Optical characterization of Argentinean lakes, from deep Andean lakes to shallow Pampean ones

Gonzalo L. Pérez

With 8 figures and 5 tables

Abstract: The purpose of this article is to aboard phytoplankton community as an optically active particulate component of water systems. Mayor concepts of hydrologic optics such as water components and processes that determine the nature of underwater light field were briefly revised. A detailed optical characterization of several contrasting Argentinean lakes is presented. From large deep oligotrophic Andean lakes to very shallow eutrophic Pampean lakes, I describe these aquatic systems using bio-optical properties (i.e., inherent and apparent optical properties) together with optically active substances (i.e., TSS, DOC and Chl a). Spatial variability of optically active substances and their optical properties were used to confront different group of lakes. Finally, throughout the study of phytoplankton absorption coefficients, acclimation and adaptation processes in contrasting lakes were revised.

Keywords: Phytoplankton, optical characterization, lakes, shallow lakes, phytoplankton absorption coefficients

Introduction

Almost half of all the photosynthetic activity on Earth occurs in the aquatic environment (Falkowski & Raven 1997). Within aquatic ecosystems, phytoplankton is the photoautotrophic part of the plankton and a major primary producer of organic carbon in the pelagic of the seas and inland waters (Reynolds 2006). There are only a handful of biological mechanisms extant for the reduction of inorganic carbon, being photosynthesis the most important one. This process is the biological conversion of light energy to chemical bound energy that is stored in the form of organic carbon compounds. These compounds contain biologically usable energy and also supply the elements to build complex organic molecules. The cumulative energy fixation in carbon compounds by phytoplankton is one of the most important basis for the majority of oceanic and inland waters food webs and significant contributes