

An Introduction to the Project BLASCO - Blending Laboratory and Satellite techniques for detecting Cyanobacteria

Algal blooms can have an impact on health care costs, on the costs associated with the treatment of water intended for human consumption and on the tourism industry. The implementation of early warning systems would reduce these costs and the efforts needed to face and control the harmful effects of an algal bloom. A system for monitoring the quality of the waters, which operates on a large scale and at high frequency, would allow to keep under control the evolution of a bloom. The observation by satellite allows such a monitoring: in particular, the project is focused on the development of techniques for the analysis of satellite images, in order to detect the specific phytoplankton species potentially responsible for bloom formation in lakes. To reach this goal, it is necessary to analyse the spectral response characteristic of cyanobacteria and to develop algorithms to be applied to the analysis of satellite images. New calibration algorithms for the interpretation of satellite images will be obtained in lab experiments, using algal cultures. The developed algorithms will be tested through the analysis of remote sensing images, with particular attention to the bloom events occurring in the lakes of Lombardy and Piedmont. Field data on water optical properties and phytoplankton samples will be also collected. Moreover, different approaches will be applied and compared to quantify the amount of cyanobacteria (HPLC, counting, in vivo fluorimetry, spectroradiometry). Among the main results there will be the creation of a dataset of spectral signatures of some cyanobacteria taxa, as well as the development of calibration curves for the qualitative and quantitative estimation of the blooms. In general, we expect that it will be possible to distinguish, in natural conditions, the spectral signatures of cyanobacteria, even at low concentrations and within mixed populations of phytoplankton.

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