



Support to the development of physical oceanography and marine database for the coastal area of Montenegro

Ana Castelli, Danijela Joksimovic, Aleksandar Jovicic, Milena Mitric, Vladan Vukovic, and Rajko Martinovic
University of Montenegro, Institute of Marine Biology, Kotor, Montenegro (ana.bulatovic@ucg.ac.me)

The spatial and temporal variability of the oceanographic parameters temperature and salinity of the Montenegrin coastal sea is usually obtained by means of data collection during regular activities in the national monitoring surveys or by CTD measurements collected within project's cruise campaigns. There is no available in situ real time observations of these physical properties in the coastal sea. Currently, the Institute have one permanent station for long-term monitoring of temperature and salinity of the bottom seawater layer. In order to increase the knowledge about the temporal and spatial temperature and salinity pattern of changes, a small scale information oceanographic system with a database and three fixed marine observation stations along the coast has been established within the national project ProDATA. Two stations are located in Boka Kotorska Bay and one, open sea oriented, is situated in Bar (southern Montenegrin coast). All three stations are observing temperature and salinity of the bottom seawater layer in delayed mode via installed small autonomous conductivity/temperature (CT) data loggers. The sampling mode is set up to log CT records every one hour and measured data are stored in the internal memory. The programming of the CT data loggers for measuring and retrieving the data via communication box, as well as uploading of the data to the software is performing every month, together with the maintenance of the station in order to provide high quality of measurements and to avoid bio-fouling effects. Additionally, one station in Boka Kotorska Bay is equipped with Aanderaa Conductivity Sensor 4419R with RS422 communication protocol for the in situ real time CT observing of the sea. This CT sensor is fixed with the small plastic buoy at 1m bellow the sea surface, on the distance of 40 m from the coast. Output parameters are conductivity, temperature and salinity of the seawater with output signal frequency of one minute. In order to obtain more controlled data, the CT spot monitoring with profiling up to 30 m is performed by multiparameter probe, with monthly measurement frequency.

Real-time data provided by moored CT sensor need to be automatically collected and stored into the database. Data are transmitted through the computer network of the Institute to a virtual private server where they are stored in the database and are further adapted for distribution through the SeaDataNet standardized Pan-European infrastructure for ocean and marine data management (SeaDataCloud project). In order to provide free access to marine data, we have created an Internet Web Page (<https://prodata.oceanography.me>). At this page it is possible to monitor in (near) real time the subsurface temperature and salinity transmitted from the standalone CT sensor.

The focus of our study, based on the data acquired from small network of marine observing stations, is to obtain the temporal and spatial variability of the two physical properties of seawater along the Montenegrin coast. Moreover, the recorded temperature and salinity time series are an important input for environmental quality studies of the investigated area.