



## **Community metabolism of coral reef ecosystem at la Réunion island by the water flow box model**

**H. Fujimura**(1), T. Oomori(1), B. E. Casareto(2), Y. Suzuki (3) and/or the FIXAREEF

(1) Graduate School of Engineering and Science, University of the Ryukyus, Okinawa, Japan (fujimura\_h@yahoo.co.jp/ Fax:+81-98-895-8565), (2) LASC, (3) Shizuoka University

Coral reefs have been under a serious threat of degradation in the world ecosystems. It is necessary to observe the early irregular change in the coral reef ecosystem to prevent the degradation from the various threats such as coral bleaching and water pollution. Coral reef ecosystems are characterized by the high productivity of community metabolisms of photosynthesis-respiration and calcification. These parameters can be estimated from the oxygen and carbonate system in the reef water. We introduced a model to estimate the daily organic and inorganic carbon production under the natural water flow system that enable long-term monitoring of community metabolism. The study area for model calculation was Trou d'Eau of la Réunion. Corals were flourishing and water was flowing from NNW to SSE. The box-model was used for the derivation of the oxygen and CO<sub>2</sub> flux. Oxygen concentration and carbonate system of reef water flowing in the model area was modified by coral communities. The degree of the modification depends on the irradiance and depth, and residence time of reef water. The oxygen and CO<sub>2</sub> flux from the benthic metabolism were determined to fit the reconstructed variation of oxygen or CO<sub>2</sub> from model with monitored variation. Dissolved oxygen (DO), pH, temperature, salinity and water current were monitored every 10 minutes for 1-4 days. Total alkalinity was measured by the Gran titration. Carbon dioxide in seawater (pCO<sub>2</sub>) was directly measured with NDIR (CO<sub>2</sub> analyzer) by bubbling air in seawater to equilibrate CO<sub>2</sub>. Community metabolism calculated by the water flow model was within the range of the other coral reefs. This result indicates that the model can be used for the estimation of community metabolisms in natural reef environment and apply for the long-term monitoring of the status of coral reef ecosystem.