

## Mechanisms inducing anomalously high pCO<sub>2</sub> without CO<sub>2</sub> leakage in coastal environment

\*Yuji Watanabe<sup>1,2</sup>, Keisuke Uchimoto<sup>1,2</sup>, Makoto Nishimura<sup>1,2</sup>, Saeko Mito<sup>1,2</sup>, Ziqiu Xue<sup>1,2</sup>

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When CO<sub>2</sub> is stored in sub-seabed geological formations in Japan, marine monitoring is mandatory to detect CO<sub>2</sub> leakage as soon as possible should it occur. In the Tomakomai CCS Demonstration Project, a threshold line based on a negative correlation between partial pressure of CO<sub>2</sub> (pCO<sub>2</sub>) and dissolved Oxygen saturation in seawater is used to detect an anomalously high value of pCO<sub>2</sub>, which is suspected to be a sign of CO<sub>2</sub> leakage. Although CO<sub>2</sub> leakage has never occurred in Tomakomai, pCO<sub>2</sub> values obtained in the monitoring have frequently exceeded the threshold line; that is, many false-positives have been produced. It is important to consider what can be causes of the false-positives. To discuss the causes, we analyzed data observed in the marine monitoring of the Tomakomai project, and meteorological data at Tomakomai. It is implied that weather conditions, such as wind speeds and precipitation, were related with false-positives. Also, we found that total alkalinity was remarkably low at a monitoring survey where many false-positives were observed. The low values of total alkalinity make pCO<sub>2</sub> values higher than usual, and consequently they might produce many false-positives. Based on the results, we are going to present how to avoid or reduce false-positives.

Keywords: Sub-seabed CO<sub>2</sub> storage, Marine monitoring, CO<sub>2</sub> leakage, pCO<sub>2</sub>, Total alkalinity