Deployment of models predicting compressed sward height on Wallonia: confrontation to ground truth.

Nickmilder, C.[1], Tedde, A.[1], Dufrasne, I.[2,3], Lessire, F.[2,3], Tychon, B.[4], Curnel, Y.[5], Glesner, N.[6], Bindelle, J.[1], Soyeurt, H.[1]

[1] TERRA Research Centre, Passage des Déportés 2, BE-5030 Gembloux

[2] Faculté de Médecine vétérinaire / Nutrition des animaux domestiques, Uliège, Place du 20 Août 7, BE-4000 Liège

[3] Centre des Technologies Agronomiques, Rue de la Charmille, 16, BE-4577 Strée-Modave

[4] Département des sciences et gestion de l'environnement, Avenue de Longwy 185, BE-6700 Arlon

[5] Centre wallon de Recherches agronomiques (CRA-W), Rue de Liroux, 9, BE-5030 Gembloux

[6] Fourrages Mieux ASBL, Horritine, 1, BE-6600 Michamps (Bastogne)

Currently, pasture management is of interest for economical or ecological reasons. The use of remote sensed data and the implementation of machine learning algorithms is growing. So, over the past two years, models predicting the available compressed sward height (CSH) in Walloon pastures using Sentinel-1, Sentinel-2, and meteorological data were published. Those models were developed to be integrated in a decision support system (DSS). A platform predicting CSH over Wallonia was therefore developed. The variability of the predicted CSH within parcels ranged from 0 to 287.7% once the non-finite values and the values out of the training range were discarded. Concerning the CSH values, the five developed models predicted CSH below 75 mm more than 75% of the time. These values were compared with an independent dataset including a total of 122 average measures of CSH were available and concerned 5 different parcels, grazed in 2019. These reference values ranged from 45 to 212.5 mm of CSH with a mean of 83,8 ± 31.2 mm. The estimated root mean square error values estimated between predicted and reference values varied between 20 and 35 mm of CSH. The coefficient of determination ranged from 0.6 to 0.8 depending on the model and the parcel considered. The poorest performances were recorded on parcels that were split in sub-parcels managed differently during the year. So, there is a need for including flexibility in the parcel definition for the future DSS, the visual support and their corresponding analysis.