An integrated database for marine environment monitoring and management system at the Tongyoung bay in Korea

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A marine environmental monitoring and management system to support efficient operation of the aquafarm at Tongyoung bay in Korea, was started to be developed by the Korea Institute of Ocean Science and Technology *(*KIOST) in 2017. The system consists of an intensive observation system, a data management system, a hybrid environment prediction system, and a facility management system based on artificial intelligence technology. During the 1st phase of the project (2017-2018), we are setting up a database system to manage marine data of the intensive observation and to archive all available environmental data of Tongyoung bay area. Several physical parameters and chemical parameters measured at the surface buoy and automatic vertical profiler are transmitted to the server through wireless network, processed and stored into DB system, and provided to the researchers via intranet in real-time mode. Observed data of biological parameters and biogeochemical parameters are being submitted to the database system by the related researchers in delayed mode. We also collected all oceanographic data produced by several organizations and satellites (Figure. 1). We manipulated all collected data in accordance with the metadata standard and quality control procedures which had been prepared for rasearch marined data of KIOST. An internet web site was established to support data retrieval and share collected data with researchers.
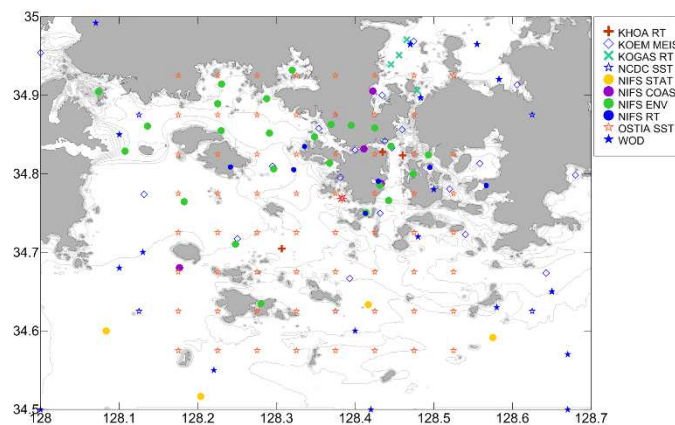

Figure 1: Observation stations near Tongyoung bay

To develop marine environment prediction system, a data driven model and a numerical dynamic model are under development. We are trying to build a data driven model based on LSTM (Long Short tem Memory) network of RNN (Recurrnet Neural Network) to simulate biological parameters based on physical parameters and chemical parameters. Tensorflow librarys was used to set up machine learning programs. An ensemble model will be set up to combine the results of the data driven model and the numerical model and provide prediction information to the aquafarm operation system.