GLEON 10
Cool Things Poster Presentations

The threats and the challenges of environmental problems on turkish wetlands

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Turkey is identified with her rich species diversity, different ecological structures, and also her different topographic structures. Different habitats of wetlands have different species and densities. There are also complex ecological relationships not only among the species, but also between species and phsico-chemical parameters in the wetlands.

From the economic point of view, wetlands are very important due to their characteristics and the living species they harbour.

Wetlands, an important area in term of their fauna, flora, ecology and economically, are the highest template on the earth, where organic substances and oxygen are produced. Also, seving as depots for underground waters, wetlands provide sources for both irrigation and potable waters.

Inspite of being a very important ecosystem, Turkish wetlands are facing serious threats and challenges such as pollution, effects of global warming, illegal hunting, excessive grazing and the cutting down of water plants. Even though wetlands cover a good portion of the country's land mass, poor policies by the government are not helping toward solving the basic problems facing the wetlands, thereby giving way to a gradual reduction in biological diversities habited in the wetlands ecosystems.

Modelling lake response to land use change: improving model accuracy using high-frequency buoy data

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The Rotorua region in the eastern North Island of New Zealand contains 15 lakes which are economically and culturally important to the region. These lakes have high diversity of water quality and physiography. Intense agricultural land use is common in many of the lake catchments, and declining water quality has become an increasing concern over recent decades. Catchments are typically comprised of porous volcanic substrates, and previous studies have estimated that the effect of intense land use on nutrient loads involves time lags of >50 years for some lakes.

Land use change is currently being considered as a management option for improving the water quality. To assess the effects of reduced surface nutrient inflows, output scenarios from a catchment groundwater model (ROTAN) has been used as the input to a lake ecosystem model DYRESM-CAEDYM. Typically, model calibration involves assessing the accuracy of simulations against any and all available field data, usually manual samples with up to a month between routine measurements. Here we show the benefits of high-resolution, in-lake measurements from a sensor platform, both for providing more accurate input data, and for more accurately capturing lake dynamics. This is particularly important in a polymictic lake such as Rotorua, where frequent short stratification events drive deoxygenation of bottom waters, sediment nutrient release events and associated changes in phytoplankton growth.

BaMM: a Bayesian metabolic model and its potential for GLEON data sets

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We present a generalized, single-station model of diel oxygen dynamics in aquatic ecosystems organized in Bayesian statistical construct. This model estimates key physical and biological parameters in aquatic ecosystems including gross primary production (GPP), ecosystem respiration (ER), and reaeration. The model can incorporate prior information on many parameters and generates estimates of parameters values, along with their uncertainties, based on their likelihood given the data. We tested the model using simulated data and found it to be robust to significant errors in observation (precision) within a wide range of metabolic states. Patterns in diel oxygen concentration from streams and rivers are well described by the model and parameter estimates are highly constrained. We explore the application of this model to GLEON data sets and identify useful future refinements to the modeling structure for estimating ecosystem metabolism in lakes.

Organic carbon as an indicator of lakes trophic state

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The purpose of the study was to determine the trophic level of the lakes using the trophic state indices of Carlson (1977) and to analyze the relationship between the Carlson's TS variables and the content of organic carbon.

The main criterion for the lakes selection was harmonic development, i.e., from oligotrophy to eutrophy. Natural lakes that were studied were located in the river-lake systems of the northeastern Poland; lakes have been anthropogenically altered by their incorporation in the cooling system of a power plant.

A high statistical correlation was found between the content of total organic carbon and the Secchi disc depth, the content of total phosphorus, and the chlorophyll *a* concentration. Based on these findings, a TSI for TOC has been derived, according to the following equation: **TSI(TOC)= 20.59+15.71*ln(TOC)**. With the help of the TSI(TOC)

a comparative analysis of the lakes was performed and a numerical assessment of the trophic state provided.

Using only one TSI value for lake classification can be erroneous thus, the author suggests a combined analysis of all TSI indices, i.e., Secchi depth, total phosphorus, chlorophyll *a* and TOC, which makes the ground for assessment of the lakes metabolism and determination of the factors limiting primary production, as well as the water pollution level. TSI(TOC) calculated from the TOC concentrations may be helpful in assessing the ecological condition of aquatic ecosystems, as provided by The Water Framework Directive. Content of organic carbon in the water can be a sensitive indicator of the surface water quality changes and should be applied in the monitoring studies. Early recognition of the pollution sources coupled with their abatement and supported by a rational watershed management provide the ground to sustain good water quality in lakes of the meso/eutrophy trophic state.

Developing a Lake Buoy and Managing Information Flow

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The poster will contain information regarding the process that PME has taken to develop a lake buoy and the implementation of Data Turbine. We have our first lake station installed in Arkansas. Data is being telemetered to our internal server and then imported into Data Turbine (http://www.dataturbine.org/). This piece of software is able to communicate with our server, withdraw real-time data and then produce up to the minute data plots. If you would like to see it work, just download the RDV from here, http://code.google.com/p/dataturbine/ (Featured downloads RBNB-V3.2B3.jar) and then once you have the program on your computer, open it up, go to File, Connect and then for Host: 63.200.217.2 and Port: 3900. There you can click on the folder (left side of the screen) that says "Demo Data" and then click the folder that says "Measured." All sensor channels will open and each one can be clicked for a data plot. Oh, and remember to change the time from 1.0 s (drop box located at the top of the screen) to something like 1 hour.