

# Observation of a river plume by drone-mounted visible/infrared cameras

\*Kenta Araki<sup>1</sup>, Shinichiro Kida<sup>2</sup>, Atsuhiko Isobe<sup>2</sup>

1. Interdisciplinary Graduate School of Engineering Sciences, Kyushu University, 2. Research Institute for Applied Mechanics, Kyushu University

## Introduction

Thermal infrared observations of the sea surface temperature (SST) from satellites are important for understanding the ocean. However, the use of satellites is still difficult for observing coastal oceanic process with small spatio-temporal scales. The purpose of this study is to use drones and observe ocean color and SST distributions of the coastal area with a spatial resolution of about a few centimeters. Drones can be used for remote sensing of the sea surface from an altitude less than 150m.

## Observation

On September 11, 2018, we conducted observations of the coastal ocean at the Lyonada of the western Seto inland sea and the Hiji river using the Ehime University research ship "Isana". We used drone-mounted visible and infrared cameras and took images of the sea surface from 100m above the sea level. A total of 18 images were acquired over the observation time of about 7 minutes. The area covered by each image of the visible image and the infrared image are 100 m × 70 m and 80 m × 60 m, respectively. We also pursued CTD observations at the same time to examine the oceanic structure across the front.

## Result and Discussion

In the observed infrared image, we found vignetting, which is a difference in brightness from the center to the periphery of the image. Therefore, we will need to remove this impact of vignetting to understand the actual SST distribution. Observed visible image showed the river plume clearly so we are currently working to detect the location of the front that matches with the infrared image. We plan to present the microstructure of the front found in the visible and infrared images. We also plan to compare the vertical cross section of the front obtained from CTD data with the sea surface temperature observed in the infrared image.

Keywords: drone, sea surface temperature, river plume