Editorial Corrections

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Please find in "black" the editor's comments, in "blue" our replies, in 'green' the modification in the revised manuscript.

General comment: We thank the editor in charge the suggestions indicated in the attached file which improved the overall quality of the manuscript. We also would to inform you that all editor's suggestions (strikethrough text; or suggestions hereafter) were taken into consideration.

Line 20: Should this not be "design"?

Response: Noted with thanks. We modified the sentence.

Line 20: *"Designed" has been replaced by "design"*

Line 27: Not clear what this % refers to

Response: Noted with thanks. We modified the sentence to make it more understandable.

Line 27: *Here's the new sentence: "Simulations made for the four land use scenarios suggested that ploughing up 33 % of grasslands would increase sediment discharge at the water treatment plant by 5 % on average.*

Line 29: 10-44%

Response: Noted. We added the "%" in the sentence.

Line 29: *……(respectively in the range of 10-44 % and 24-61 %).*

Line 42: is 5 million per year of during the period 1992-2018

Response: It is during the period, so we modified the respective sentence. In addition, we modified the reference because the corresponding article has been published in Land Use Policy since.

Line 42: *……was estimated at €5 million during the period 1992-2018 (Patault et al., 2021a)*

Line 583: *Patault, E., Ledun, J., Landemaine, V., Soulignac, A., Richet, J-B., Fournier, M., Ouvry, J-F., Cerdan, O., Laignel, B. (2021a). Analysis of off-site economic costs induced by runoff and soil erosion: Example of two areas in the northwestern European loess belt for the last two decades (Normandy, France). Land Use Policy, 108, 105541. https://doi.org/10.1016/j.landusepol.2021.105541*

Line 59: examined

Response: the term "examined" has been added.

Line 68: represent

Response: As suggested, "predict" has been replaced by "represent".

Line 69: by

Response: the term "by" has been added.

<u>Line 84:</u> River

<u>Response:</u> "river" has been replaced by "River".

<u>Line 86:</u> mm/year

<u>Response:</u> "mm" has been replaced by "mm/year".

<u>Line 88:</u> m above sea level

<u>Response:</u> "m" has been replaced by "m above sea level"

<u>Line 91:</u> Are your referring to infiltration or percolation. Infiltration is a surface process. Are you referring to subsurface flow of water?

<u>Response:</u> We are referring to infiltration. The term "ground" has been deleted.

<u>Line 94:</u> Is the water being pumped from a spring? How can water be pumped through a spring?

<u>Response:</u> the term "through" has been replaced by "from".

<u>Line 135:</u> Should this not be "evaluated"?

<u>Response:</u> the sentence has been modified as follow

<u>Line 135:</u> *"After training, the quality of the model is evaluated on a test set"*

<u>Line 135:</u> Correct this sentence

<u>Response:</u> the sentence has been paraphrased as follow:

<u>Line 135:</u> *"The ability of the model on the test set is known as generalization, and it can be influenced by overfitting during the training stage"*.

<u>Line 206 & 215:</u> design

<u>Response:</u> The term "designed" has been replaced by "design".

<u>Line 215:</u> If these land use scenarios are for 2050, then it is expected that you explain how the 2050 scenarios were developed. The assumptions made in developing the scenarios must be explaining in a manner that convince readers that they are realistic.

<u>Response:</u> Thank you for the suggestion. We modified this section as follow:

<u>Line 215:</u> *" Four land use change scenarios for year 2050 were investigated and compared to a baseline land use scenario (2018). The scenarios were incorporated in the model in order to simulate SD variability at the WTP and evaluate their impacts. All scenarios are described below:*

- *Baseline scenario (S_base): This scenario served as a reference and was built considering the latest available land use data on the catchment (see section 3.3). Existing erosion control measures in 2018 were considered and extracted from a regional database (BD CASTOR; http://bdcastor.fr/). The database contained 45 dams/retention ponds, 16 ponds, 1 fascine, and 4 hedges for the actual land use scenario on the Radicatel catchment, which have been included in the WaterSed model.*
- *Ploughing up of grassland (S_grass): Based on regional benchmarks (DRAAF; https://draaf.normandie.agriculture.gouv.fr/) for the 1970-2010 period in the studied region (Pays de Caux), we observed an average conversion rate of grasslands up to 900 ha yr^{-1}.*

Extrapolation by 2050 lead to the conversion of 33% of existing grasslands. The extrapolated rate was applied on the Radicatel catchment. Grasslands were ploughed up based on a slope criterion, taking into account the working conditions of farmers and prioritizing those with mild slopes (<12 %), therefore mainly located on the plateau upstream of the catchment.

- *Eco-engineering (S_engi): based on expert knowledge, 181 fascines and 13.1 ha of grass strips were implemented in addition to existing erosion control measures to mitigate runoff/erosion on the catchment and reduce rapid transfer via the connected sinkholes. Grass strips were deployed on the flow paths in the vicinity of the sinkholes. Fascines were deployed throughout the catchment, also on flow paths and along plot boundaries. This scenario allows for a shift from a 0.19 per 30 ha erosion control measure density to nearly 1 per 30 ha which is advised to promote sedimentation and landscape restructuring (Ouvry et al., 2019). The localization was optimized according to the baseline scenario simulations.*

- *Best farming practices (S_farm): This scenario promotes the adoption of farming practices improving infiltration on the catchment (increasing crop cover or delaying the formation of the slaking crust). 50 % of the plots were randomly selected and applied a 15 % increase in infiltration capacity, respecting the actual proportions of winter and spring crops on the catchment. The applied value was set based on the study of Maetens et al. (2012), who synthetized the reduction in erosion and runoff following different agricultural practices across Europe. According to their results, 15 % increase in infiltration capacity can be regarded as a conservative assumption that can be easily achieved through simplified agricultural techniques (e.g. minimum tillage, no till, direct seeding, crop cover, etc.)."*

- *Coupling eco-engineering and best farming practices (S_farm+engi): Both scenarios, S_farm and S_engi were combined. Experiments carried out in the study area suggested that combining both approaches is necessary to reduce the impact on sensitive or vulnerable areas (Ouvry et al., 2012).*

The following references have been added to the reference section:

Ouvry, J-F., Richet, J-B., Saunier, M. (2019). « Le rebocagement » : une réponse pertinente face aux enjeux érosifs ? Retour d'expérience du Pays de Caux, Revue Science Eaux & Territoires, Ressources en eau, ressources bocagères, 30, 54-59 pp. doi : 10.14758/SET-REVUE.2019.4.11

Ouvry, J-F., Coufourier, N., Richet, J-B., Lhériteau, M., Pivain, S. (2012). Maîtrise du ruissellement et de l'érosion des sols : expérimentations sur les pratiques culturales : synthèse des résultats du ruissellement et d'érosion. Expérimentations sur les pratiques culturales, 2001-2010. 2021. Hal-02811122

Line 215: for year

Response: the term "by" has been replaced by "for year".

Line 219: in

Response: the term "by" has been replaced by "in".

Line 224: is this a percentage of the area or what?

Response: Yes, it is. We modified the sentence to better explain the assumptions.

Line 224: *"Based on regional benchmarks (DRAAF; https://draaf.normandie.agriculture.gouv.fr/) for the 1970-2010 period in the studied region (Pays de Caux), we observed an average conversion rate of grasslands up to 900 ha yr^{-1}."*

<u>Line 304-305:</u> Not clear / correct this phrase

<u>Response:</u> Noted. We paraphrased as follow.

<u>Line 304-305:</u> *"While the performance of deep learning-based methods to model extreme events is discussed (Zhang et al., 2019), the results obtained here provide confidence in the model's ability to simulate them due to a careful selection of input data that allows the model to learn patterns of extreme events in historical time series."*

<u>Line 316:</u> What do these represent?

<u>Response:</u> The design storms. We modified the sentence as follow:

<u>Line 321:</u> *"For the first scenario (S_grass), 33 % of grasslands were ploughed up, which led to an increase of the spatial extent of runoff generation on the catchment. SD_{S_grass} ranged from 8468 to 188264 kg for the five DS with an average increase of 4.74 % compared to the results of the baseline scenario."*

<u>Line 355:</u> not very clear

<u>Response:</u> We replaced "high average decrease" by "global decrease".

<u>Line 379 & 384:</u> infiltration capacity

<u>Response:</u> The term "capacity infiltration" has been replaced by "infiltration capacity". In addition, we modified a reference in the same paragraph and in the reference section, line 399 (Patault et al., 2020), because our article has been published in La Houille Blanche.

<u>Line 399:</u> *Patault et al., 2021b*

And the following reference in the reference section:

Patault, E., Soulignac, A., Landemaine, V., Ledun, J., Allard, E., Fournier, M., Ouvry, J-F., Cerdan, O., Laignel, B. (2021b). Analyse coût-bénéfice du programme d'actions visant à réduire les impacts du ruissellement et de l'érosion en Haute-Normandie : évaluation des actions passées et projections futures sur le bassin versant de la Lézarde, LHB, 107:1, 1-10, https://doi.org/10.108/00186368.2021.1912963.