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Abstract

Battery has been one of the constraints for monitoring longer-term movement and behavior of aquatic animals using an animal-borne micro data logger. To overcome the limitation of the fixed energy in bio-logging systems, a prototype of data logger system using a vibration-powered generator was developed, and the feasibility of utilizing the oscillation energy of aquatic animals as external sources of the power was investigated. The system was composed of a vibration-powered generator and data logger part incorporating 3-axis acceleration, pressure, and temperature sensors, and these were connected via a 5 m bending resistance cable. The system can initiate sensor measurements and writing to the memory alternately when enough voltage (5 V) is charged in a capacitor in the data logger part. The generator was attached to the peduncle of the fish simultaneously with another small data logger measuring the acceleration of caudal fin movement reflected to the generator, and then the fish was released in a tank. While the fish actively swam in the experimental tank (general frequency and amplitude of the caudal fin movement in steady swimming: 1.76 Hz and 0.32 *g*, respectively), it was impossible to initiate the sensor measurements because there was not enough electricity charged in the capacitor. However, the voltage in the capacitor, which was manually charged to 4 V before the experiment, decreased more slowly in the data from the fish experiment than the data from the control experiment without the vibration-powered generator. This suggested that it was succeeded in producing the electricity from the fish movement while the electricity discharge rate in the capacitor was larger than the charging rate. Although this study cannot solve the technological issues around the efficiency in the vibration-powered generator, it showed the possibility of harvesting energy from the aquatic animal's oscillation.