|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Study area** | **Variable** | **Stratum** | **N** | **ALS metrics** | **RMSE (%)** | **RMSE** |
| Bauges | BA | Coniferous\_73 | 64 | zq15 + imean + ipcumzq30 + p\_1st\_hmin + Tree\_meanH + Tree\_density | 24.6 | 8.2 |
| Bauges | BA | Coniferous\_74 | 42 | pzabove2 + zq40 + imean + Tree\_giniH + altitude | 29.4 | 9.2 |
| Bauges | BA | Broadleaves\_73 | 84 | pzabove2 + zq30 + zpcum8 + imean + ipcumzq50 + p\_1st\_hmin | 25.9 | 7.1 |
| Bauges | BA | Broadleaves\_74 | 36 | zentropy + zq90 + sdCH + altitude + slope\_gr | 32.1 | 9.1 |
| Bauges | BA | Mixed\_73 | 48 | zq85 + p\_hmin + TreeSup10\_density + altitude | 30.1 | 10.0 |
| Bauges | BA | Mixed\_74 | 54 | imax + p\_hmin + TreeCanopy\_meanH + altitude + slope\_gr | 21.4 | 7.1 |
| Bauges | Dg | Coniferous\_73 | 64 | zkurt + ipcumzq70 + sdCH + Tree\_sdH + TreeInf10\_density | 17.2 | 5.1 |
| Bauges | Dg | Coniferous\_74 | 42 | zq25 + iskew + ipcumzq10 + ipcumzq70 + Tree\_giniH | 15.5 | 4.6 |
| Bauges | Dg | Broadleaves\_73 | 84 | zkurt + zentropy + zpcum4 + imax + Tree\_meanH + altitude | 16.0 | 3.2 |
| Bauges | Dg | Broadleaves\_74 | 36 | pzabove2 + isd + ipcumzq90 + Tree\_meanH + Tree\_sdH | 14.3 | 3.4 |
| Bauges | Dg | Mixed\_73 | 48 | zentropy + zq35 + ipcumzq30 + ipcumzq90 + altitude | 14.7 | 3.8 |
| Bauges | Dg | Mixed\_74 | 54 | zskew + iskew + Tree\_meanH + Tree\_meanCrownSurface + TreeCanopy\_cover\_in\_plot | 17.0 | 4.6 |
| Milicz | BA | Coniferous[0,41) | 125 | zq90 + isd + ipcumzq30 + p\_hmin + Tree\_density | 13.6 | 4.0 |
| Milicz | BA | Coniferous[41,54) | 146 | zpcum5 + ipcumzq50 + mCH + p\_1st\_hmin + Tree\_density + nir.mean | 11.9 | 4.1 |
| Milicz | BA | Coniferous[54,66) | 121 | p\_1st\_hmin + Tree\_meanH + Tree\_giniH + Tree\_density | 11.6 | 4.1 |
| Milicz | BA | Coniferous[66,89) | 147 | zq45 + imean + p\_hmin + Tree\_meanH + Tree\_density | 13.9 | 5.2 |
| Milicz | BA | Coniferous[89,Inf) | 149 | ipcumzq90 + p\_hmin + Tree\_density + Tree\_meanCrownSurface + TreeCanopy\_meanH\_in\_plot | 16.0 | 6.0 |
| Milicz | BA | Other Broadleaves | 111 | imean + ipcumzq30 + mCH + p\_1st\_hmin + ndvi | 23.5 | 6.8 |
| Milicz | BA | Quercus sp | 102 | ipcumzq90 + TreeCanopy\_meanH + TreeCanopy\_cover\_in\_plot + altitude + slope\_gr + prop | 23.5 | 7.3 |
| Milicz | Dg | Coniferous | 688 | zmean + zpcum1 + ipcumzq30 + Tree\_meanCrownSurface + TreeCanopy\_cover\_in\_plot + altitude | 10.2 | 2.5 |
| Milicz | Dg | Other Broadleaves | 111 | zmean + zpcum1 + ipcumzq90 + TreeSup10\_density + g.mean.1st + r.mean.hmin | 18.3 | 6.0 |
| Milicz | Dg | Quercus sp | 102 | zskew + zq90 + TreeCanopy\_cover\_in\_plot + g.mean.hmin | 21.0 | 6.5 |
| Snežnik | BA | Coniferous\_Leskova dolina | 208 | zq95 + ipcumzq30 + TreeCanopy\_cover\_in\_plot + TreeCanopy\_meanH\_in\_plot | 32.0 | 10.6 |
| Snežnik | BA | Coniferous\_Sneznik | 197 | zq85 + zpcum7 + sdCH + p\_hmin + TreeCanopy\_cover\_in\_plot + altitude | 31.5 | 9.4 |
| Snežnik | BA | Broadleaves\_Leskova dolina | 63 | pzabovezmean + zq5 + zq50 + p\_1st\_hmin + altitude + slope\_gr | 22.3 | 7.2 |
| Snežnik | BA | Broadleaves\_Sneznik | 47 | zq65 + zpcum6 + Tree\_sdH + TreeCanopy\_cover\_in\_plot + altitude | 33.5 | 8.9 |
| Snežnik | Dg | Coniferous\_Leskova dolina | 156 | zq35 + ipcumzq30 + Tree\_meanH + TreeCanopy\_cover\_in\_plot + altitude + BRDPROP | 20.4 | 7.5 |
| Snežnik | Dg | Coniferous\_Sneznik | 131 | zq65 + zpcum2 + TreeCanopy\_cover\_in\_plot | 20.8 | 7.8 |
| Snežnik | Dg | Broadleaves\_Leskova dolina | 46 | zq5 + sdCH + p\_hmin + altitude + BRDPROP | 16.7 | 4.9 |
| Snežnik | Dg | Broadleaves\_Sneznik | 32 | zq45 + zpcum6 + zpcum8 | 24.1 | 8.9 |
| Snežnik | Dg | Mixed\_Leskova dolina | 69 | zq95 + ipcumzq10 + Tree\_sdH + TreeSup30\_density + slope\_gr | 21.7 | 8.7 |
| Snežnik | Dg | Mixed\_Sneznik | 81 | zq20 + Tree\_giniH + TreeInf10\_density + TreeCanopy\_meanH\_in\_plot | 20.0 | 7.3 |

Table S1. Metrics used in the stratum-specific prediction models of BA and Dg. Metrics names refer to those computed with functions aba\_metrics and std\_metrics of R packages lidaRtRee and lidR, except ancillary variables prop (Milicz study area: proportion of main species in stand) and BRDPROP (Sneznik study area: proportion of broadelaves in stand). Root mean square error (RMSE) computed in cross-validation is indicated in percentage and units.