SampleOptim R-tool to optimize fish sampling for biological parameters

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IPMA, Portugal
2019

SamplingOptim R-tool

MAIN OBJECTIVE:

SampleOptim R-tool as designed and implemented based on the Portuguese National Programme for Biological Sampling (EU Data Collection Framework), which the main objective is determining the optimal number of fish at each length class to sample in order to produce data (e.g. ALKs and MO) for stock assessment.

Github link: https://github.com/gonpatricia/SampleOptimRDBformat

SamplingOptim R-tool

Input data: RDB format

(Mandatory columns: samplig info (year, quarter, port), length, sex, age, maturity)

Data exploratory analyis script: 1_Data_exploratory_analysis_RDB.R

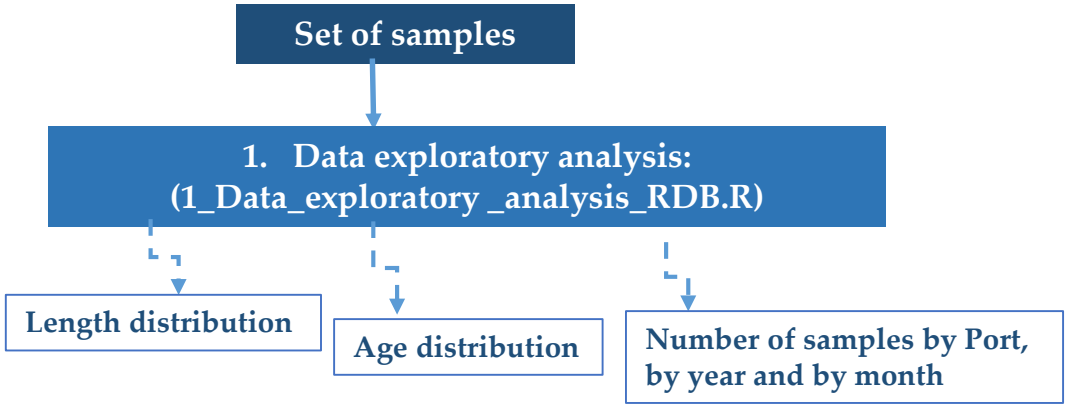
Data generating model (sample/individuals selection): sample_selection_function_RDB.R

Simulation run: 2_Simulations_RDB.R

Statistical analysis of the simulation scenarios: 3_Simulations_results_data_analysis_RDB.R

SamplingOptim R-tool

Aim: Selection of the optim number of individuals by length class to sample



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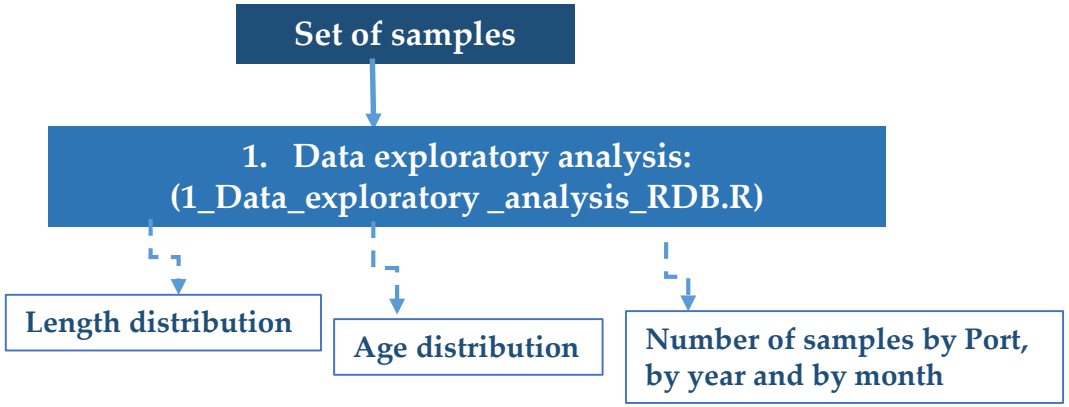

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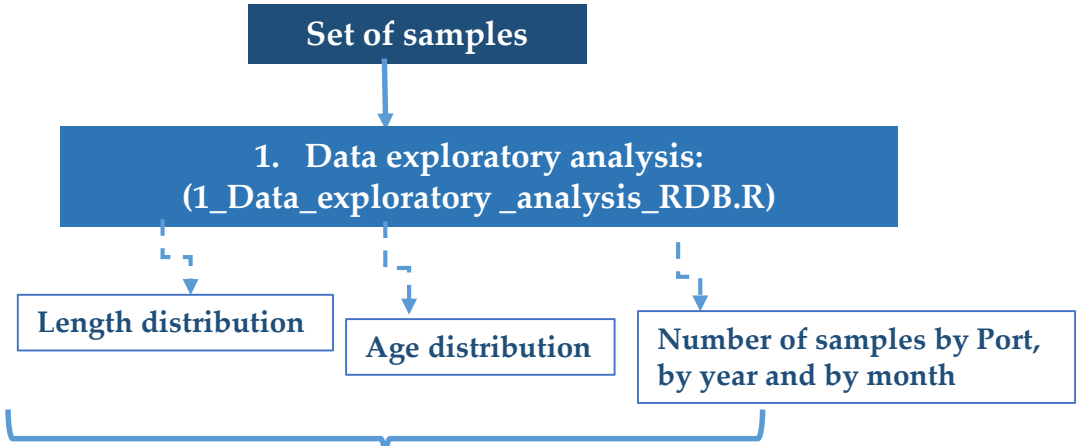
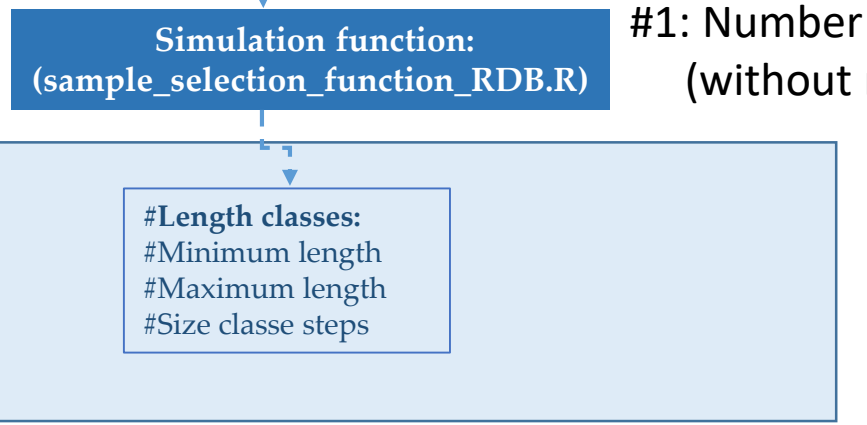


Data generating model



#1: Number of individuals/length class
(without replacement, #number of repetitions)

OPTION 1:
Simple scenario
Only pre-defined length sampling conditions

- means values/specifications *add in* the model by the user

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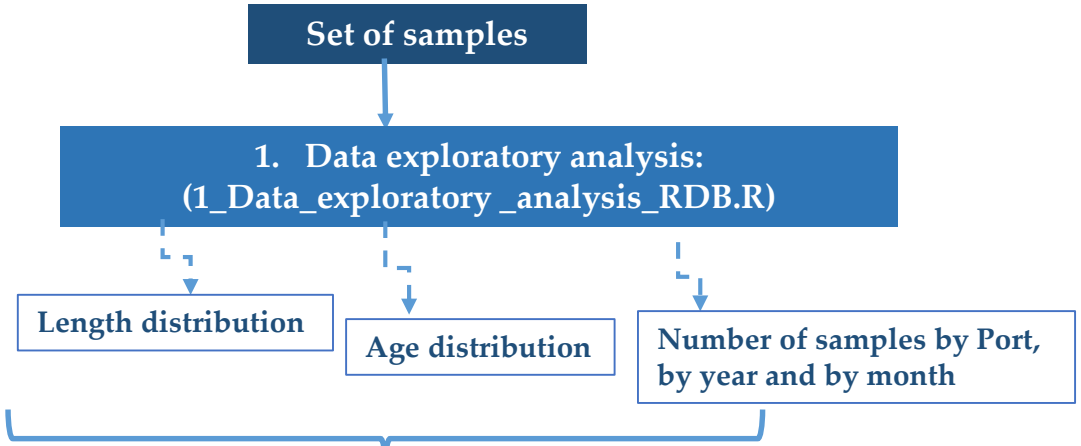

Data generating model

Simulation function:
(sample_selection_function. _RDB.R)

#1: Number of individuals/length class
(without replacement, #number of repetitions)

OPTION 2:
Realistic scenario
Simulation with stratification

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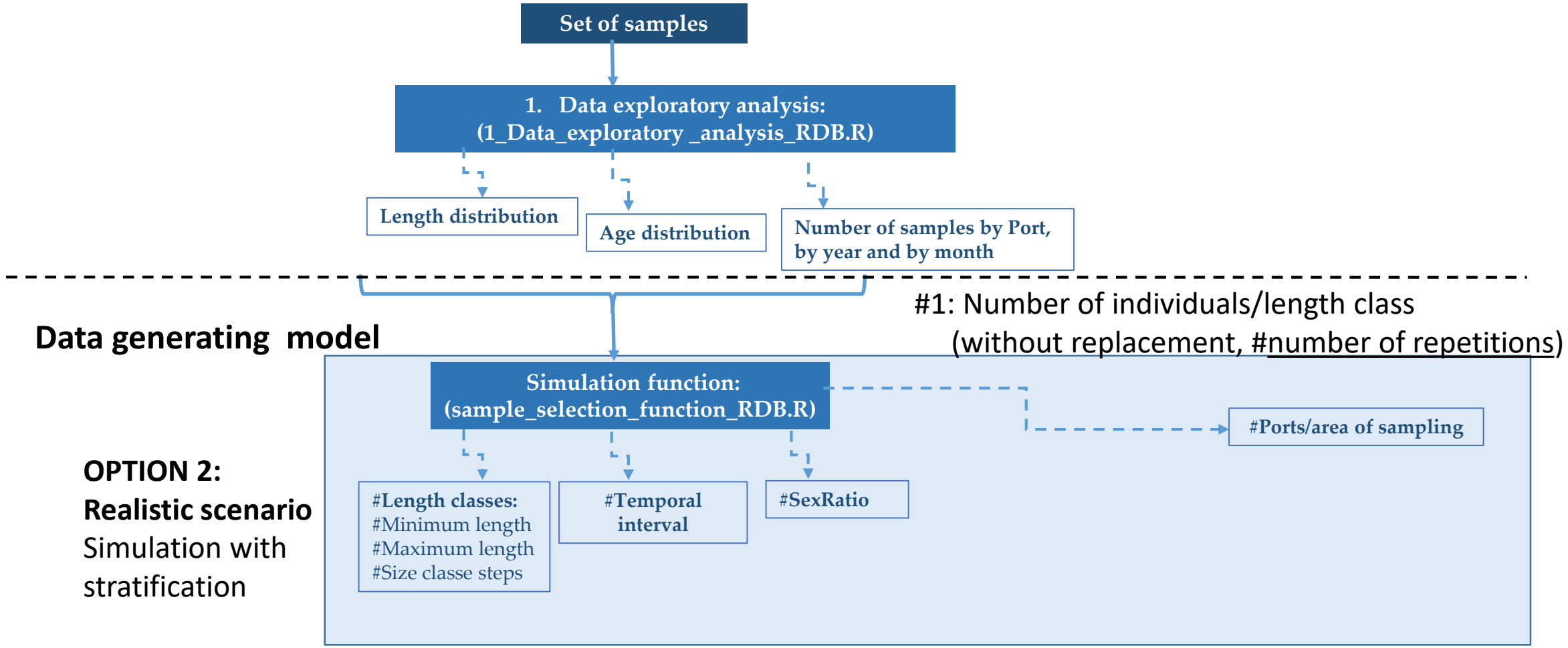

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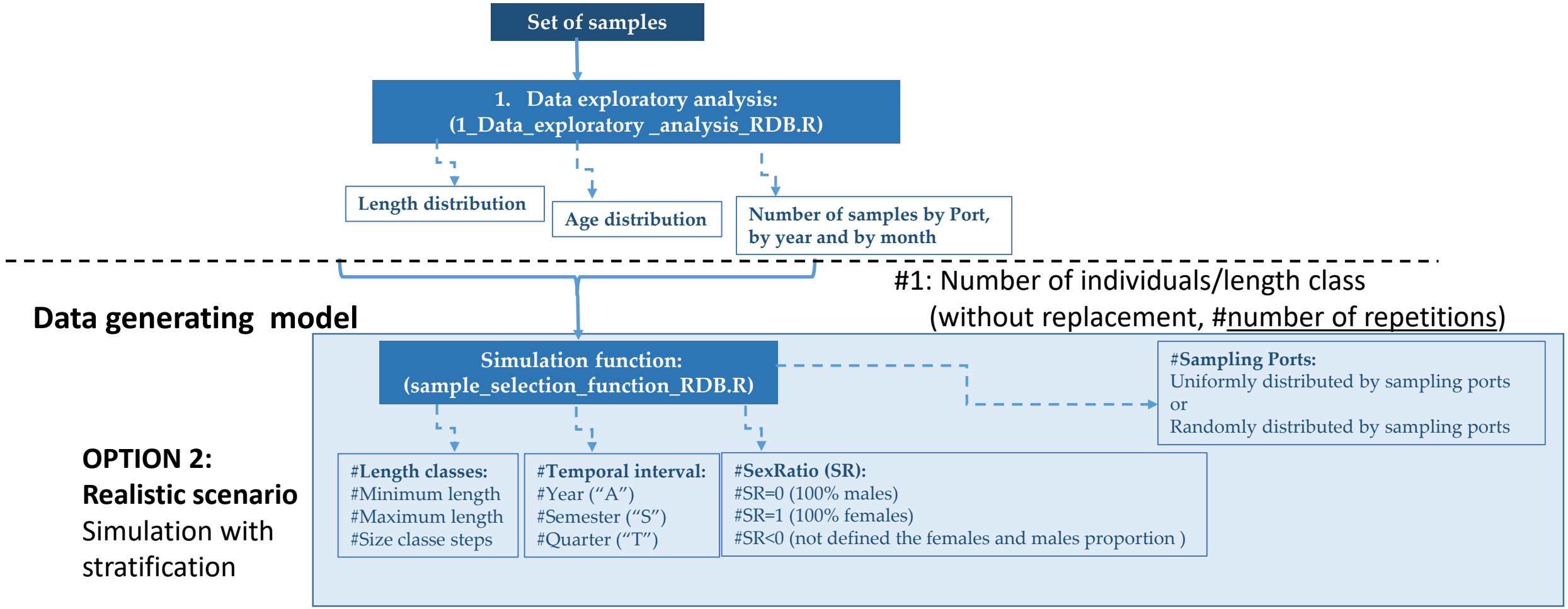

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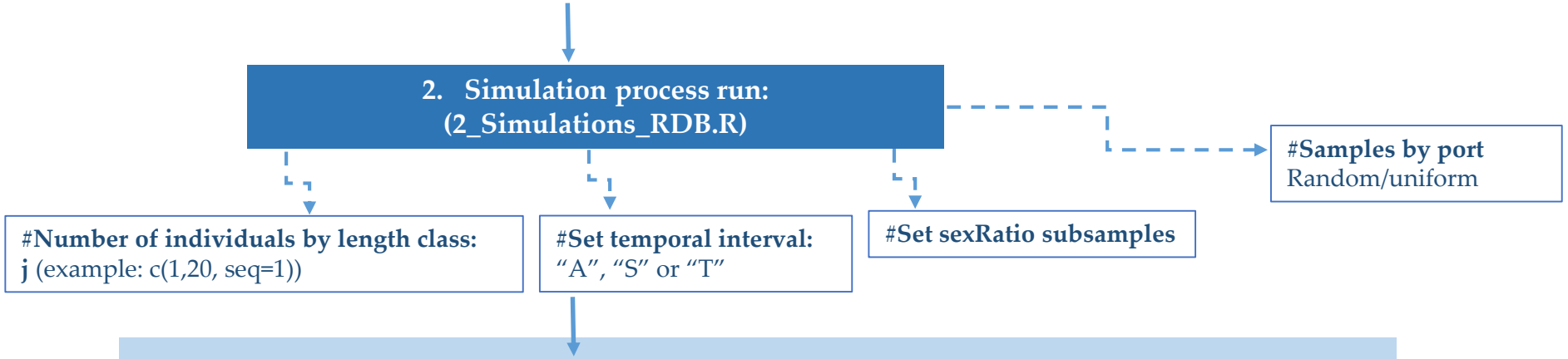

Simulation set up:

length_class<- seq(11.0, 40.0, 1.0) #set length class range and the intervals
n <- 100 #the number of repetions
tm<- "T" #Time interval (T="quarter")
SR=0.5
porto=FALSE

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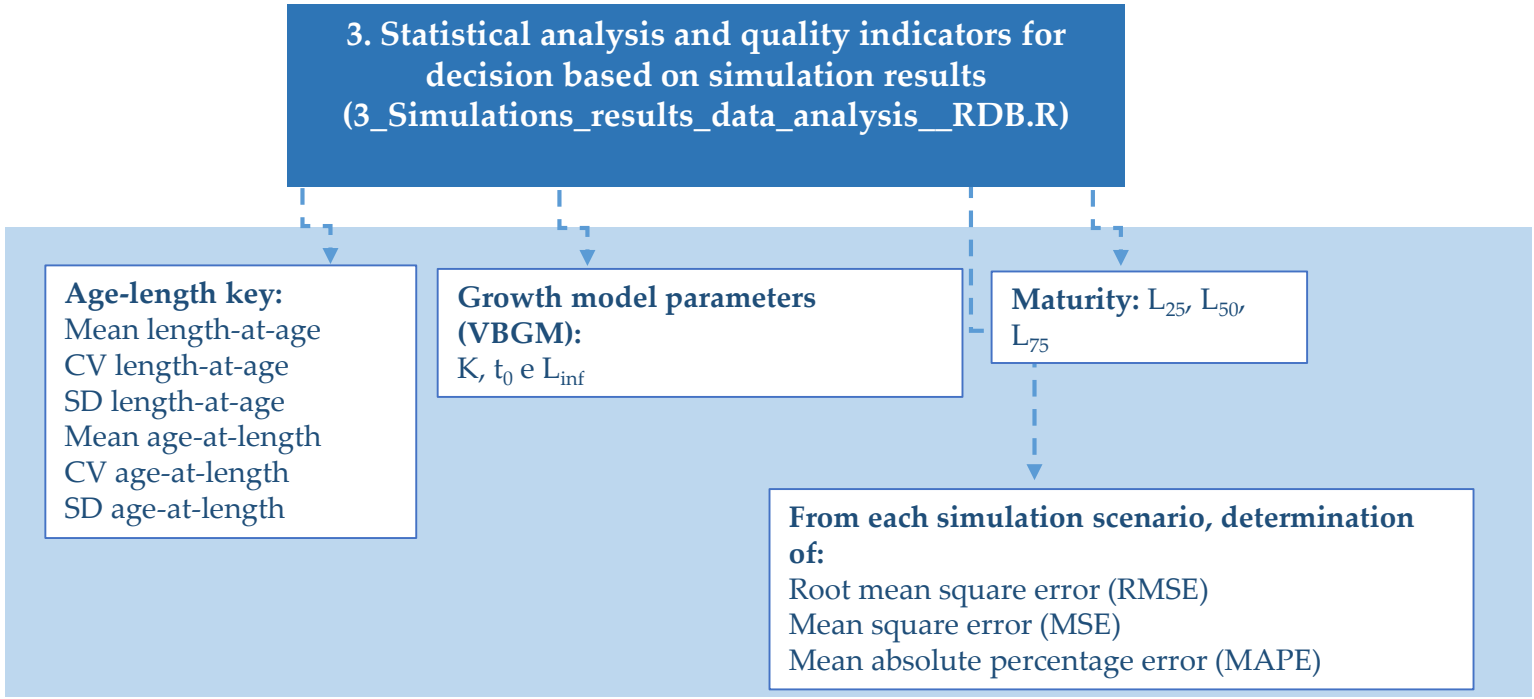

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Aim: Selection of the optim number of individuals by length class to sample

3. Statistical analysis and quality indicators for decision based on simulation results (3_Simulations_results_data_analysis_RDB.R)

Age-length key:
Mean length-at-age
CV length-at-age
SD length-at-age
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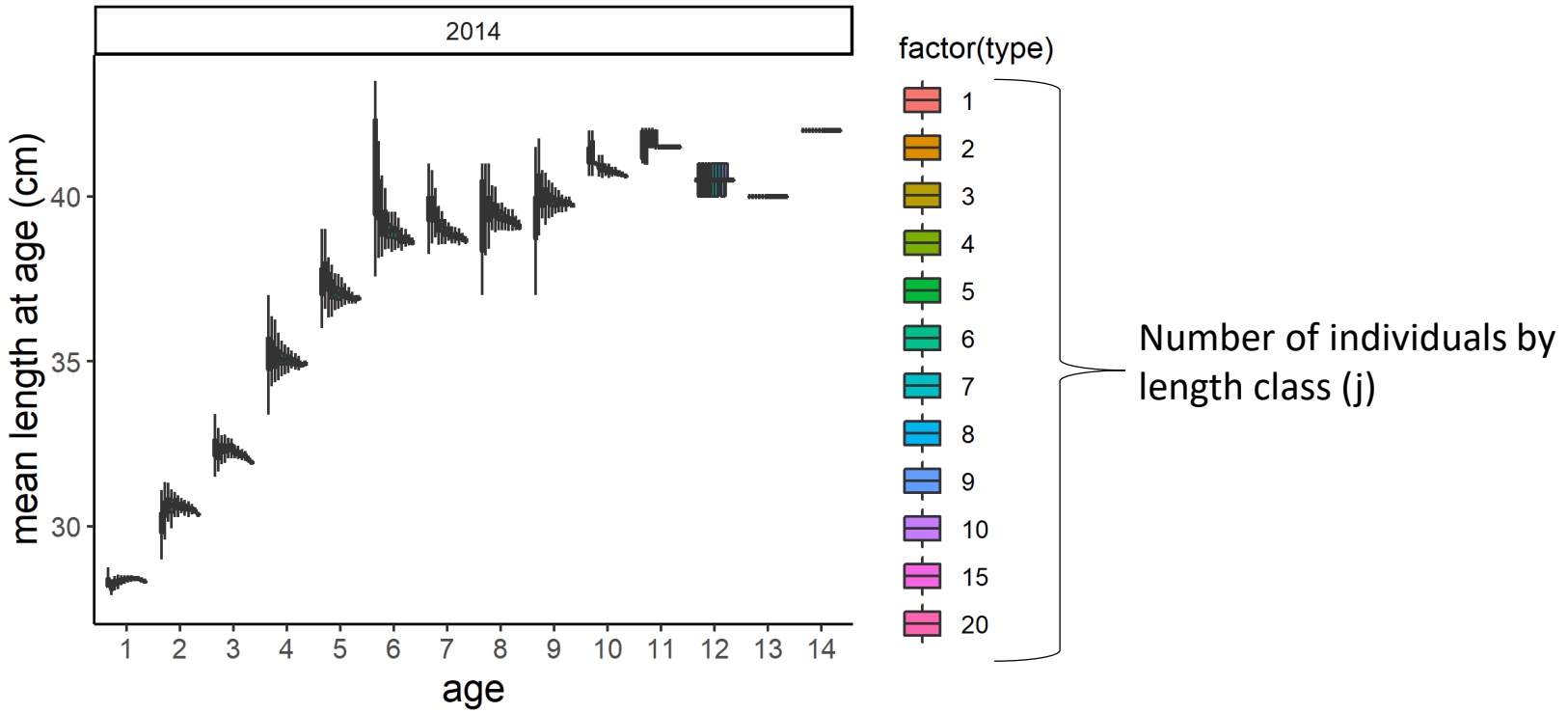
CV age-at-length
SD age-at-length



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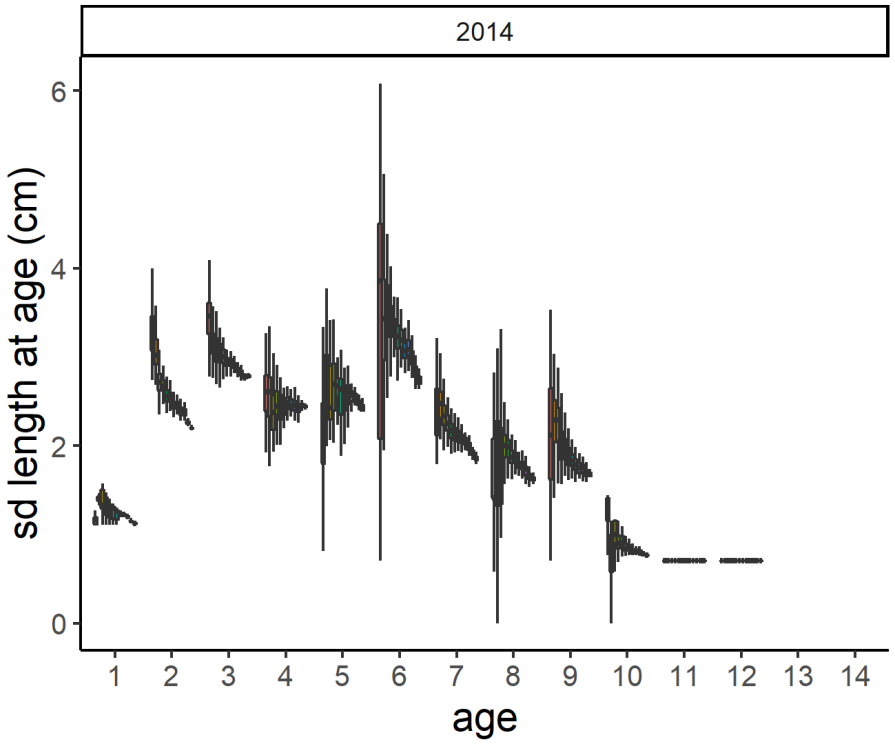

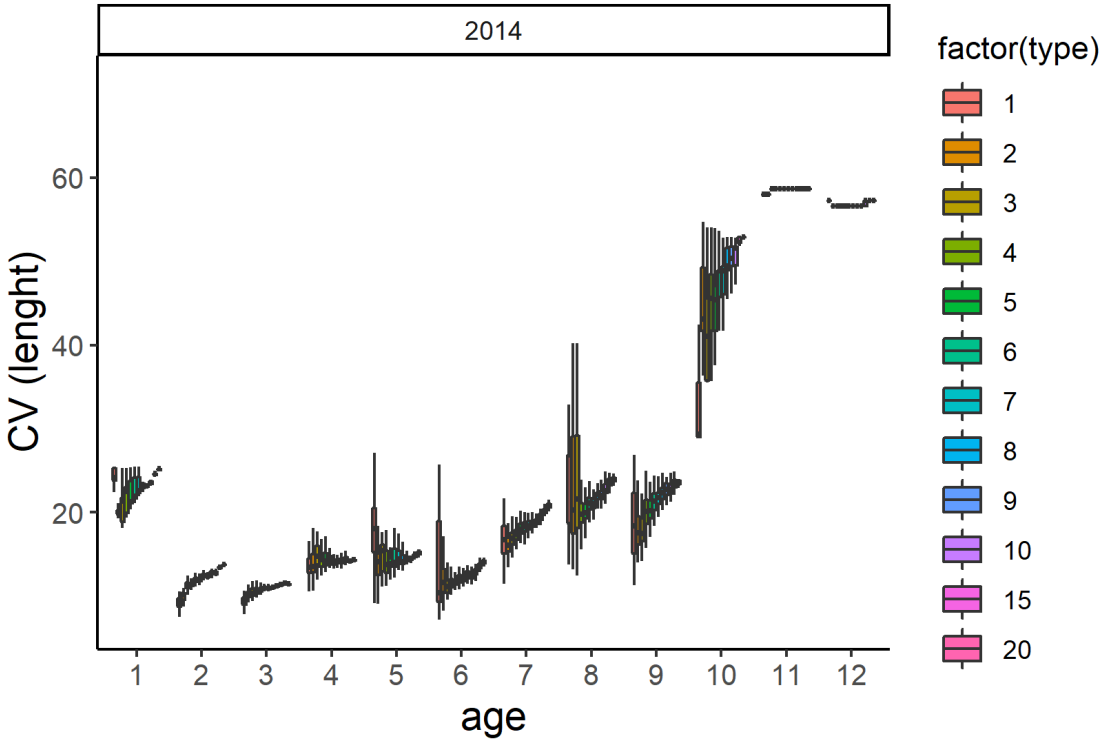

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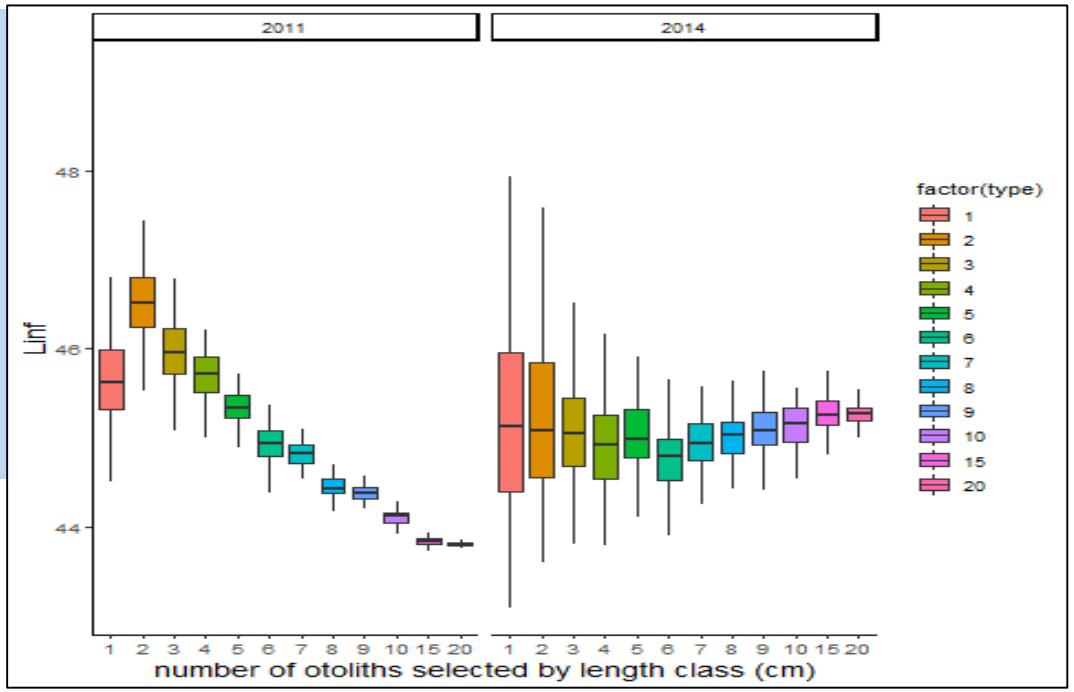
Growth model parameters (VBGM):
K, t_0 e L_{inf}



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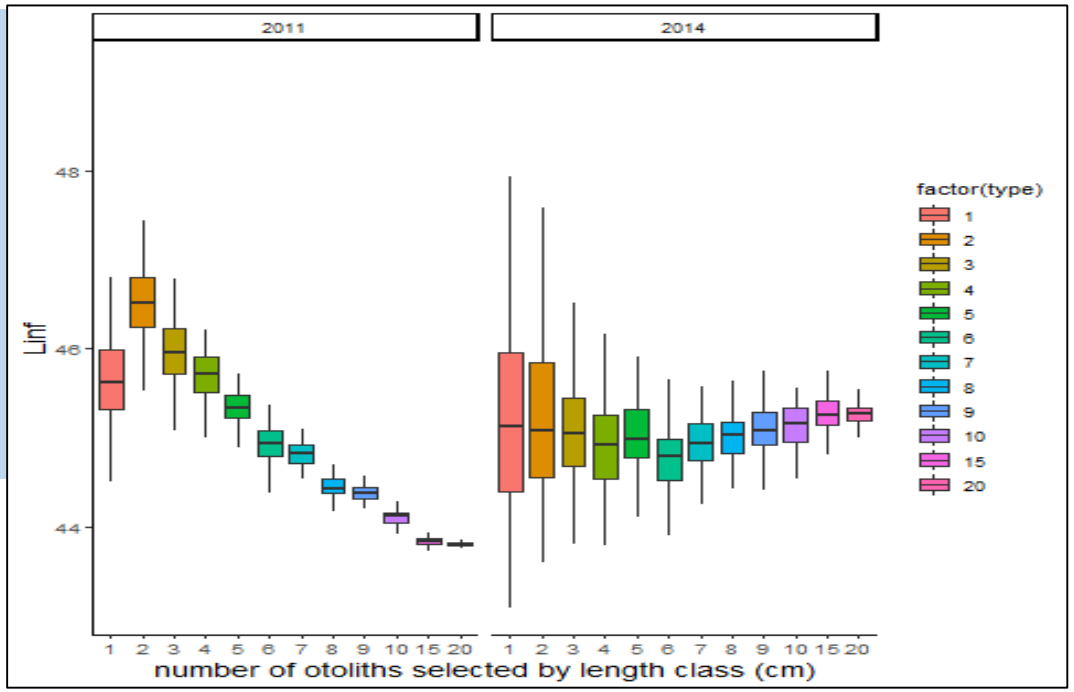
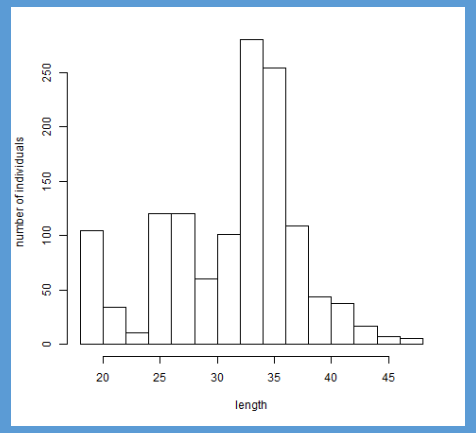
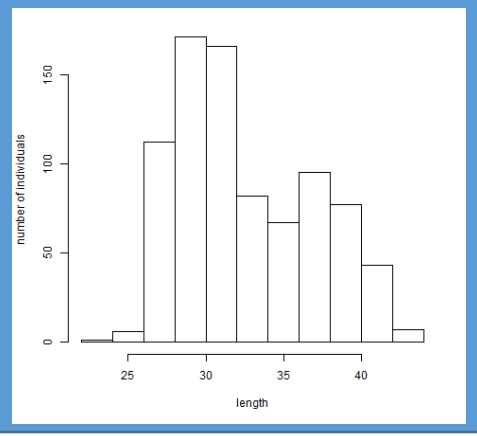


Main data set (all samples collected)



2011



2014

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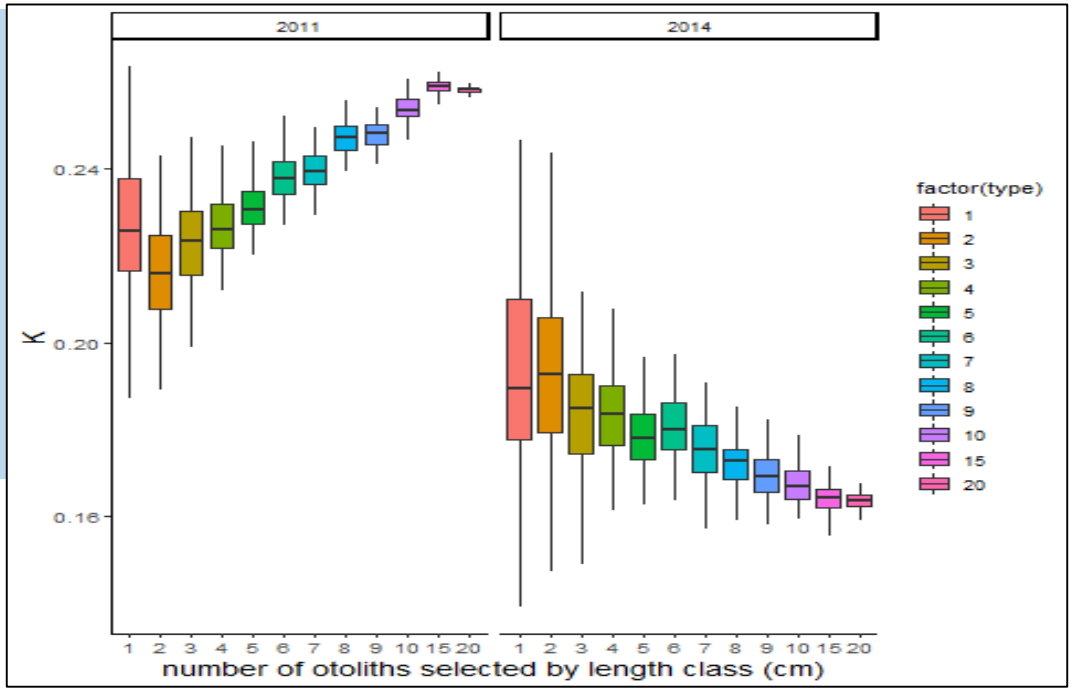

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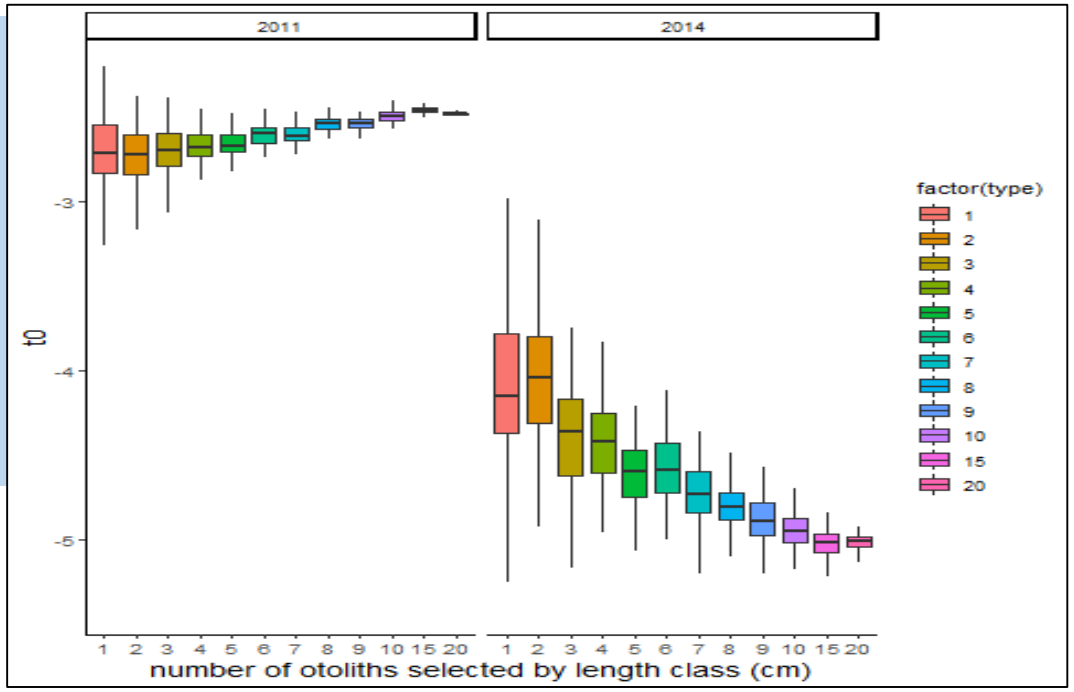

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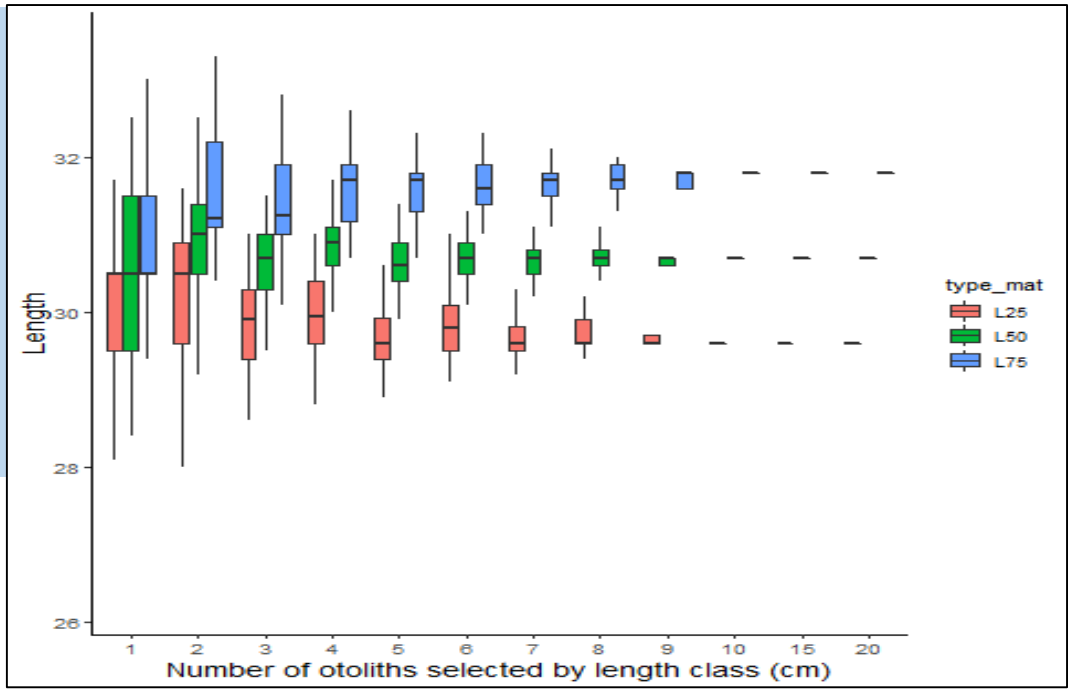
Maturity: L_{25}, L_{50}, L_{75}



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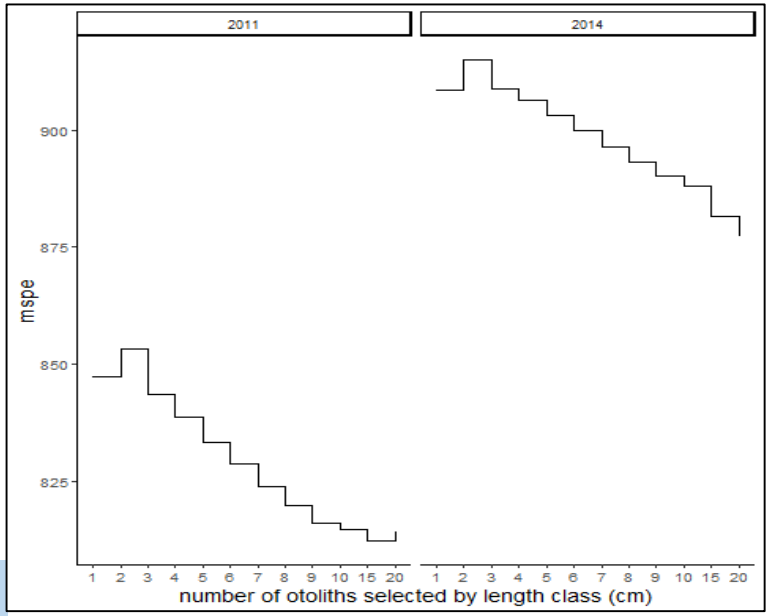
3. Statistical analysis and quality indicators for decision based on simulation results (3_Simulations_results_data_analysis_RDB.R)

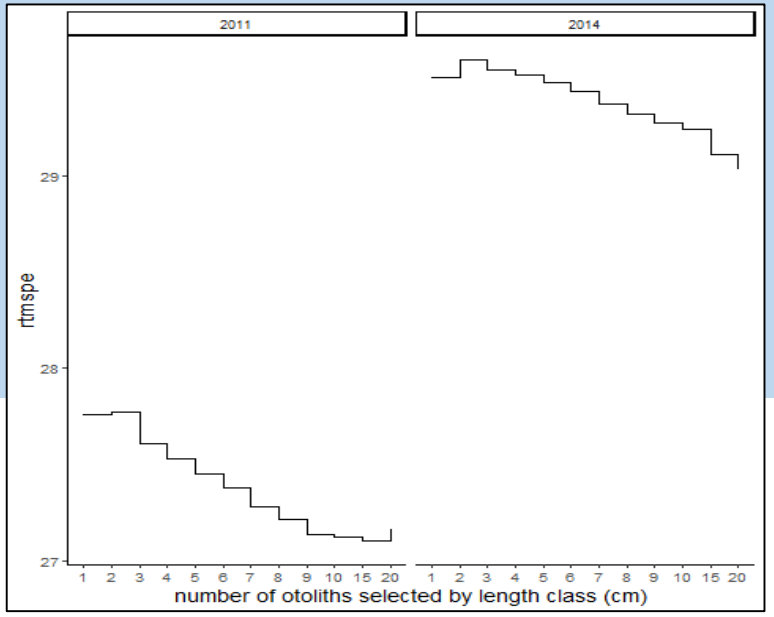
From each simulation scenario, determination of:

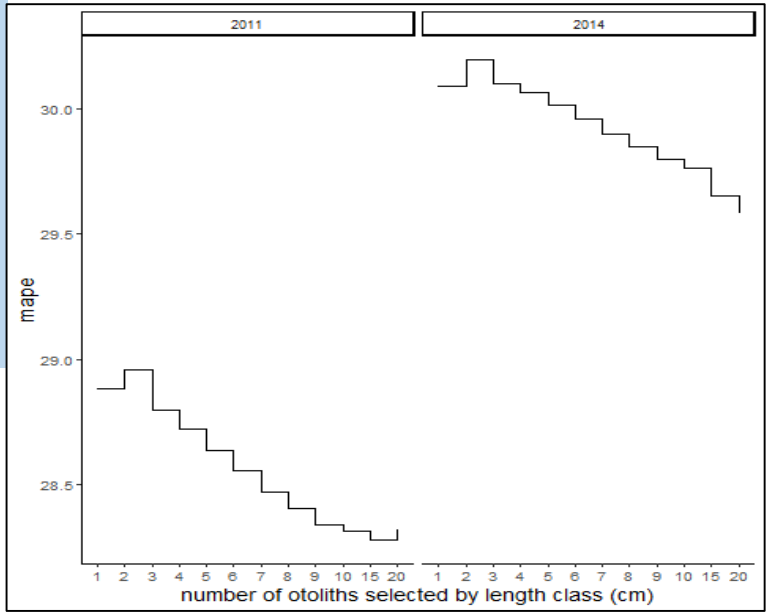
Root mean square error (RMSE)

Mean square error (MSE)

Mean absolute percentage error (MAPE)







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Suggestion for users:

- Applied it to several years of data;
- Use different scenarios (e.g. year/quarter, sexratio variation, Port sampling…)

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Optimal number to sample by length class

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