EINDRAPPORT

Externe revisie EMAV2.1

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English summary

This scientific manuscript describes the work performed by VITO in the framework of an external validation/revision study of the Emission model Ammonia Flanders, version 2.1 (EMAV2.1). This model tries to estimate the ammonia emissions from agricultural practices. The model input requires specific information from the declaration of manure to the VLM and a version of calculation factors. In the framework of this study, a VLM-data structure for 2017 containing relevant information about the declaration of manure in that specific year was provided. Besides this, it was decided to use version ‘2017EA 2.1’ of the calculation factors.

At the start of this project, the following documents were provided: ‘EMAV2.1 manual/final report’, ‘EMAV2.1 Appendix analyse flow’, the EMAV2.1 source code and a working version of EMAV2.1 that was installed on the ILVO servers. Chapters 2 and 3 of this report discusses the content of the ‘EMAV2.1 manual/final report’ and ‘EMAV2.1 Appendix analyse flow’. In these chapters, these documents were assessed on their quality. An important aspect within the EMAV2.1 calculation scheme is the concept and availability of meta data, which is lacking in the current EMAV2.1 version. With meta data of the VLM-data structure and version of the calculation factors, the EMAV2.1 user can find out how the data collection was performed. Furthermore, he is capable to retrace possible errors with the data, instead of having to contact the source of origin. Besides the importance of providing meta data, information gaps were identified and suggestions for improvement/elaboration were provided.

Next, the calculations within the EMAV2.1 calculation scheme were investigated in Chapter 4. Here, all calculations were examined in detail to ascertain that they were performed correctly as described in the ‘EMAV2.1 manual/final report’ and ‘EMAV2.1 Appendix analyse flow’. Based on the analysis, the EMAV2.1 calculation flow for the emission states of ‘Pasture’, ‘Stable’, ‘Storage’ and ‘Manure processing’ were performed correctly as was described by the reports. Although these calculations checked out, several suggestions are given to improve the calculations and the explanation in the manual. Within the calculations of the emission states ‘Transport’ and ‘Drive out’, errors were found which should be further investigated. Within this report, an attempt was made to pinpoint where exactly these problems occurred.

Within the EMAV2.1 software, a preliminary GIS analysis can be performed to quickly investigate how the agricultural emissions are distributed over Flanders. The xy coordinates of each agricultural farm are assigned to the emission states of ‘Pasture’, ‘Stable’, ‘Storage’, ‘Drive out’ and ‘Manure processing’. In the subsequent Chapter 5, the assignment of these xy coordinates to the different emissions states was investigated. In addition, an assessment of its performance was done. For 95 % of all agricultural farms, the xy coordinates could be found in the VLM-data structure. The remaining 5 % of the farms should be looked up in the CRAB database. An important aspect of the geocoding of emissions is the ‘lookup algorithm’. The latter was further investigated with an uncertainty analysis. In the final part of this chapter, the generation of shapefiles by EMAV2.1 was investigated. The geocoded data was correctly translated to the shapefiles. However, within two grid cells of the VLOPS-shapefile emissions of emission state ‘Drive out’ were not properly assigned. Because this amount was limited in comparison to the total amount, the impact was very low. This should be further investigated.

In the final research chapter, the results of an extended uncertainty analysis were discussed. Here, the most important parameters of each emission state that could have an impact on the spread of uncertainty throughout the EMAV2.1 calculation scheme were identified

This document is well suited to aid in tracing the errors in the EMAV2.1 calculation scheme and to improve the existing EMAV2.1 manual.