

Forest ecosystems modelling

1 April 2025

Topic: Model evaluation.

Objectives:

- **Compute bias, precision and model efficiency statistics.**
- **Compare different models.**

Four alternative models were fitted for the prediction of diameter at breast height considering the Lundqvist-Korf function in its difference equations formulated as

$$Y = Y_0 e^{-k \left(\frac{1}{t^m} - \frac{1}{t_0^m} \right)}$$

The four alternative models allow to observe the effect of the expression of the model parameters as a function of S. The four formulations differ in the expression of parameters k and m as follows:

- Model 1: k and m are not dependent of site index (S)
- Model 2: k was fitted as a linear formulation of S
- Model 3: m was fitted as a linear formulation of S
- Model 4: both k and m were fitted as a linear formulation of S

The formulations and the parameters estimate, for each one of these four models, are in the excel file 'Practice4_data_evaluation' in sheet 'models to compare'.

Using the independent data set available in sheet 'data_set_evaluation', compute bias, precision and model efficiency statistics. Observe that this data includes two plots with S=12,14,15,16,17 and 18.

Collect these statistics in a table. Compare the models. Discuss the importance and the impact of including the site index in the model parameters in the model predictions.