

Supplementary Material

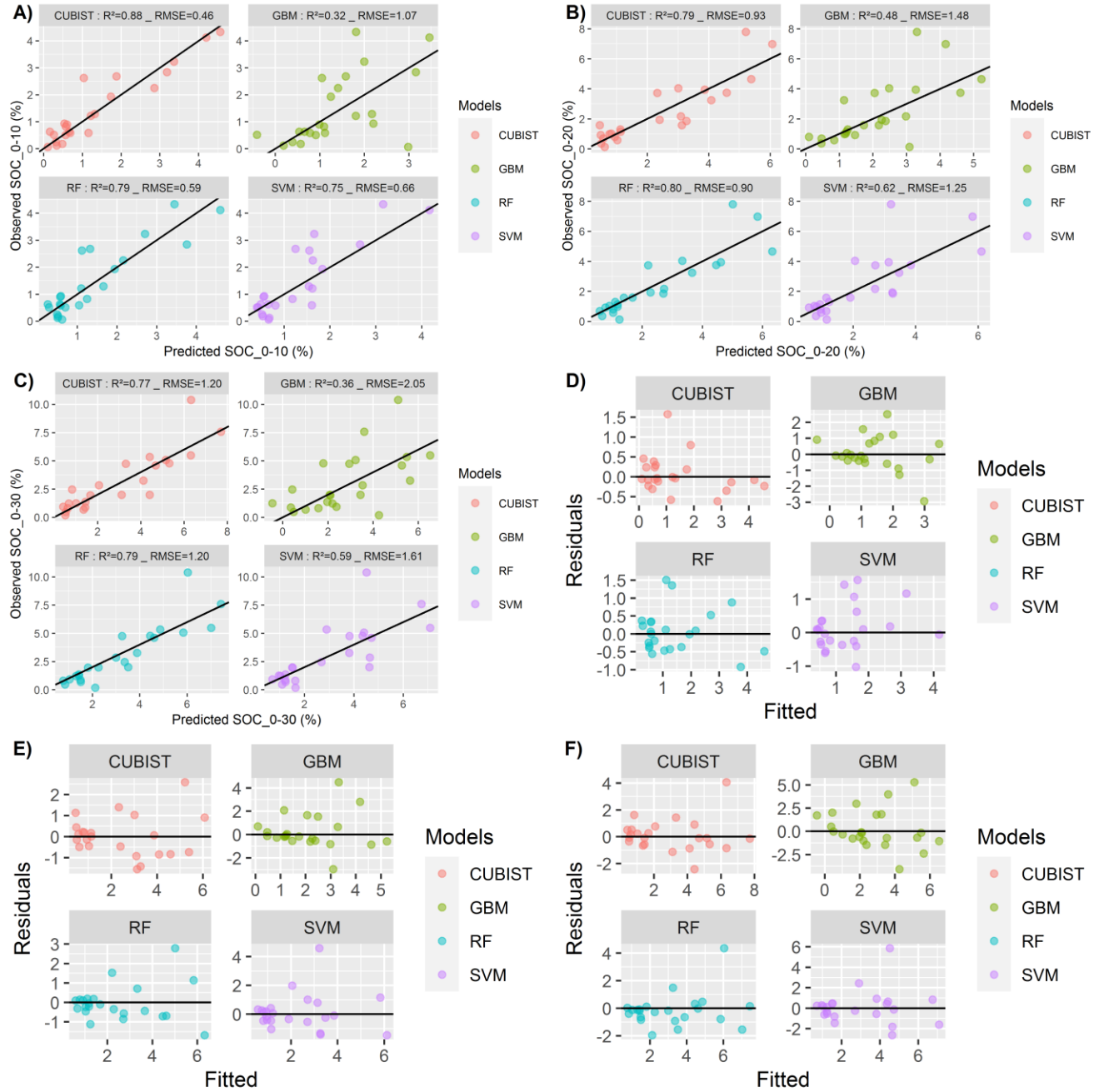


Figure S1. Distribution of measured versus predicted SOC: A) 0-10 cm depth, B) 0-20 cm depth, C) 0-30 cm depth; Distribution of residuals versus fit for D) 0-10 cm depth, E) 0-20 cm depth, F) 0-30 cm depth.

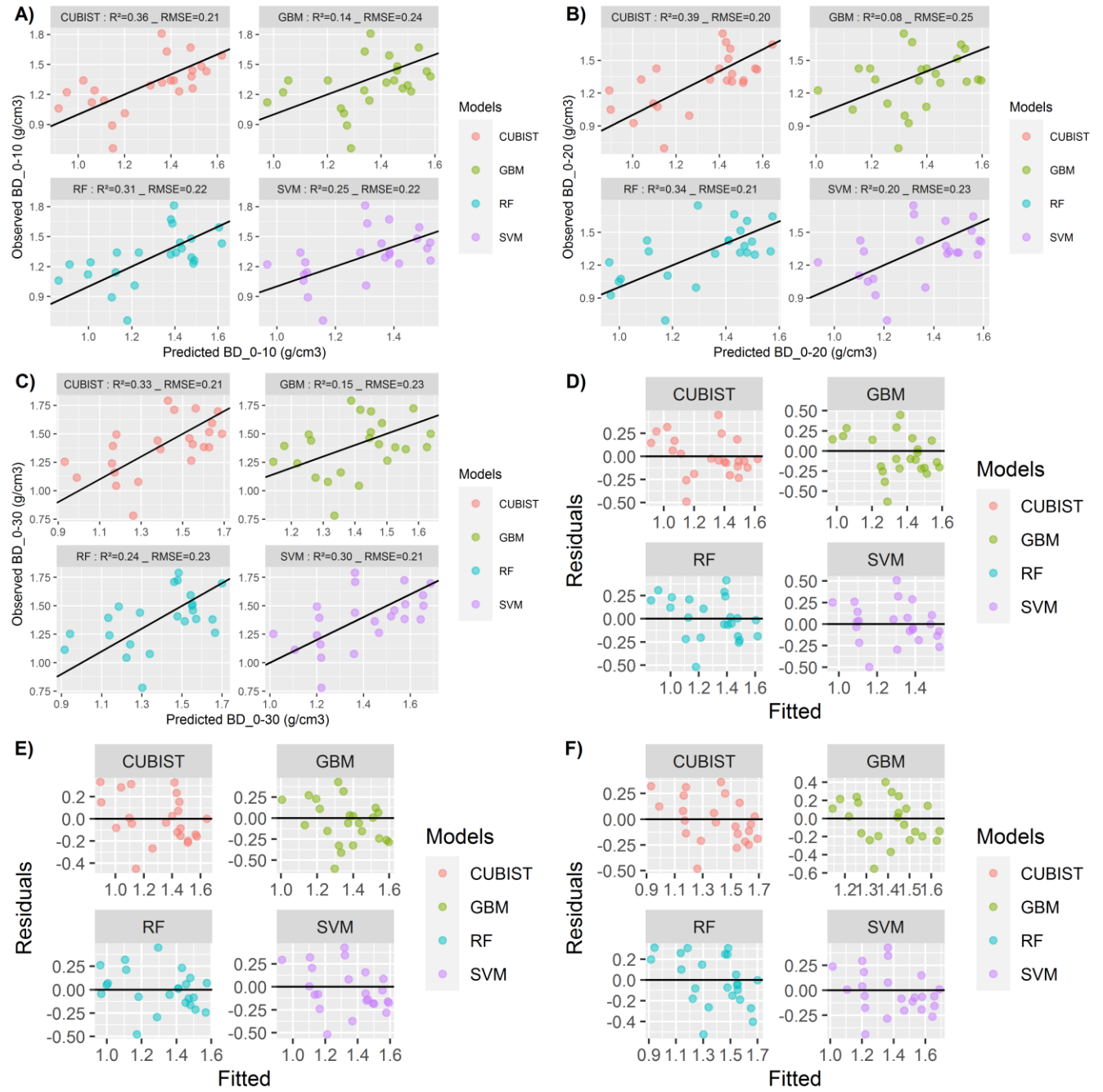


Figure S2. Distribution of measured versus predicted BDs: A) 0-10 cm depth, B) 0-20 cm depth, C) 0-30 cm depth; Distribution of residuals versus fit for D) 0-10 cm depth, E) 0-20 cm depth, F) 0-30 cm depth.

Table S1. Best tuning hyperparameters of the models

	Models	Hyperparameters
SOCS_0-10	GBM	n.trees = 150, interaction.depth = 3, shrinkage = 0.1 , n.minobsinnode = 10
	Cubist	Committees = 10, neighbors = 0
	RF	Mtry = 11
	SVM	sigma = 0.07, C = 1
SOCS_0-20	GBM	n.trees = 150, interaction.depth = 3, shrinkage = 0.1 , n.minobsinnode = 10
	Cubist	Committees = 20, neighbors = 0
	RF	Mtry = 5
	SVM	sigma = 0.07, C = 1
SOCS_0-30	GBM	n.trees = 150, interaction.depth = 3, shrinkage = 0.1 , n.minobsinnode = 10
	Cubist	Committees 10, neighbors = 5
	RF	Mtry = 8
	SVM	sigma = 0.05 , C = 1
SOC_0-10	GBM	n.trees = 150, interaction.depth = 3, shrinkage = 0.1 , n.minobsinnode = 10
	Cubist	Committees = 20, neighbors = 0
	RF	Mtry = 9
	SVM	sigma = 0.07, C = 1
SOC_0-20	GBM	n.trees = 150, interaction.depth = 3, shrinkage = 0.1 , n.minobsinnode = 10
	Cubist	Committees = 20, neighbors = 0
	RF	Mtry = 3
	SVM	sigma = 0.07, C = 1
SOC_0-30	GBM	n.trees = 150, interaction.depth = 3, shrinkage = 0.1 , n.minobsinnode = 10
	Cubist	Committees = 20, neighbors = 0
	RF	Mtry = 2

	SVM	sigma = 0.07, C = 1
SOCS_0-30	rf_b	mtry = 2
	rf_brs	mtry = 4
	rf_bs	mtry = 3
	rf_bt	mtry = 4
	rf_rs	mtry = 2
	rf_rst	mtry = 4
	rf_s	mtry = 3
	rf_srs	mtry = 3
	rf_st	mtry = 3
	rf_t	mtry = 2