## Exchange of Nitrous Oxide between Sea and Atmosphere in the Seto Inland Sea and the southern coast of the Shikoku Island

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Nitrous oxide ( $N_2O$ ) is one of the most influential greenhouse gases because it is stabile in the troposphere, and depletes the ozone layer to decompose in the stratosphere. However there are a few reports of research about  $N_2O$ , so the present situation is that the budget of an amount of sink and that of emission don't yet suit. Especially there are few reports about the coastal sea. We assumed that the coastal sea was the cause because the composition of seawater in it easily changed by inflow from water having contained many nutrients, such as a river and a factor effluent, nevertheless there is almost no report of research. Therefore we focus on the coastal sea and the purpose is to clarify about the amount of exchange between the atmosphere and the sea to know how much  $N_2O$  in the sea contributes to global warming.

In this research observation was carried out in the Seto Inland Sea and the Shikoku Island from 6th Mar 2009 to 11th and from 4th Sep 2009 to 10th. We calculated N<sub>2</sub>O flux (the amount of N<sub>2</sub>O exchange between the atmosphere and the sea) with formula (1) which is composed of 4 components, Gas transfer speed ( $k_w$ ), N<sub>2</sub>O concentration when assuming that N<sub>2</sub>O in the atmosphere melted altogether all over seawater ( $N_2O_s$ ), N<sub>2</sub>O concentration in the sea ( $N_2O_e$ ), Surface area( $A_s$ )

$$N_2 O \ flux = k_w (N_2 O_s - N_2 O_a) A_s$$
 [1]

and considered that the following things;

Keywords: N2O; global warming; flux; the coastal sea.

• Solve the interaction between the atmosphere and the sea.

 ${\boldsymbol \cdot}$  Examine about the amount change of  $N_2O$  discharge / absorption by marine environment change

- · Comparison examination with the amount of emergence of the artificial origin
- Perform CO<sub>2</sub> conversion and it is comparison examination with carbon dioxide.

## References

H.ISHIBASHI, About an amount of evaporation in the Seto Inland Sea (1978)
Wilde Hein P.D. and Helder W., Nitrous oxide in the Somali Basin (1996)
Weiss, R.F. Price :B.A., Nitrous oxide solubility in water and seawater (1980)

## Acknowledgements

The research was financially supported by Japan Marine Science Foundation.