Water quality monitoring is nowadays one of the most studied topics in the world, due to the useful information that it can give to the global changing understanding. Remote Sensing data, once processed, providing a regular and synoptic view of oceans colors, are a powerful instrument to study the marine biosphere, its spatial characteristics and its temporal evolution.

Ocean colors observed by satellite are the measure of the water leaving reflectance of the investigated area, and vary according to the concentration of water’s constituents, i.e. chlorophyll concentration, suspended sediments and dissolved organic matter [1]. In fact, as the concentration of Chlorophyll $a$ increases, a decrease in the shortest wavelength and the increase of the peak around 550nm in the water leaving radiance value can be observed [2]. These three bio-optical parameters can be used as indicators of plankton biomass, as input to primary production models, or to trace oceanographic currents, jets, and plumes.

The relationship between satellite-derived ocean colors and chlorophyll $a$ concentrations has been studied for several decades [3-5], and several model-based estimation algorithms have been proposed. These algorithms are based on two different approaches: inversion of analytical modeling, [6] and empirical analysis. Analytical models take account for all parameters relating water leaving reflectance with chlorophyll concentration: downwelling irradiance, absorption, backscattering, and the angular distribution of light within the ocean [7]. In empirical approaches, regression methods are commonly used. Analytical models inversion is characterized by a high complexity level and computational load; ill-posed problems are usually encountered and noise sensitivity can be significant [8]. Moreover, where global models are suitable for open ocean waters (case I waters), in coastal zones, due to the high spatial and temporal variability of the atmosphere, and to the independence of the three bio-optical properties, a more sophisticated approach must be used.

Accurate Atmospheric Radiative Transfer Equation codes can be used to atmospherically correct remote sensing data in order to retrieve the Water Leaving Reflectances, values used to invert chlorophyll $a$ concentration, backscattering coefficient of suspended sediments and absorption coefficient of dissolved organic matter. This correction, based on analytical inversion models results a very computational intensive application, and can be used only to process very small areas.

For these reasons the research for a global empirical models has become very important. In empirical approaches remote sensed data is related to the chlorophyll concentration by interpolation techniques applied to a set of training samples. Several neural networks based algorithms have been proposed for the empirical approach [9-14]. Neural networks approach presents however some important drawbacks: (i) training can results an expensive task; (ii) minimization of the training errors can lead to poor generalization performance; and (iii) performance can be degraded when working with low-sized data sets. In [15] a performance evaluation between several empirical approaches in inversion problems, shown that the use of the support vector machine (SVM) can improve the state of the art neural network solution.
In this paper we propose a Support Vector Machine specialized on Apulian coastal zones. In the framework of the IMCA project, we use a training dataset consisting of coincident water leaving reflectances and chlorophyll concentration measurements taken by the Micropor II Satlantic profiler over three different areas in South Italy. Taranto, the first area is characterized by a very polluted marine ecosystem; Margherita di Savoia lies near the Ofanto river, making its water rich in sediments; finally the Isole Tremiti zone represents a very clean environment.

The found SVM parameters give a very good result in the retrieval of chlorophyll concentration over the coast.