Characteristics of the water quality environment at the Sumpu Castle Moat in the center of Shizuoka City

*JUNYA KANEKO[1], Kazuyoshi Yamada[1]

1. School of Human Sciences, Waseda University

1. Introduction.
In some cities, water bodies serve as so-called oases. Castle moats are often located in the heart of the city and have the aspect of historical heritage. It is necessary to clarify the status of such water bodies to ensure a good water environment for the future. In this study, a water quality survey was conducted in the moat of Sumpu Castle to clarify the current state of the water environment.

2. Location and methods
Sumpu Castle is in Shizuoka City, Shizuoka Prefecture. The surrounding area is lined with government offices and schools, and the central area is maintained as Sumpu Castle Park. Of the three moats (inner, middle, and outer moats), the entire middle moat, most of the outer moats, and part of the inner moat are extant or have been restored.
Water quality surveys were conducted in the middle and outer moats of Sumpu Castle from July 2021 to January 2022. To observe the spatial distribution of water quality in the moats, a total of 16 observation points were set up, eight in the middle moat and eight in the outer moat, and regular surveys were conducted about once a month.
CTD water quality meters were used to measure water temperature, chlorophyll-a content, dissolved oxygen concentration, turbidity, and other parameters.

3. results and discussion
The water depth in the middle moat was stable at around 1 m regardless of season or location. There were also a few differences in the vertical profile of water quality at the same location. It is considered that a distinct hierarchical structure did not occur due to the shallow water depth. Water temperature showed seasonal changes linked to air temperature.
Chlorophyll-a levels tended to be higher on the west side of the middle moat in summer and in the enclosed waters south of the outer moat in autumn, but the maximum was below 30 μg/L and no extreme eutrophication was observed.
Overall, dissolved oxygen concentrations tended to be lower in summer and higher values were observed in winter. Values were generally high and were above 8 mg/L at most sites throughout the entire period.
In terms of turbidity, values in the middle moat generally remained between 5 and 10 degrees. In the outer moat, turbidity tended to be lower than in the middle moat and was below 2 degrees at many sites during autumn and winter. In exceptional cases, values approaching 20 degrees were observed at closed sites.
The results of the water quality survey showed no serious water pollution at many sites in the Sumpu Castle moat. This is a result of the control of organic matter inflow and the management of the water cycle. The deterioration of water quality observed at some sites may be due to leaf litter from trees overhanging the moat and stagnation of water flow due to the shape of the moat.

Keywords: Sumpu Castle, Water moat, Water quality, Urban area

