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TADA, a mechanistic model for carbon, nitrogen and water cycle in cropland and grassland ecosystems

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A process-based model which simulates carbon, nitrogen and water cycle at a plot scale has been recently developed at Gembloux Agro-Bio Tech. Adapted to different agroecosystems, this model is mainly oriented towards the estimation of greenhouse gas exchanges. The model, named TADA (Terrestrial Agroecosystems Dynamics Analysis), is based on the mechanistic 1D model ASPECTS developed for forests and was adapted to cropland and grassland ecosystems by including specific phenology, allocation scheme, management and grazing modules proposed in literature.

Some processes simulated in TADA (such as photosynthesis, soil evaporation, nitrification, etc.) were calibrated against a large dataset obtained on two Walloon ICOS (or ICOS candidate) flux tower sites: a winter wheat crop which is part of a 4-year crop rotation at Lonzee and an intensively grazed grassland at Dorinne.

The model will be presented and the improvements that could be made to improve the processes description will be highlighted, together with the measurements needed for a better calibration of these processes, as this is a long-term project.

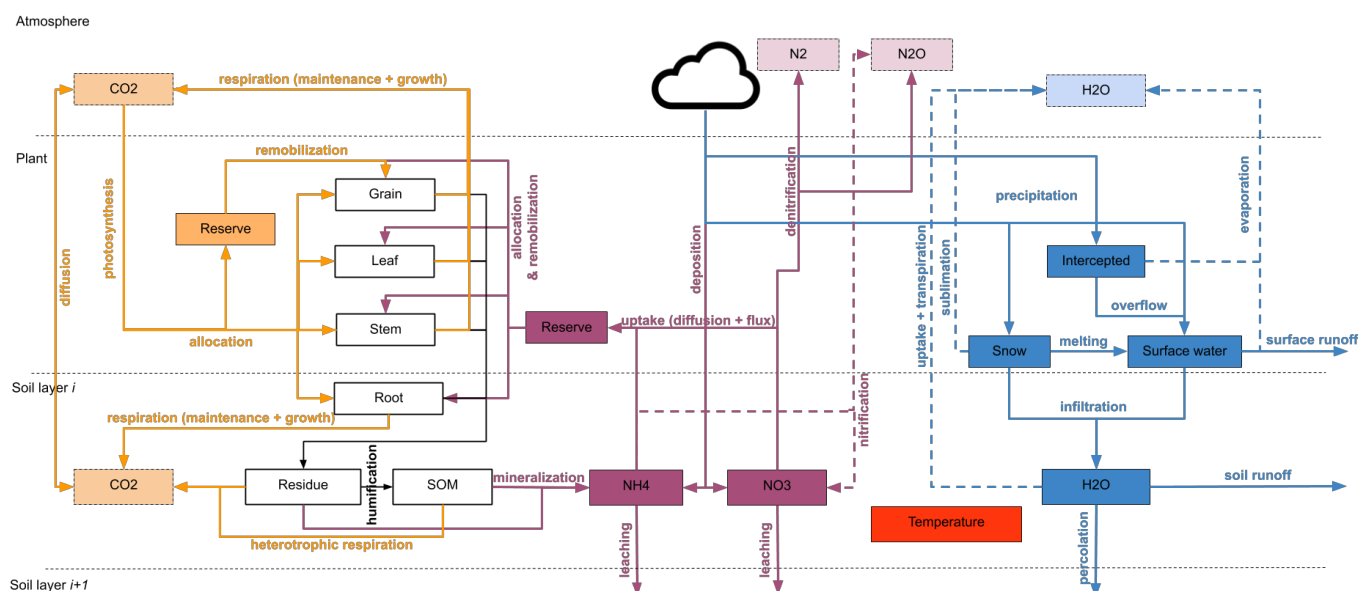


Figure 1: Diagram of the reservoirs simulated by the TADA model.

Keywords: Mechanistic modelling, grassland, winter wheat crop.

References:

1. Rasse et al. (2001), 'Modelling short term CO fluxes and long term tree growth in temperate forests with ASPECTS', Ecological modelling, 141, 35-52.