# Boxmodelling

# ODE's

July 2, 2016

# 1 ODE

The herein derived ODE's for box models are based on the phosphorus ($P$) concentration in the considered system.

In general it holds that the phosphorus concentration in a certain box is a function of time and certain 'environmental conditions'. This could be the temperature, the pressure or whatsoever:

$$\frac{dP}{dt} = f(t, condition). \tag{1}$$

# 2 Example Model 1

For a deep lake one could try to model the lake and it's phosphorus concentration as a two-box-model. The surface of the lake to a depth of the thermocline would then be a part of the *Surface Layer* box (herein referred to as *SL*) whereas the rest of the lake would be part of the *Deep Lake* box (herein referred to as *DL*).

## 2.1 Transport

A riverine inflow would bring new water into the SL box. At the end of the lake a outflow would transport lake water from the SL box downstream and finally into the worlds oceans.

## 2.2 Processes