





#### More accurate and precise.

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