

LakeN

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This model was written as a project for course 68806 Eco-hydrologic modelling with R. This model illustrates the annual N cycle in a lake in northern Israel, and simulates the transitions from oxydized species into reduced species.

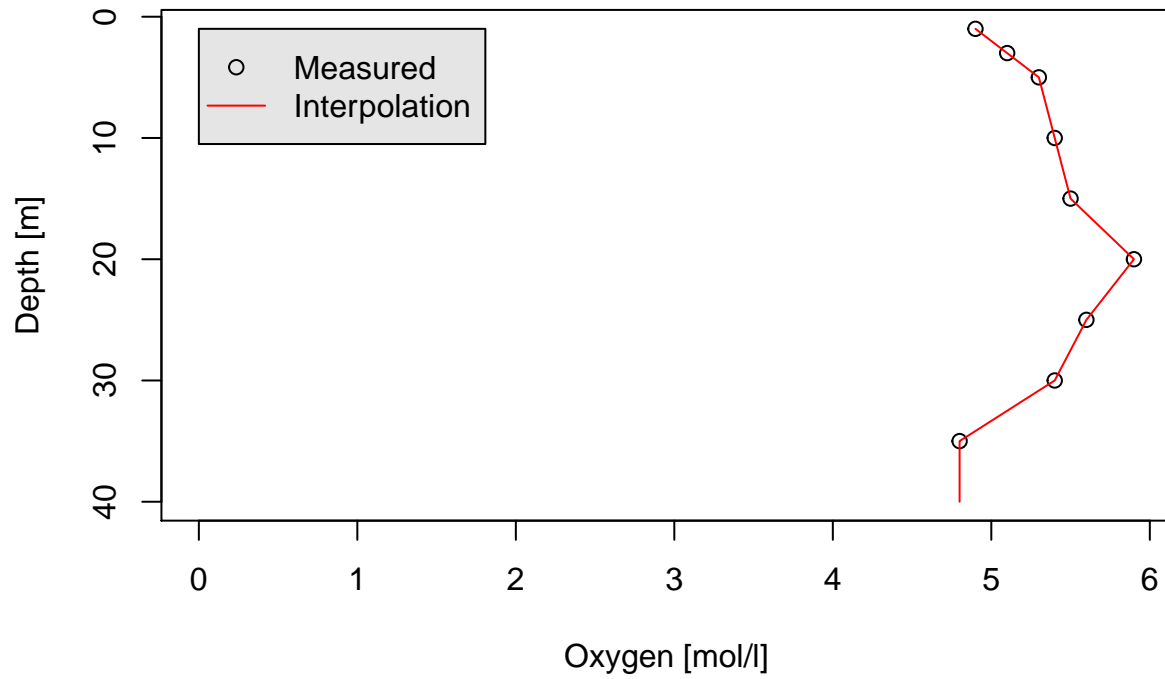
read the data and load relevant libraries

Interpolate the Data into 1 m Intervals

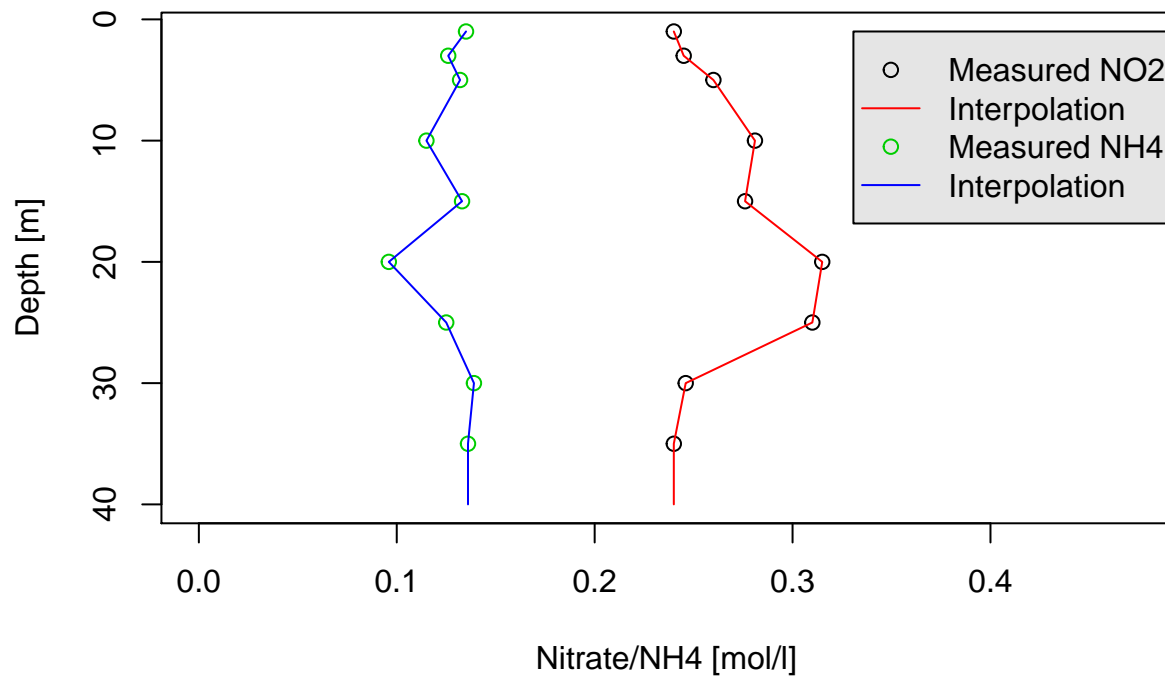
Use the function “depthinterp” to interpolate the data into uniform length for every 1 m.

Demonstrate interpolations of randomly selected data

Oxygen interpolation 2013-01-15



N species interpolation 2013-01-15

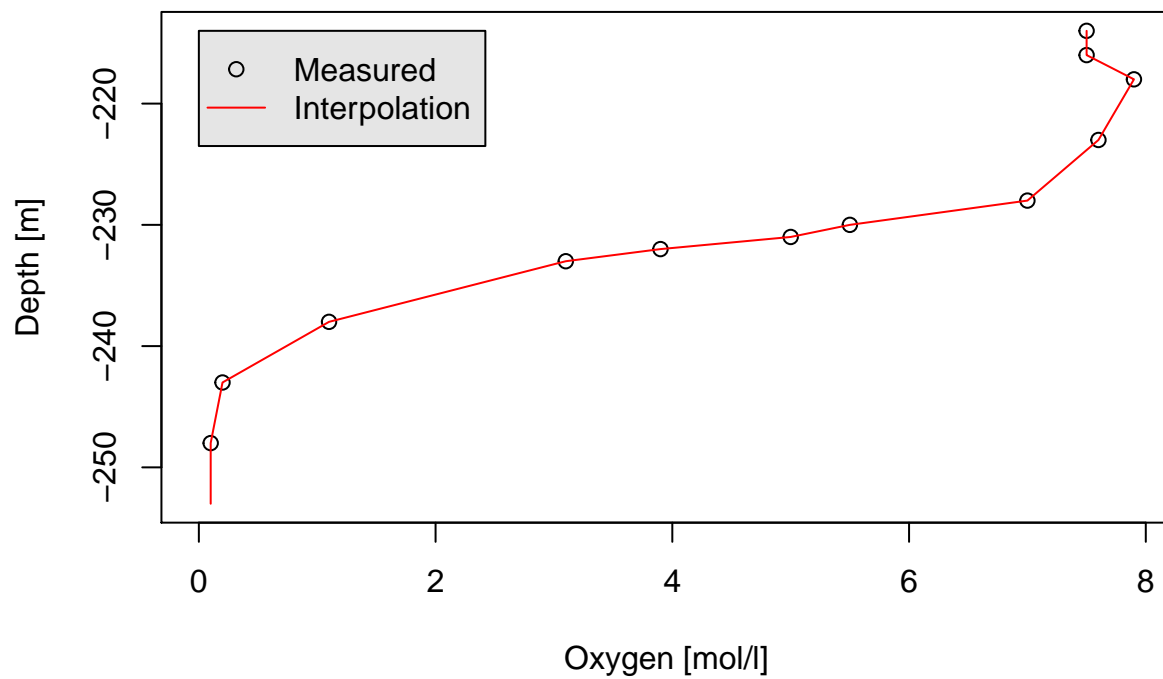


Depth and Level Corrections

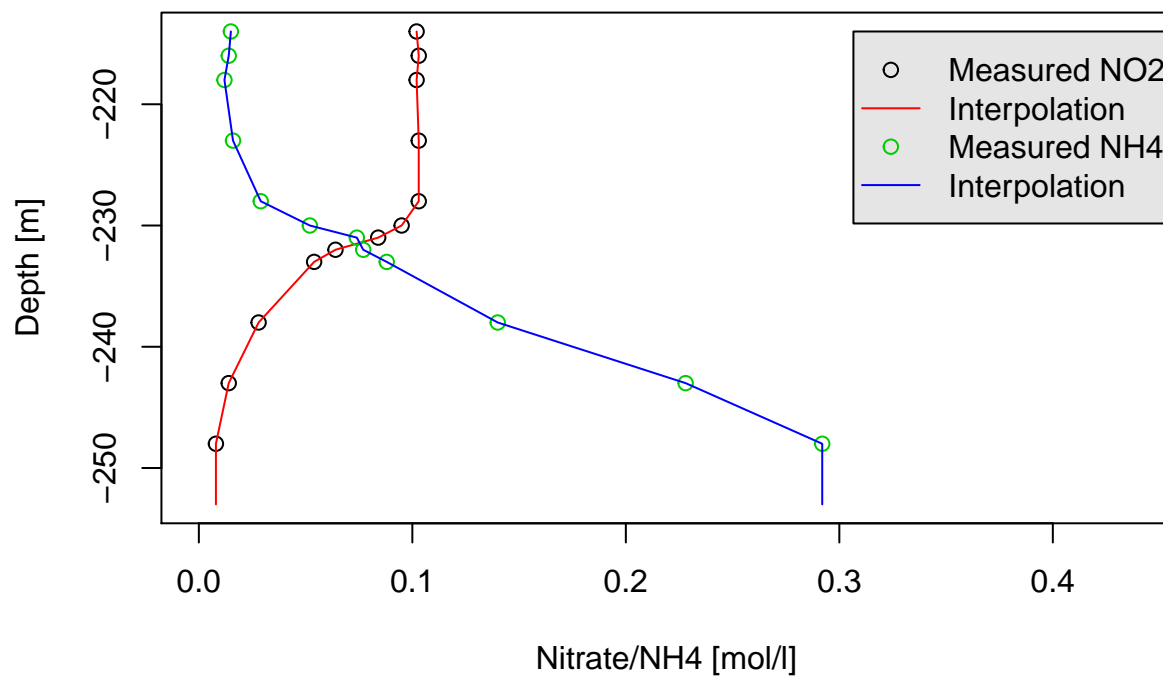
calculate the appropriate depth for each measurment using available daily level measurments. Use function “realdepth” and use closest day if no level measurment of that day is available.

demonstrate the results according to the new depth scale of randomly selected data

Oxygen interpolation 2011-06-26



N species interpolation 2011-06-26

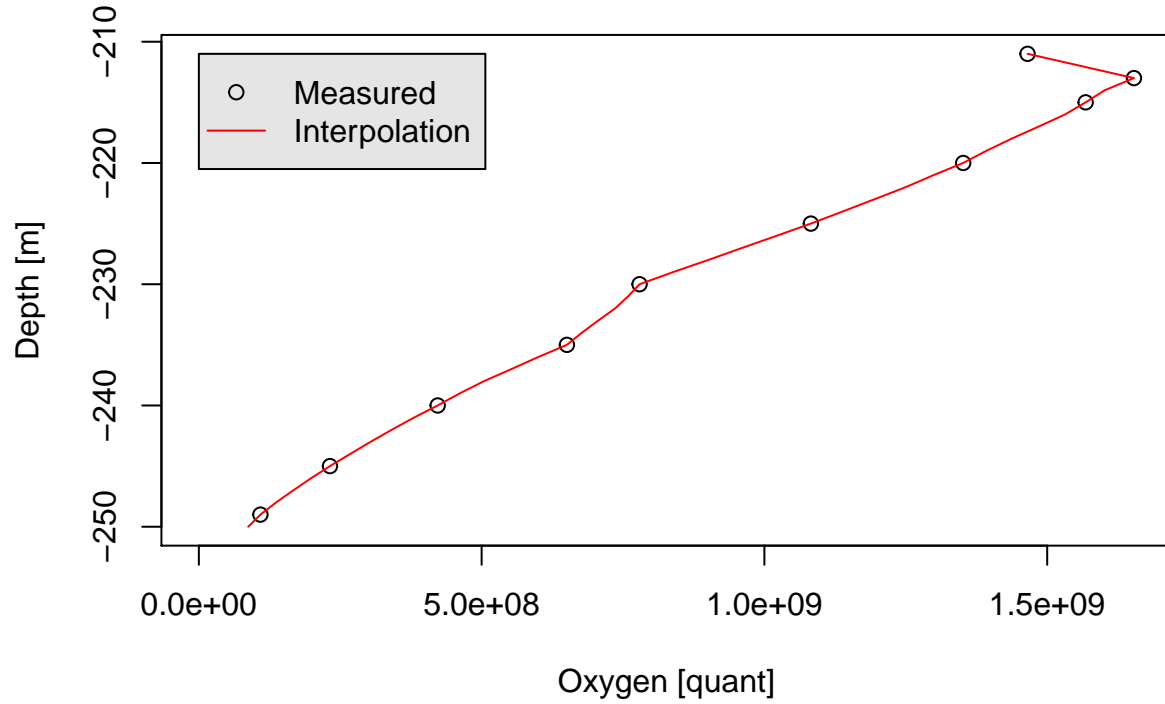


Quantify the data using lake hypsometric curve

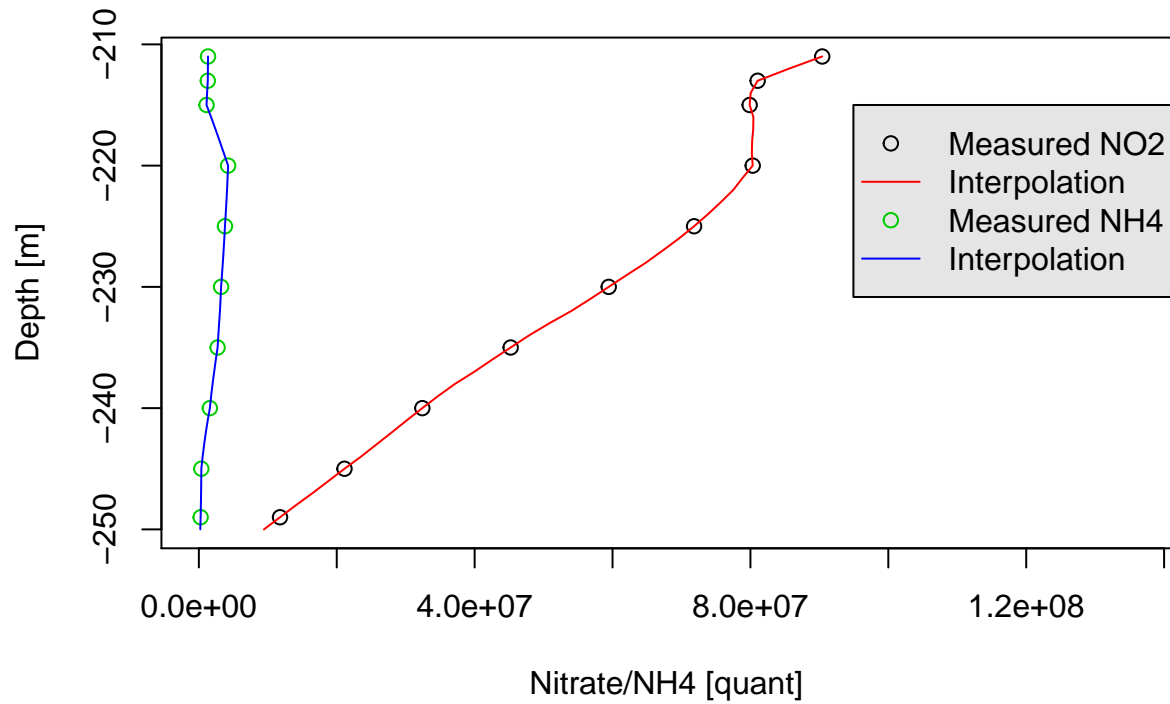
Quantify the amount of measured species using the hypsometric curve of the lake using function “conctoquant”.
Multiply each depth value with its corresponding hypsometric value

demonstrate the results according to the new depth scale of randomly selected data

Oxygen interpolation 2013-03-03

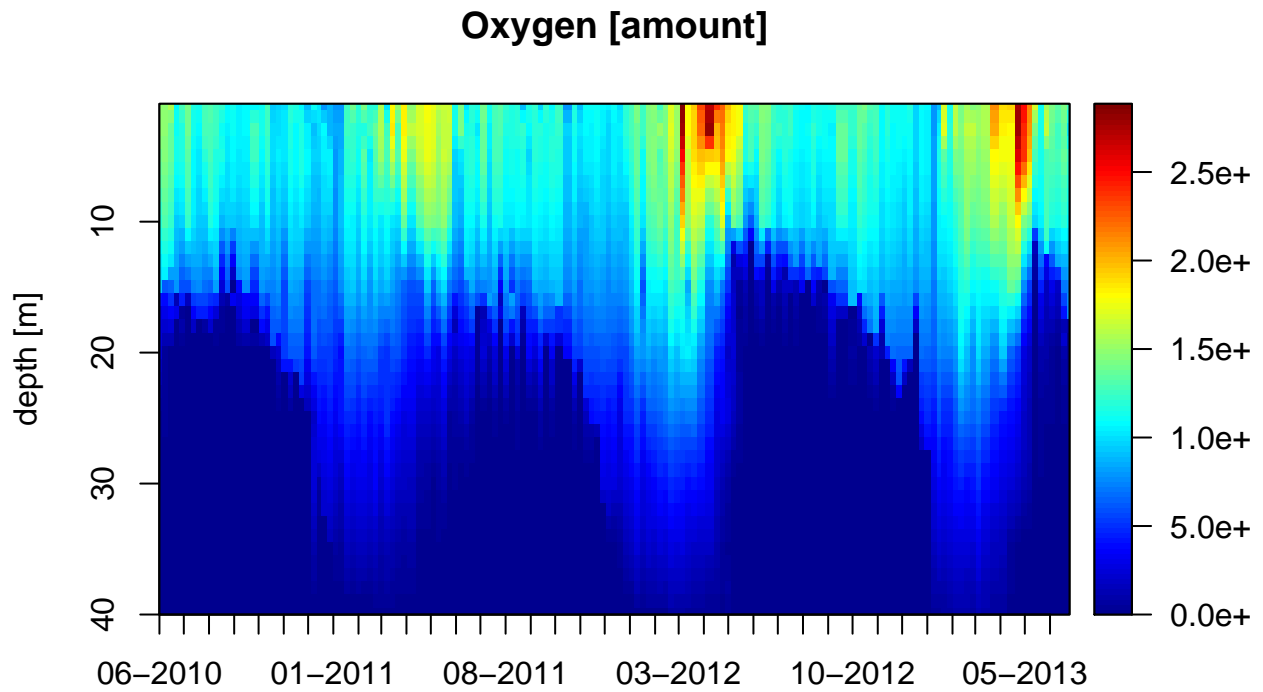


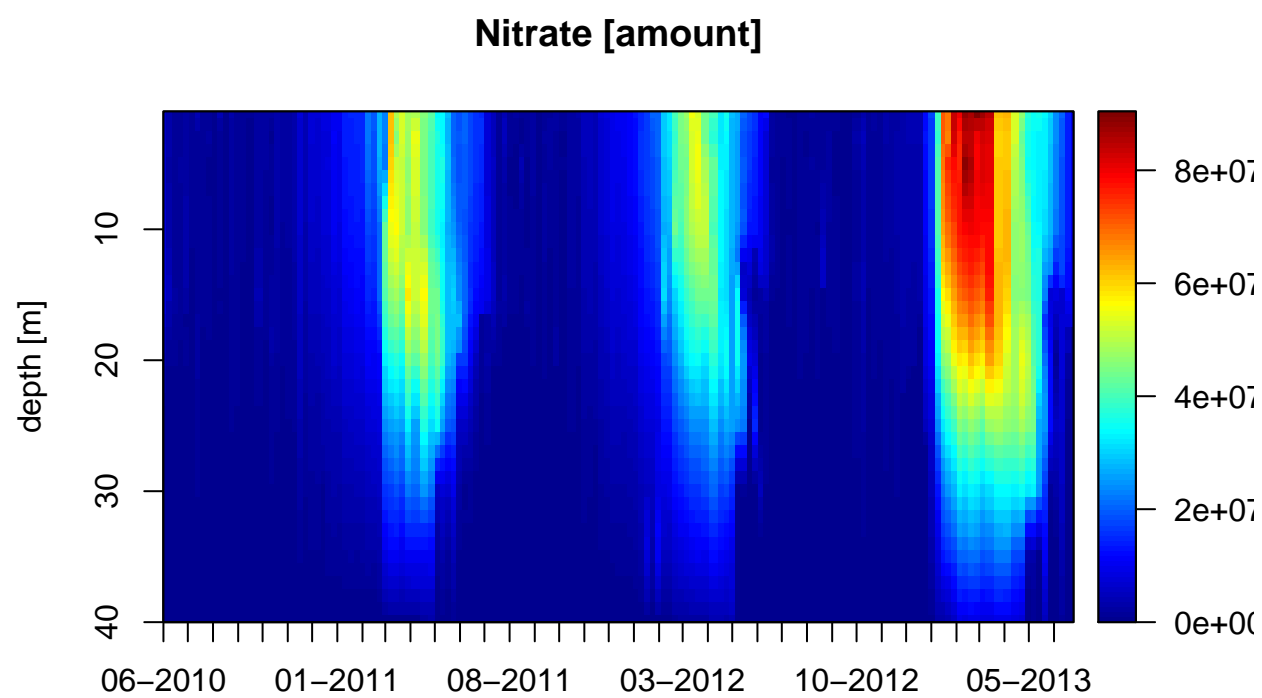
N species interpolation 2013-03-03

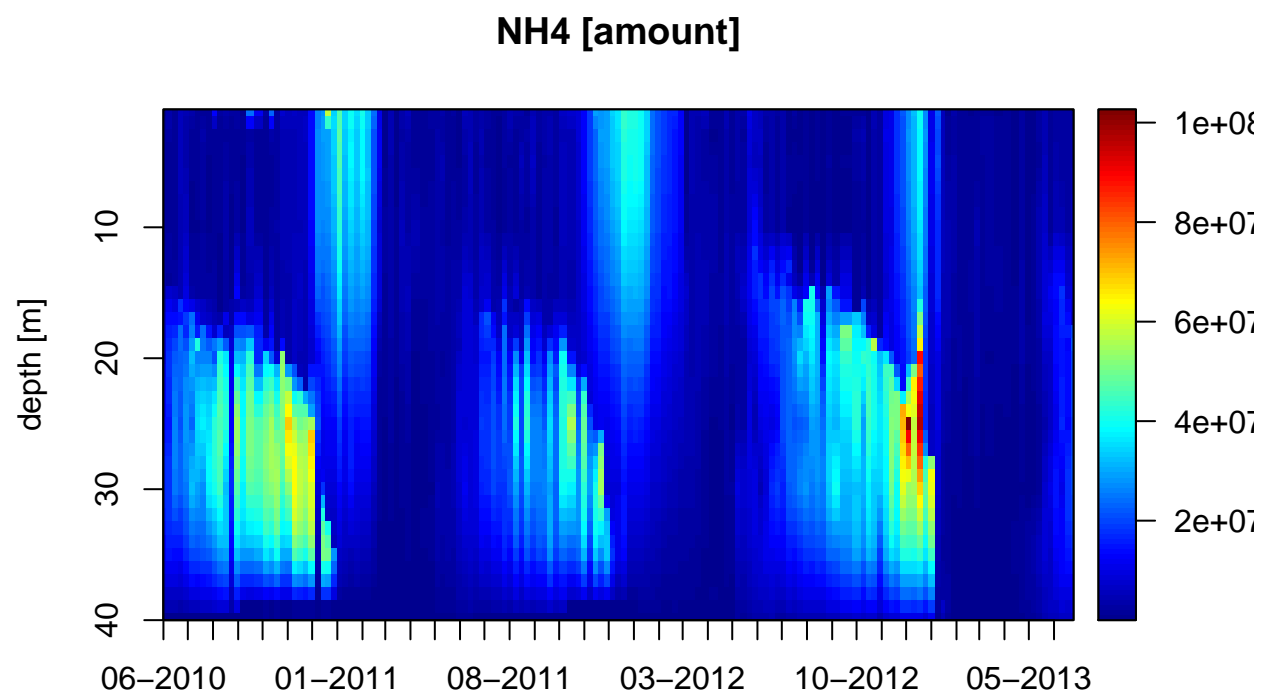


Time series plots

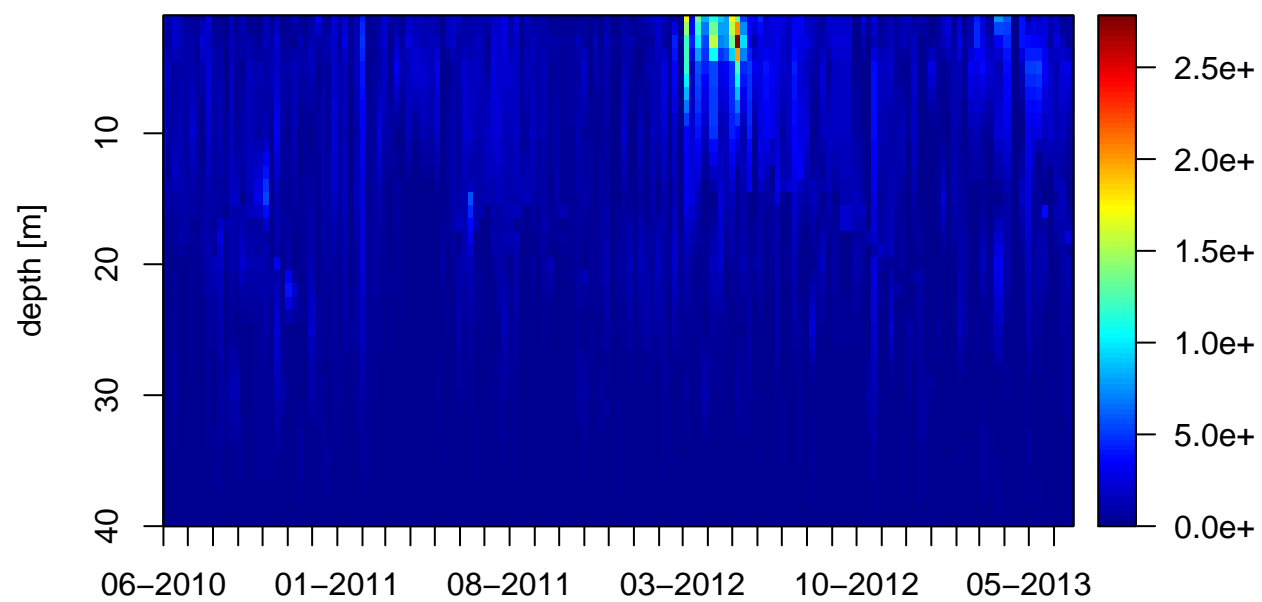
the following plots provide some visual estimation of the data to visualize time-depth processes

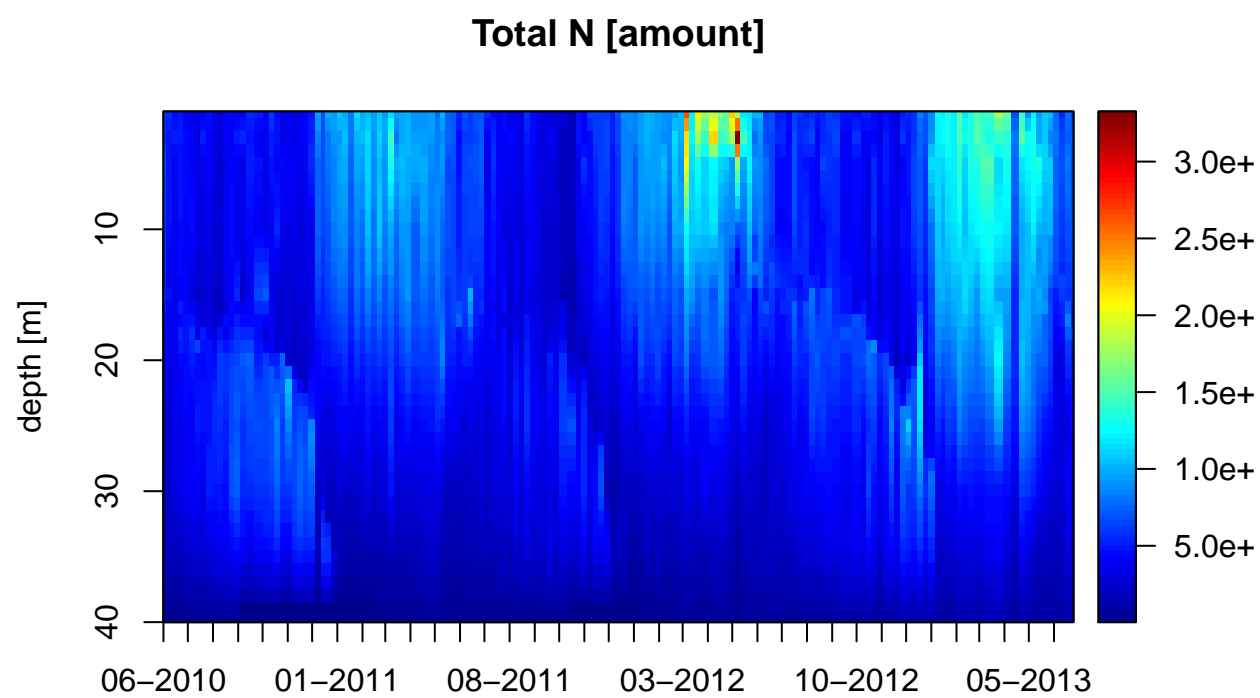






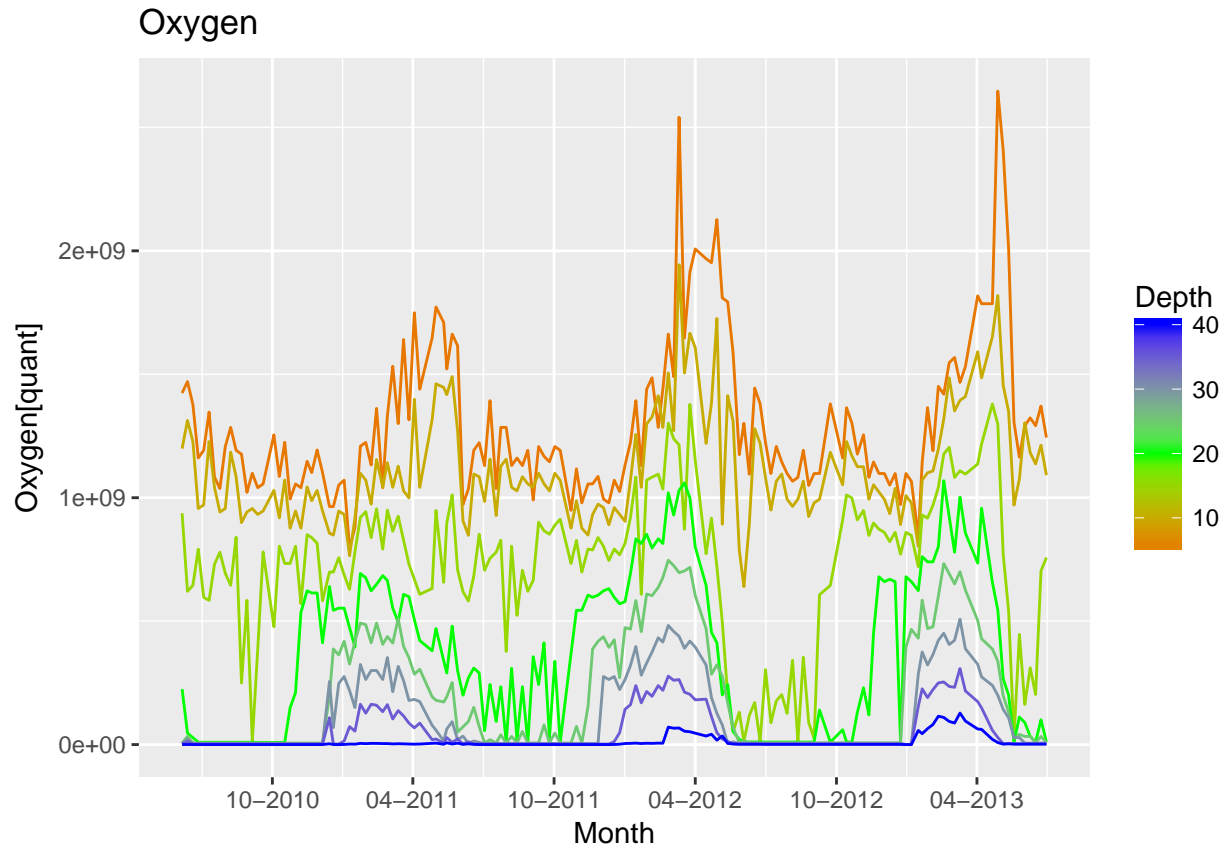
N Organic particular [amount]

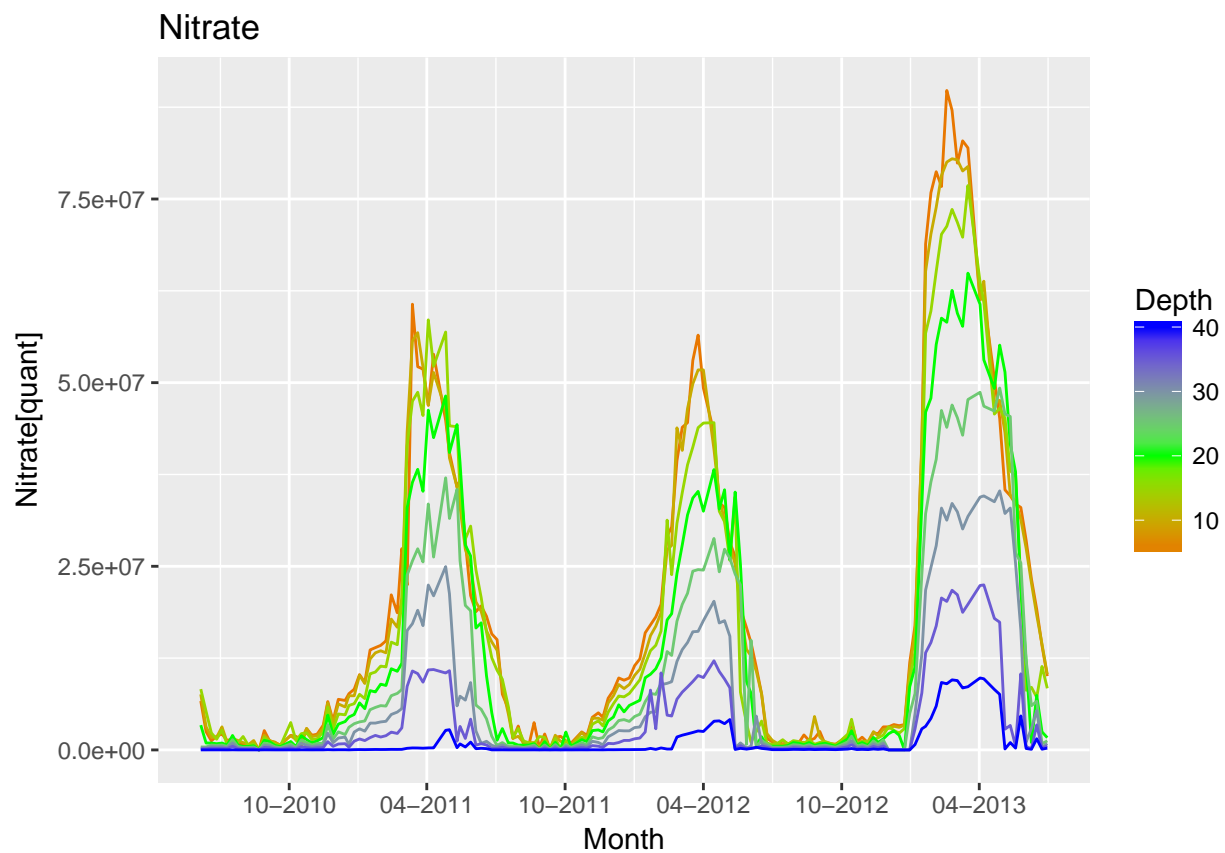


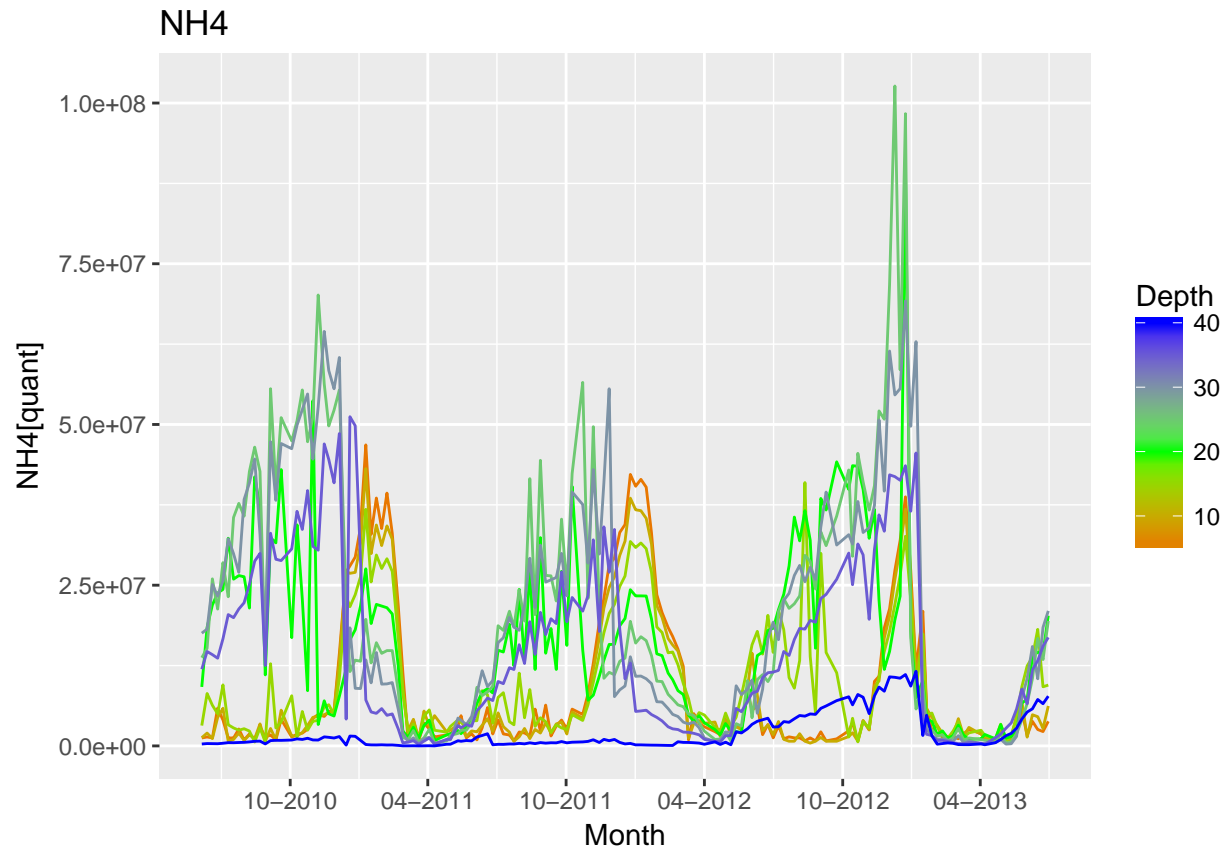


Time-depth cross sections

the following plots provide some visual estimation of the data to visualize time-depth processes



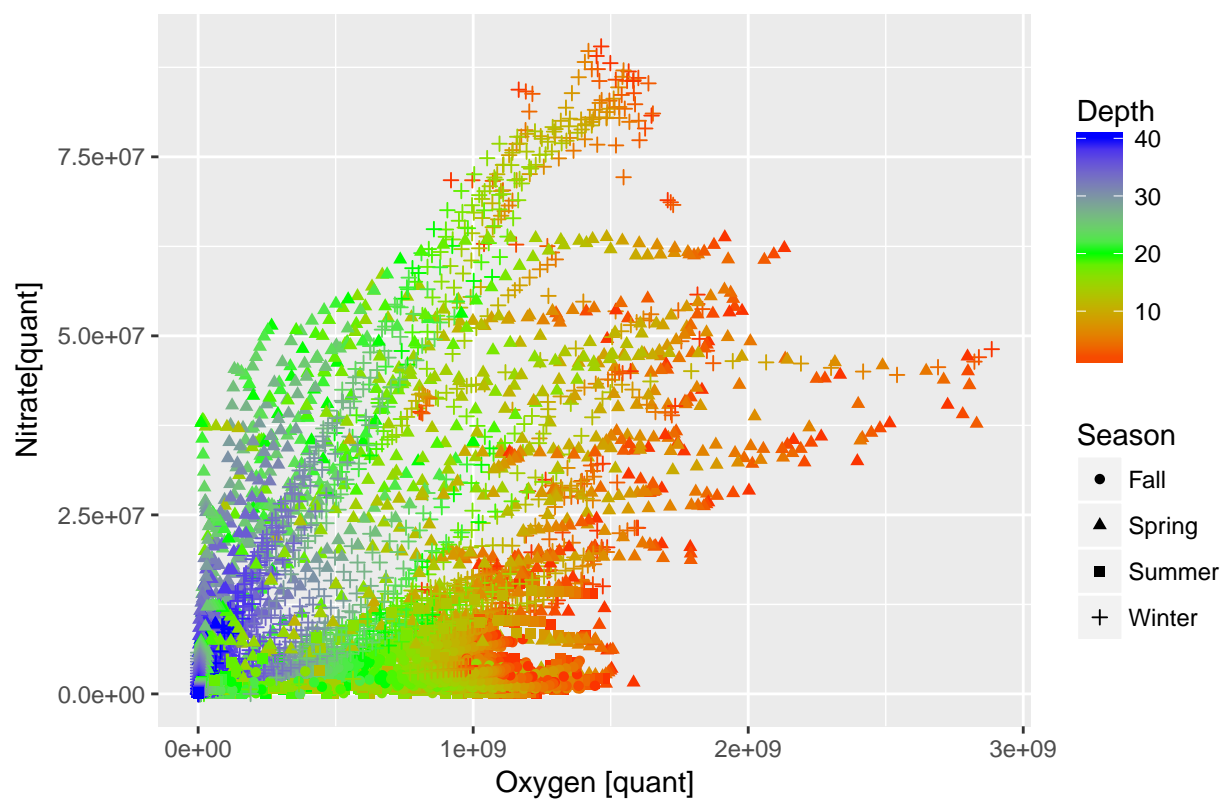




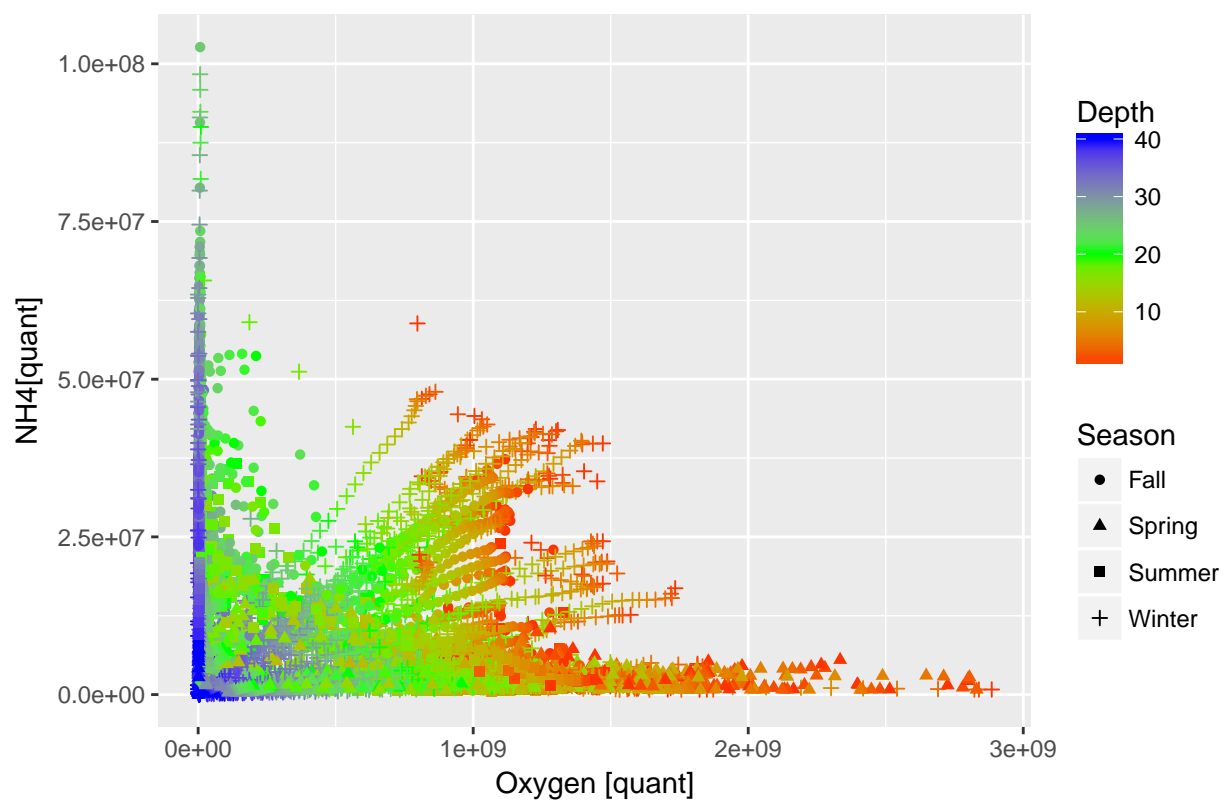
Correlation plots

the following plots provide some visual estimation of the data correlation

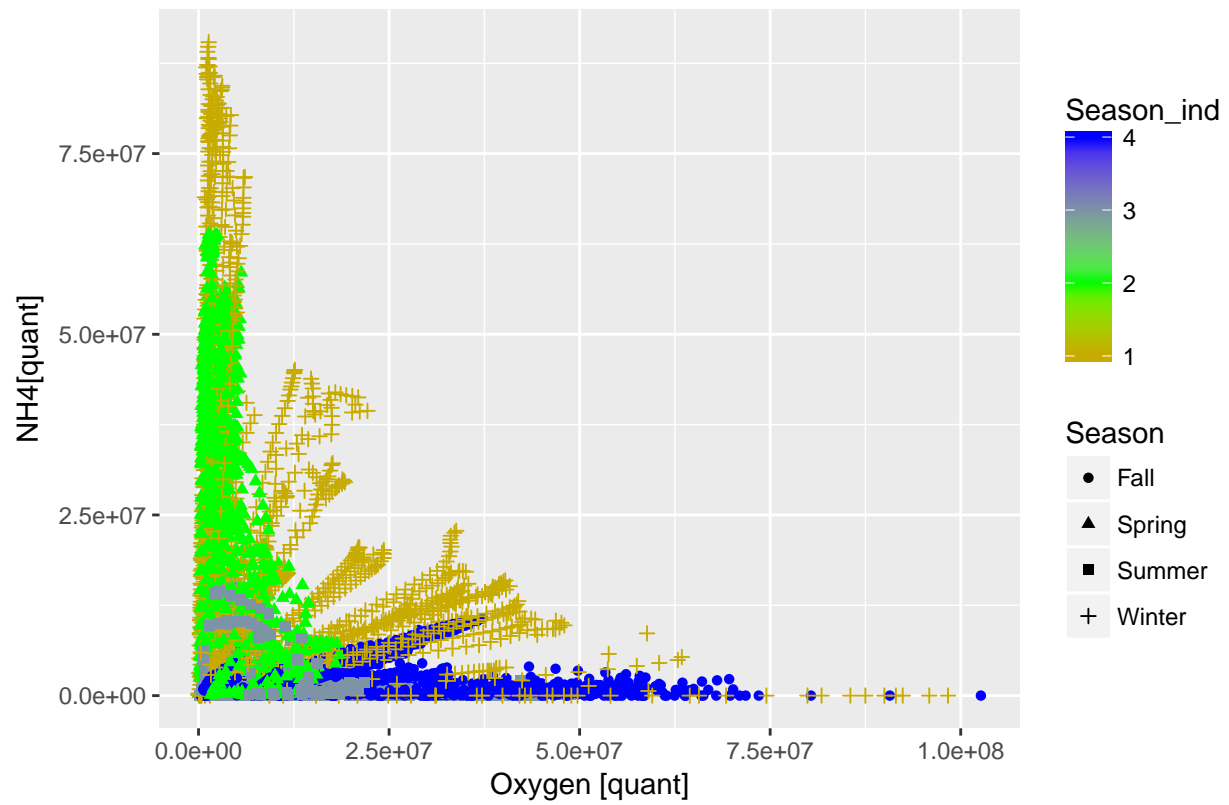
Nitrate vs. Oxygen

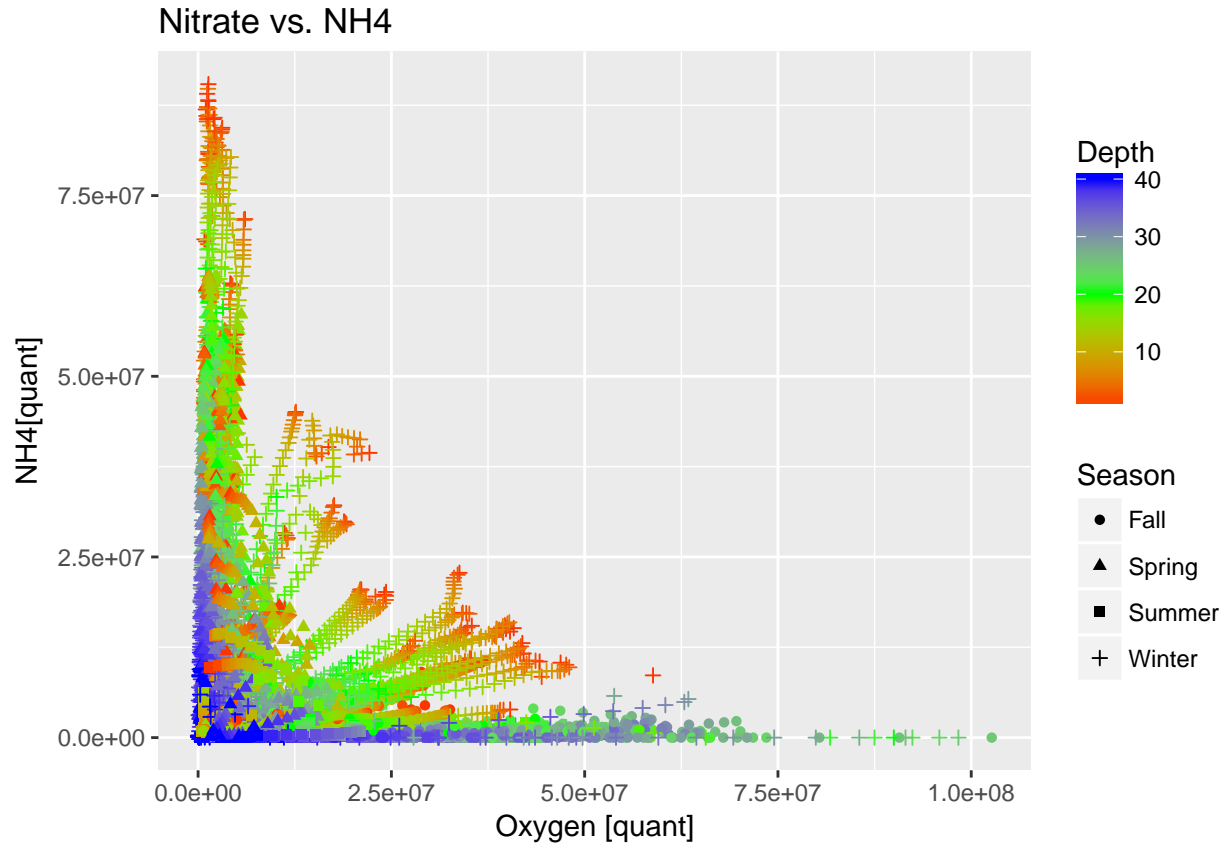


NH4 vs. Oxygen



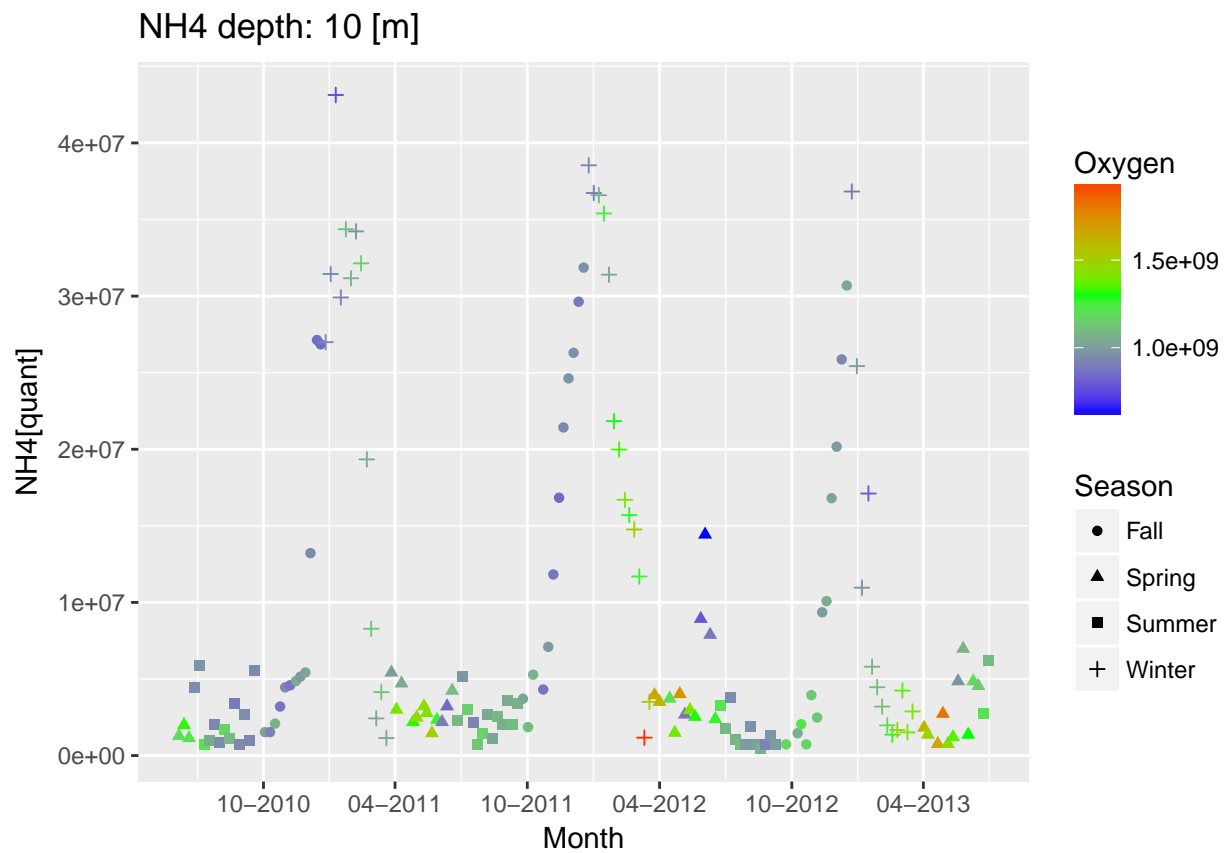
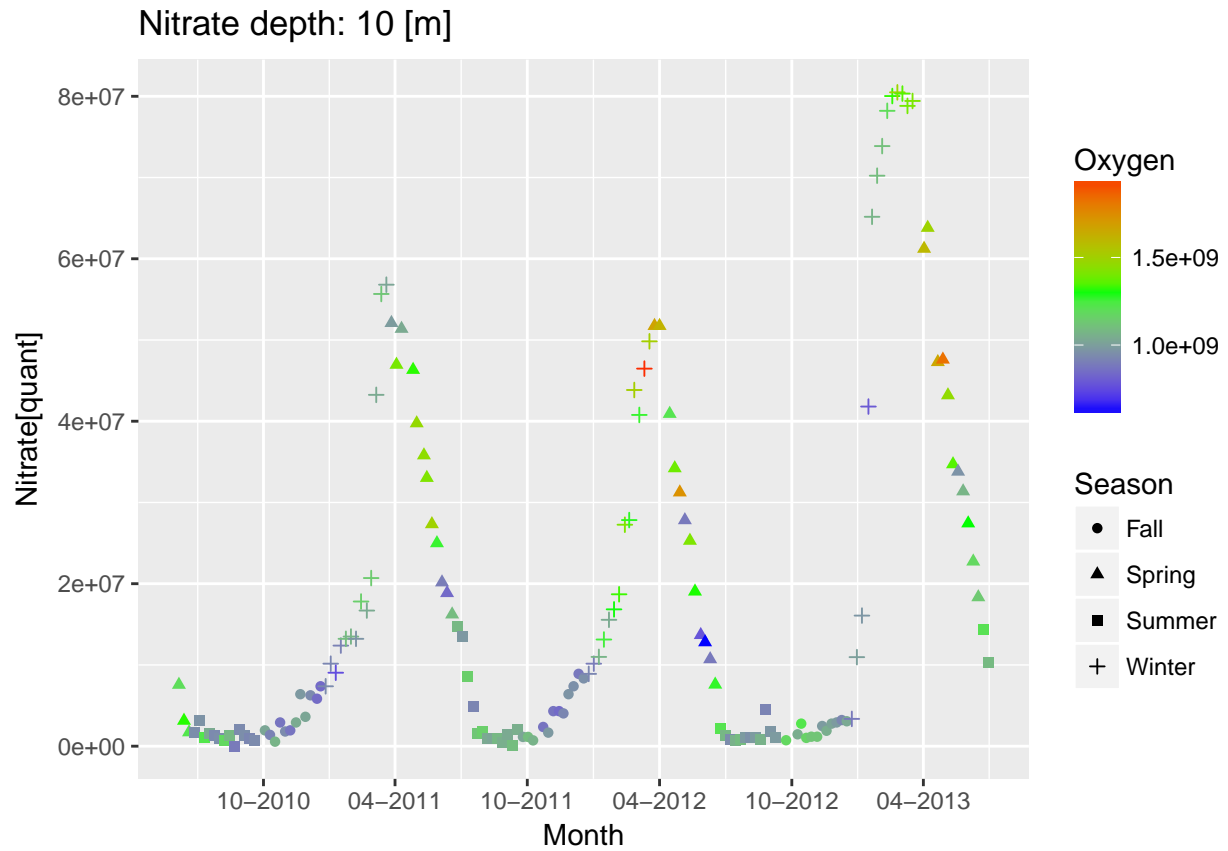
Nitrate vs. NH4

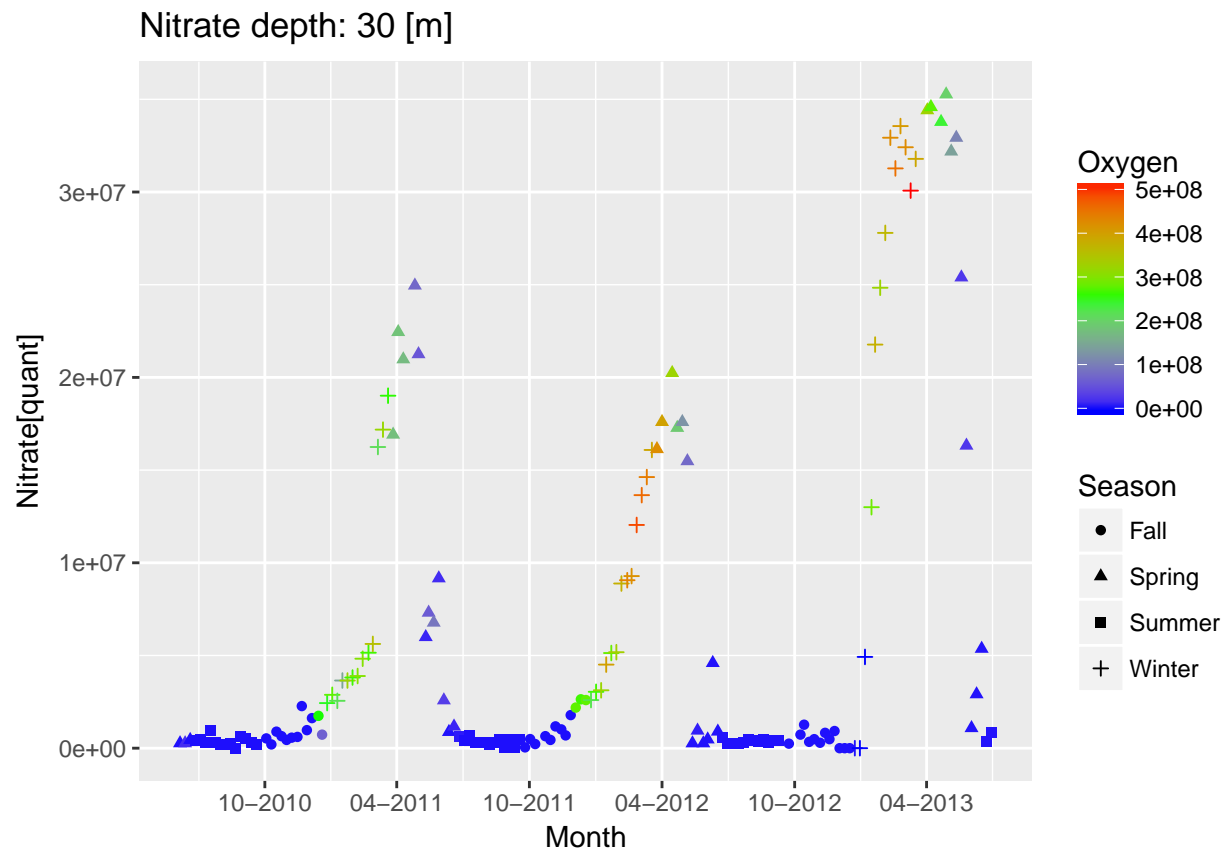


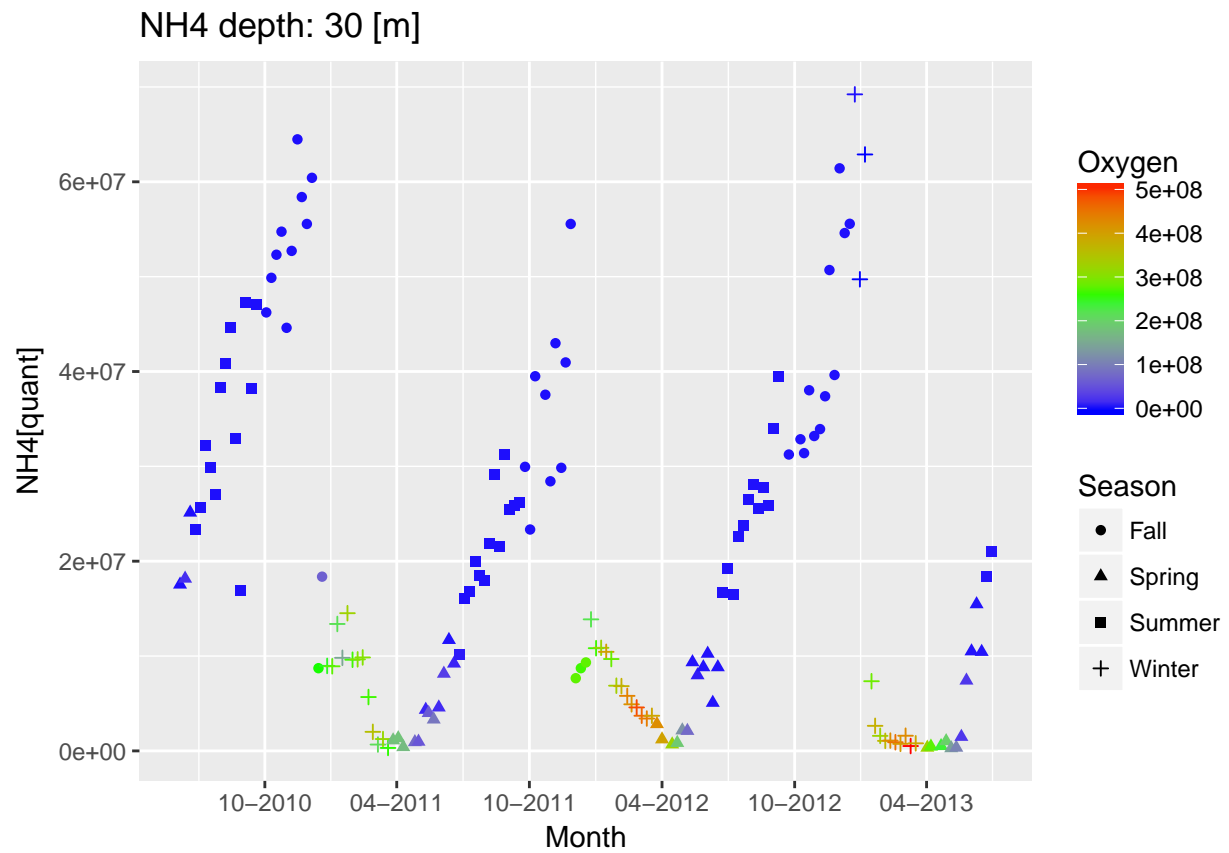


Model fitting estimation

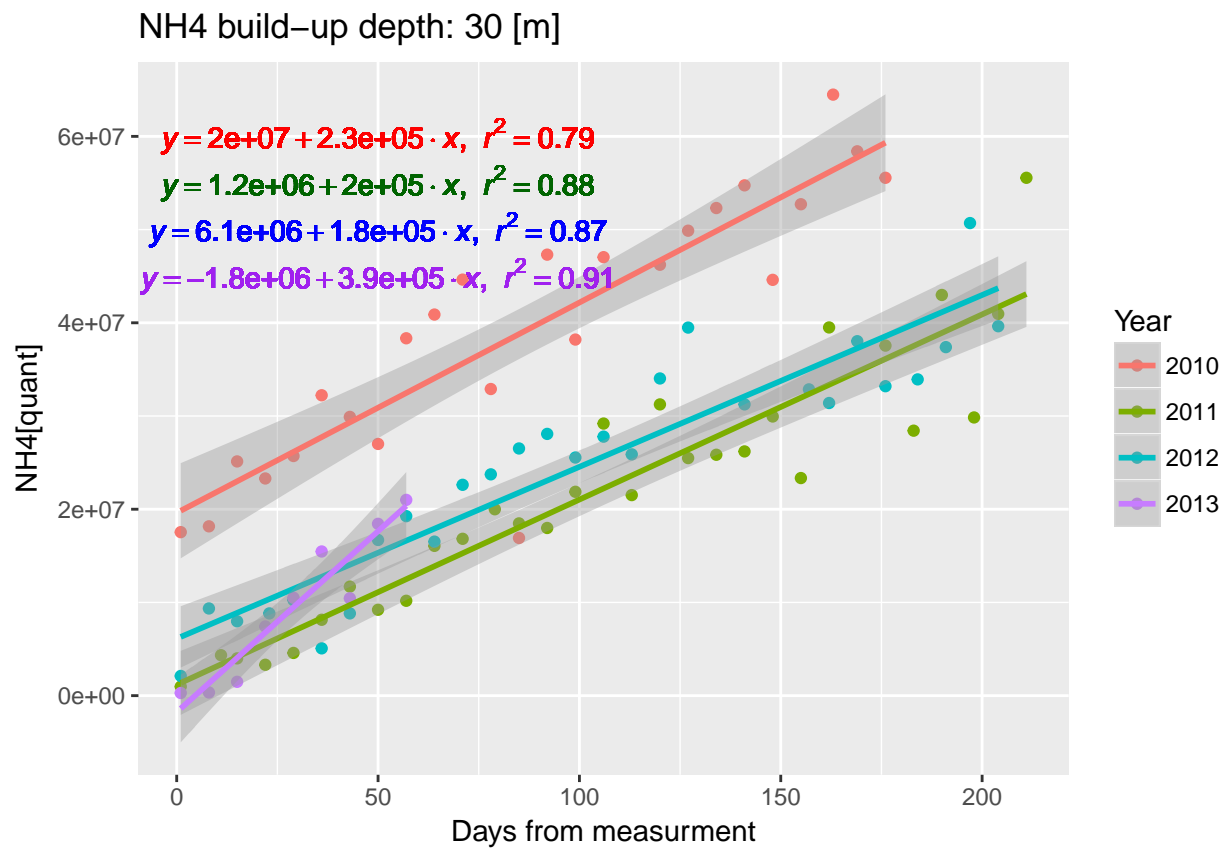
nitrification and denitrification are modelled for the stratified lake conditions, and are mixed during winter. depth 10 m is used to estimate nitrification processes, and depth 30 m is used to estimate denitrification







simulate NH₄ build-up between May and December in 30m depth
in order to estimate reaction rate



simulate Nitrate build-up between November and May in 10m depth in order to estimate reaction rate

