

Supplementary Material

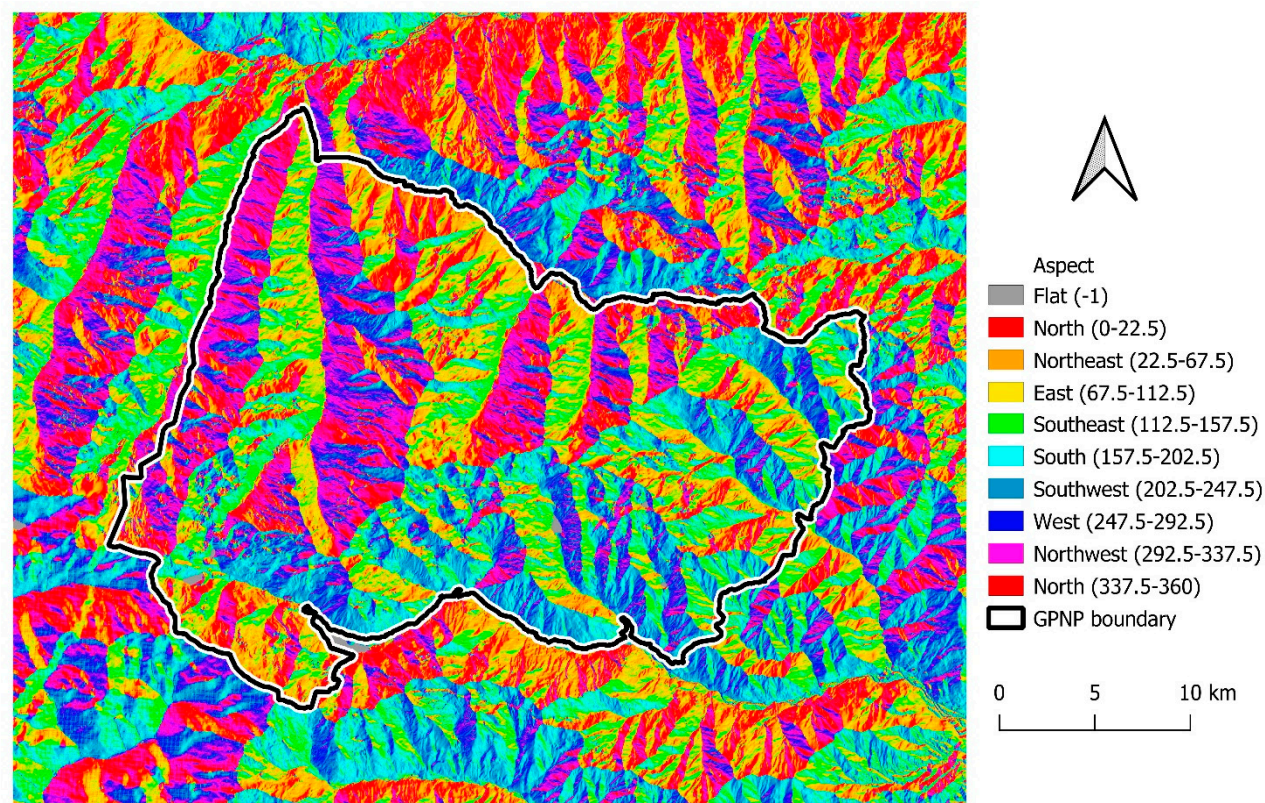
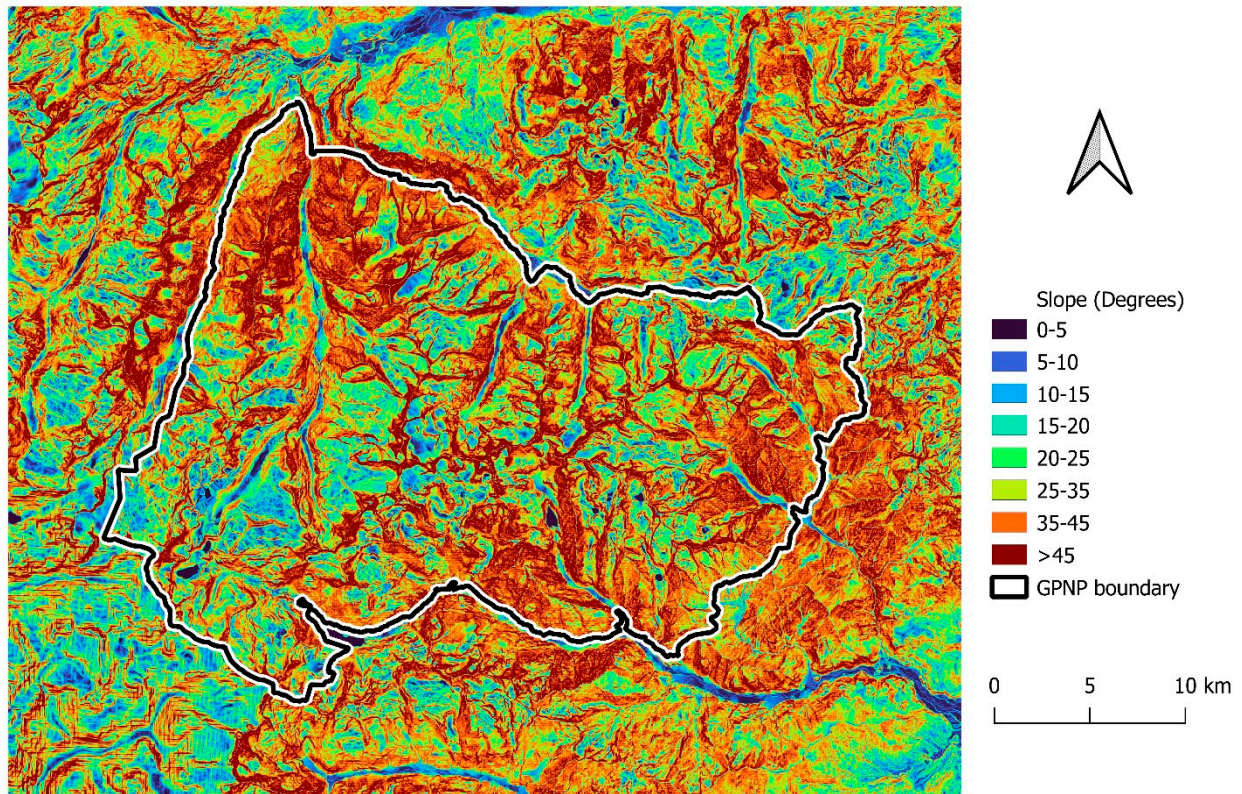
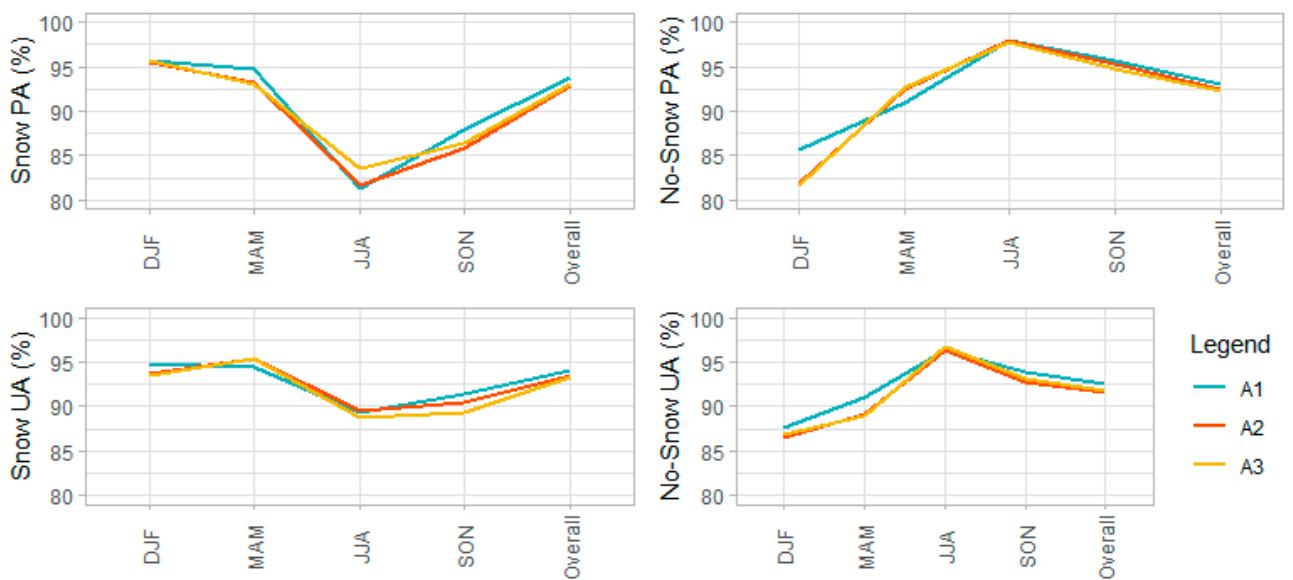


Figure S1. Aspect map of the study area.

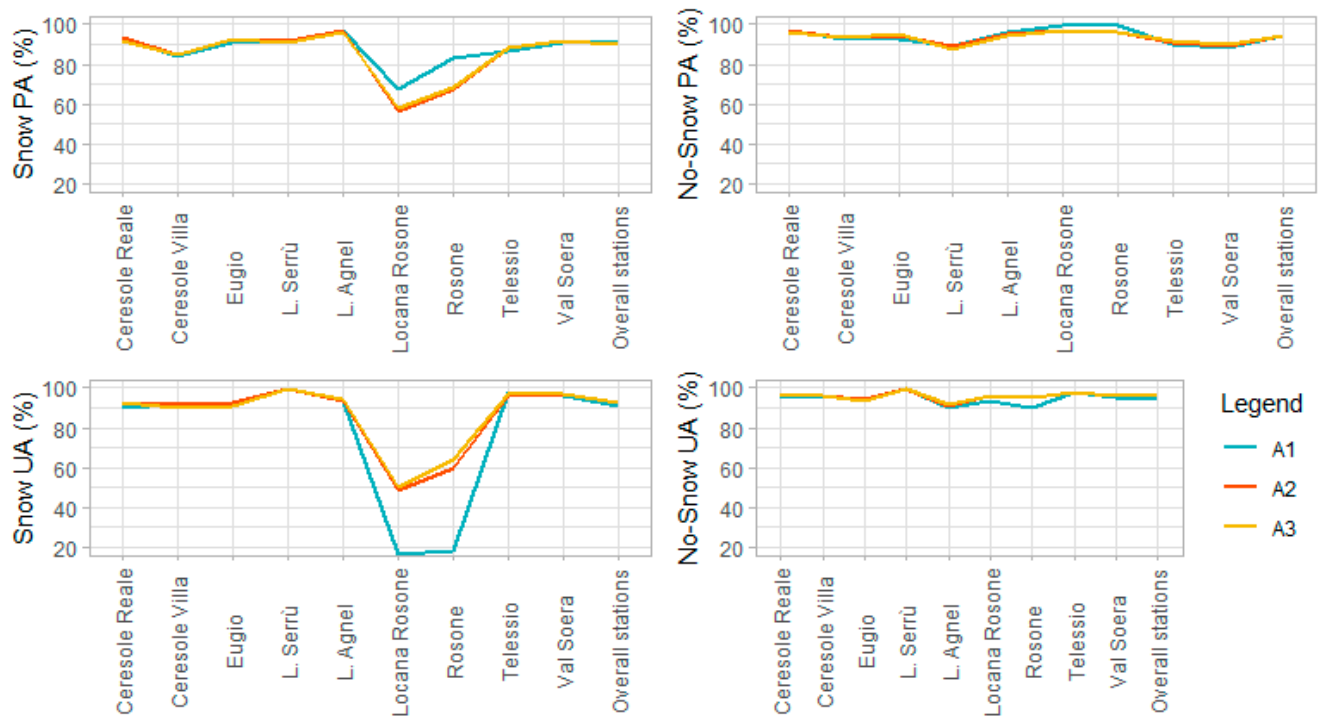


**Figure S2.** Slope map of the study area.

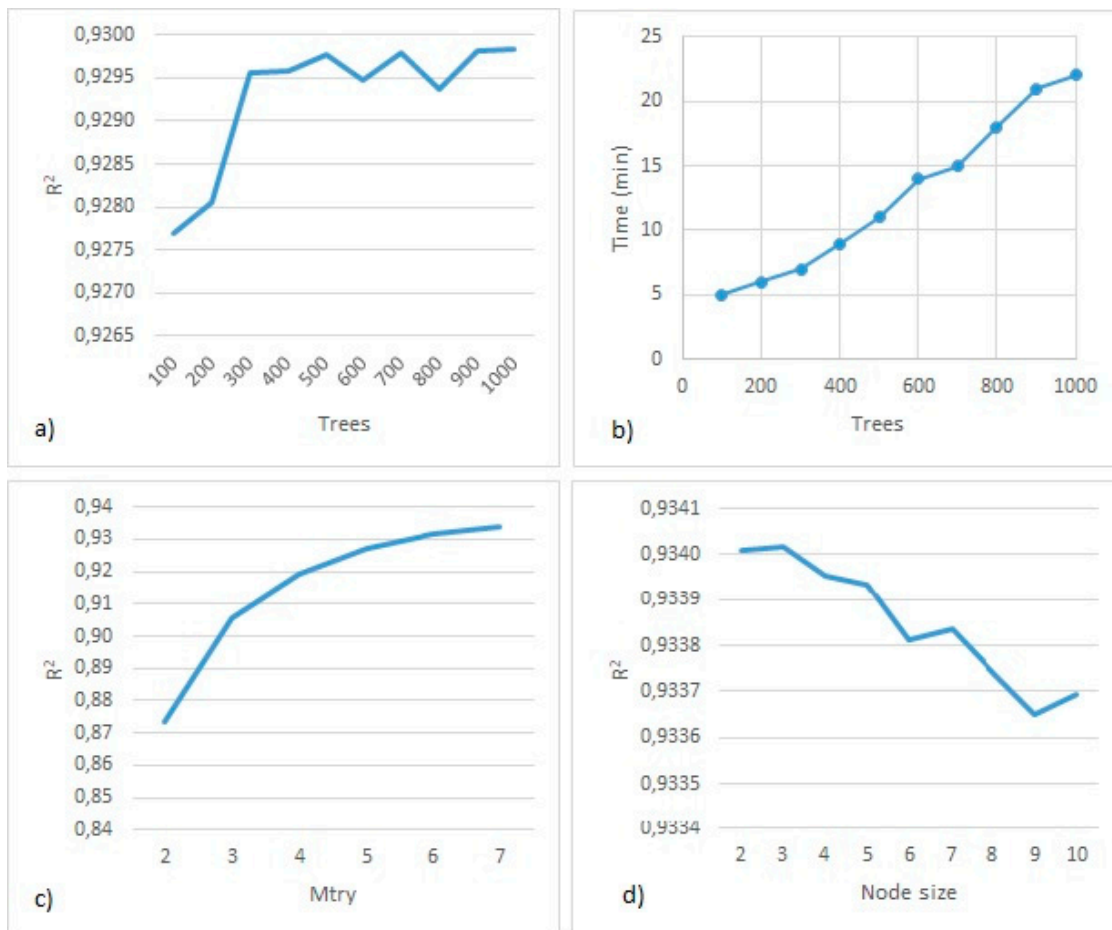


**Figure S3.** Producer Accuracy (PA) and User Accuracy (UA) for the classes Snow and No-Snow validated against independent dataset of Sentinel-2.

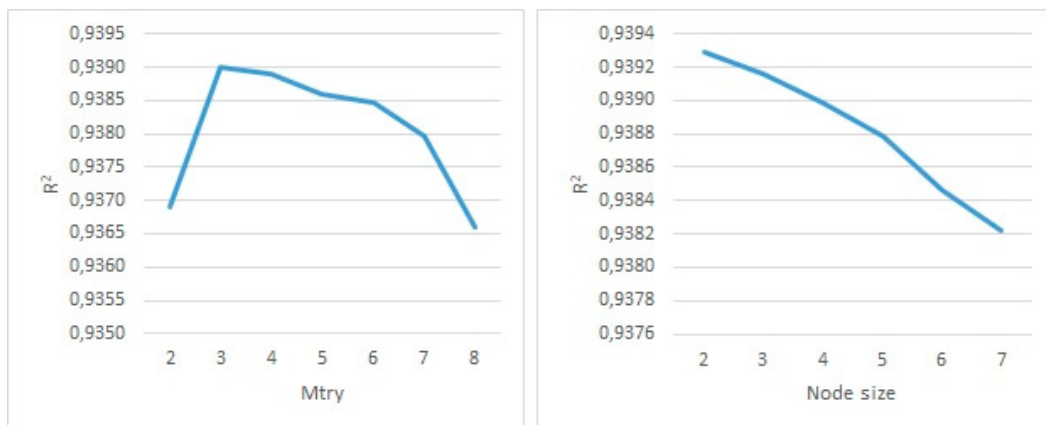




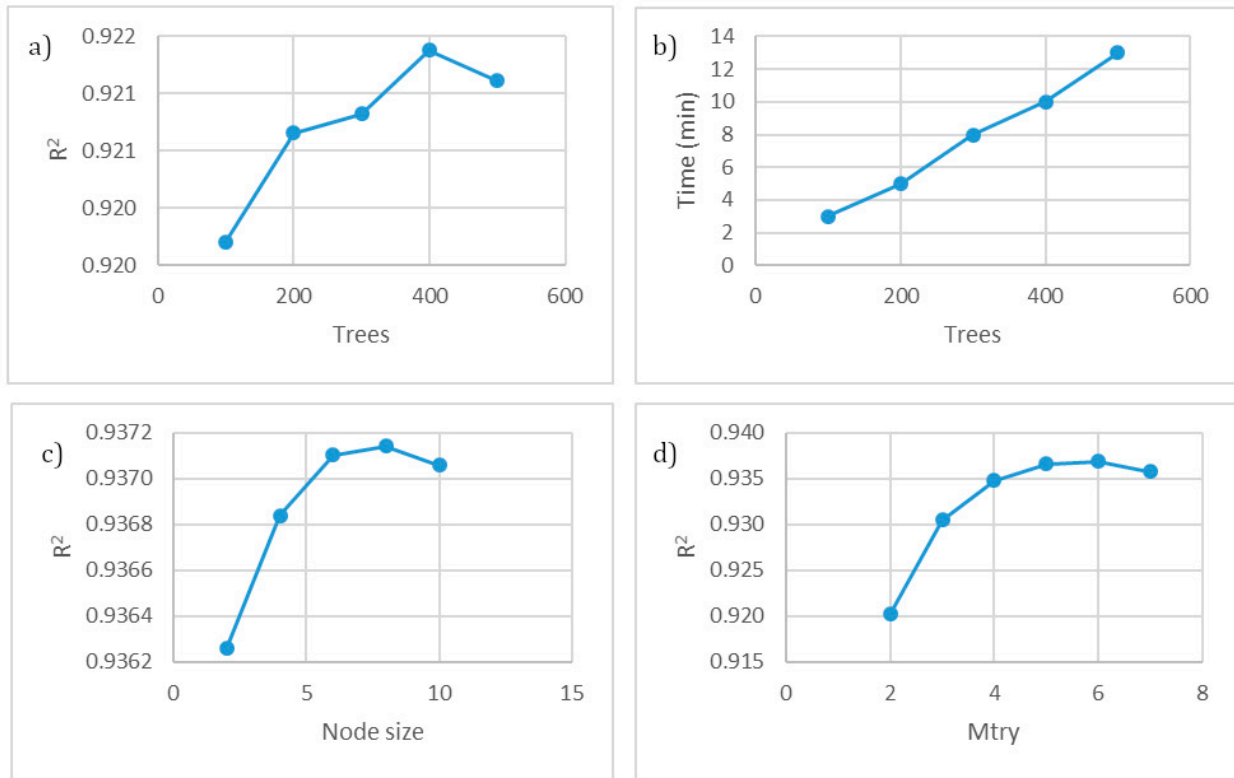
**Figure S4.** Producer Accuracy (PA) and User Accuracy (UA) for the classes Snow and No-Snow validated against in situ snow depth data.



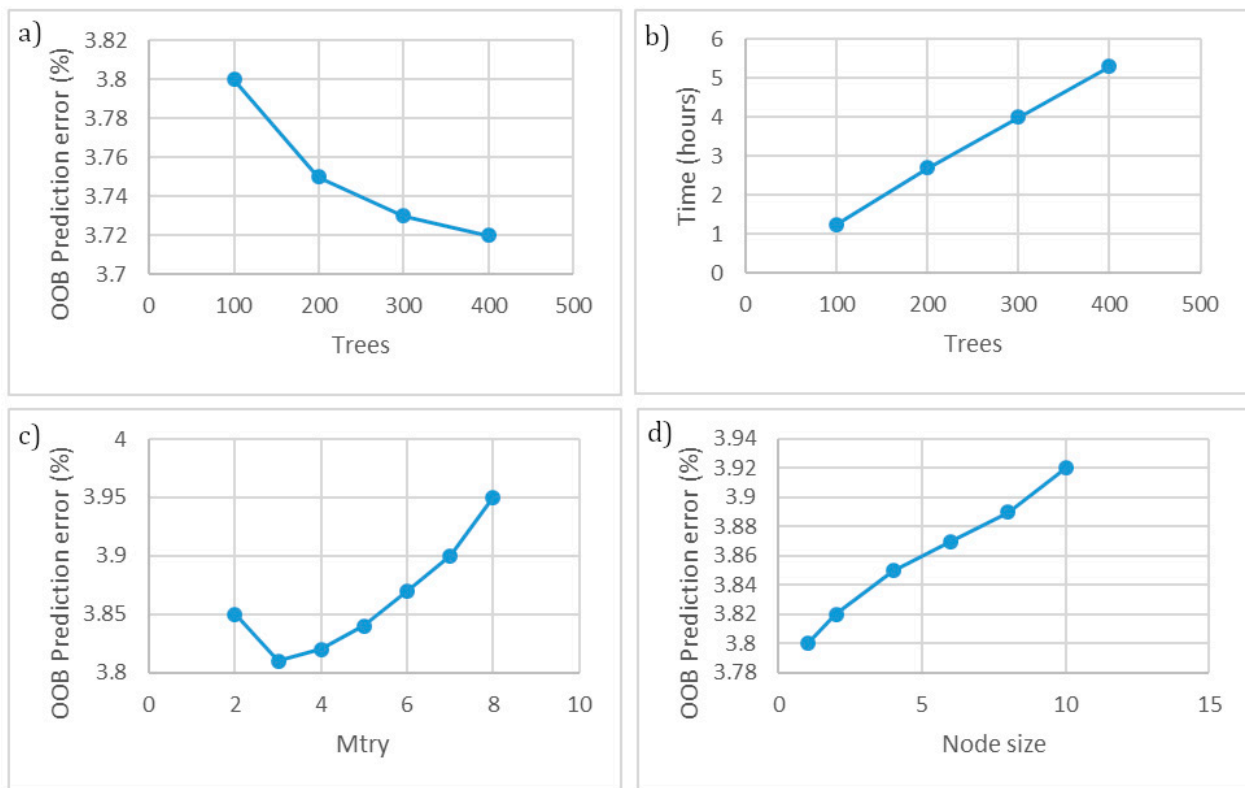
**Figure S5.** Tuning of the hyperparameters of the regression random forest fitted in step 1 of Approaches 1 and 2. **(a)** Number of trees, **(b)** relative computing time, **(c)**  $mtry$  and **(d)**  $node\ size$  in function of  $R^2$  score.



**Figure S6.** Tuning of the hyperparameters of the regression random forest fitted in step 2 of Approach 2 and 3, **(a)**  $mtry$  and **(b)**  $node\ size$  in function of  $R^2$  score.



**Figure S7.** Tuning of the hyperparameters of the regression random forest fitted in step 1 of Approach 3. **(a)** Number of trees, **(b)** relative computing time, **(c)**  $m$ try and **(d)** node size in function of  $R^2$  score.



**Figure S8.** Tuning of the hyperparameters of the classification random forest fitted in step 2 of Approach 1. **(a)** Number of trees, **(b)** relative computing time, **(c)**  $m$ try and **(d)** node size in function of Out-Of-Bag (OOB) prediction error score.