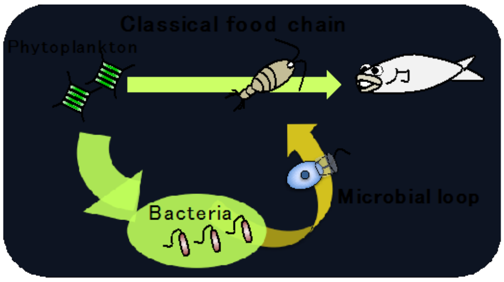
Laboratory of Biogeochemistry

Hiroyuki Takasu

takasu@nagasaki-u.ac.jp

<Topic I> In planktonic ecosystems, most of the primary production is transferred within a food web through a trophic linkage from herbivorous zooplankton, and zooplanktivorous fish to piscivorous fish (classical food chain). However, several remarkable discoveries have shown that a significant fraction of primary production passes through the bacteria → protists → zooplankton pathway (microbial loop). Thus, there still remains a controversy over the relative importance of the microbial loop versus the classical food chain as the major supply of organic matter to higher trophic level organisms. We have been conducting researches on the microbial loop in lakes and coastal seas. Our research will elucidate the basic mechanism of food webs in the surrounding areas of Nagasaki, which will help support the fishing industry of the local community.



Food web structure in aquatic ecosystem

<Topic II> A recently proposed conceptual framework, the microbial carbon pump, emphasizes the marine bacterial transformation of photosynthetically-derived organic matter from the labile to recalcitrant state. This recalcitrant organic matter persists in the interior of the oceans for thousands of years, constituting carbon sequestration in the oceans. However, the processes which sustain the microbial carbon pump have yet to be constrained. Our goal is to elucidate the transformation mechanism of recalcitrant organic matter via bacteria, which will help to understand how biological processes regulate climate through long-term carbon storage in the oceans.