

Comments on ESSD-2023-120

This manuscript attempts to identify the dam lands silted by check dams on the Chinese Loess Plateau using an object-based identification method in conjunction with Google Earth images featured with high spatial resolution. Moreover, the spatial distribution, dam lands area and sediment volumes were also analyzed. The results of this manuscript can provide a baseline for further studies which focus on the soil and water conservation, and grain yield on the CLP. But, there still are some serious issues in this manuscript. Firstly, the authors used a bit outdated identification method to identify the dam land on CLP. I suggest the authors try to use the Artificial Intelligence technology for example the random forest to identify the check dam and dam land. Secondly, the structure of this manuscript is not regular, for example the mixture of results and discussion. Thirdly, the writing logic and style are confused. Finally, some patches in the uploaded data are not in line with our recognition. For example, the patch is not drawn as one side with straight line which represents the check dam. This may be caused by the incorrect setting of identification rules. The detailed suggestions and comments are as follows.

P1, line 14, “invest...in doing ...” is always used. So, change “to implement” to “in implementing”.

P1, line 17, change “once the” to “a”, and change “great” to “large”.

P1, line 19, please avoid using the word “first”. Change “the first” to “a”.

P1, lines 21-22, change this sentence to “we first investigated and analyzed the key characteristics of check dams on the 0.3-1.0 m resolution Google Earth images during the optimum period”.

P1, lines 23, insert “methods of” before “multi-scale”, and change “self-developed” to “self-development”.

P1, line 24, change “combined with” to “in conjunction with”, and change “is” to “were”.

P1, lines 25-27, change “is” to “was”, and change “are” to “were”.

P1, lines 28-29, insert a related phrase “not only...but also....” Before two predicates of “provides” and “will help”. Delete the first comma in line 29.

P2, line 35, change “to” to “In order to”.

P2, lines 39-40, suggesting delete “, such as China, Spain, Australia, America, India, Iran, and Ethiopia”. Because the term of “global” has been used in first half sentence. It will confuse the reader.

P2, line 41, change “silted land” to “silt”.

P2, line 42, insert “can” before “reduces”. Whose runoff velocity? Soil? If true, insert “of soil” after “runoff velocity”.

P2, line 42, why place a noun before the adjective (erosion kinetic)? Suggesting change “erosion kinetic energy” to “kinetic energy of erosion”.

P2, line 44, change “data from different study areas” to “results at different study areas”. Because “data” is a general concept. It can indicate not only the input data and output data, but also the information concluded from the tables, maps, charts and results for certain research.

P2, line 46, the check dams cannot provide the ecosystem services such as carbon sequestration and grain supply. Indeed, the ecosystem services are contributed by the silt. Please rewrite this sentence.

P2, line 41, 48, change “behind” to “intercepted by”. Because the check dam is not a directional object. The direction is decided by the person’s location. If you stand at the non-silt side and face to the silt, the silt is in front of the check dam. But if you stand at the silt side and face to check dam, the silt is behind the check dam.

P2, line 51, change the second “the” to “a”.

P2, line 52, insert “its” before “serious”.

P2, line 54, change “cooperate with” to “cooperating with”.

P2, line 57, change “great” to “large”, change “is” to “has been”.

P2, line 58, change “how many” to “what are”.

P2, line 59, suggesting give the full name of “P.R.”, although most Chinese authors know it representing People’s Republic.

P2, line 60, insert “they” before “captured”.

P2, lines 61-62, change “remained intact till” to “in”.

P2, line 62, change “silt sediment” to “sediment volume”.

P2, line 63, change “data” to “amounts”.

P3, line 66, change “between” to “from”, change “detail” to “detailed”.

P3, line 67, change “remains unclear” to “remain unrecorded”.

P3, line 68, delete “data”.

P3, line 70, change “benefits of” to “benefitting from”.

P3, line 72, change “incalculable” to “some” or “a few”. “incalculable” is an adjective, which cannot modify adjective. Moreover, the mood of “incalculable” is too absolute. Please be careful when using these words. If you using this word at here, it means the check dams amount is not creditable, which will weaken the credibility of the government.

P3, line 73, change “has made” to “has been made”. Because the subject of this sentence is “remote sensing”. Change “in” to “in fields of”.

P3, lines 74-76, the mood of this sentence is too absolute. There are no limited phrases in this sentence. These two “studies” are just your findings through reading published articles. However, whether you have read all the related articles in the world about this topic? Or writing in other languages (not just in Chinese and English)? Moreover, two articles (Li et al., 2021; Tian et al., 2013) were cited at end of this sentence, but the next sentence was started with Zhao et al. (2013). Obviously, there are three articles related with the topic of check dam exploration using remote sensing technology. Please rewrite this sentence.

P3, line 77, which sensor’s images were implied in Zhao et al. (2013)? Landsat 5? Landsat 7?

P3, line 80, the deep learning and object-based classification can not be applied into the identification of check dams at a larger study area? In fact, the identification effect using machine learning is decided by the input data and specified algorithm. The study area is not a key factor affecting the identification effect. Moreover, these words of “first” and “blank” should be avoided in the article. That is to say, we should always address a sentence based on the objective fact, not the subjective assumption when we write a manuscript. Please rewrite these two sentences.

P3, line 81, delete the second “the”.

P3, line 82, change “corresponding” to “correspondingly”.

P3, line 82, suggesting transfer “hm²” to “km²”.

P3, line 83, change “product” to “generate”. Suggesting change this sentence to “The decametric-resolution images (e.g., Landsat-7/8) may generate erroneous judgement for identification of silt due to the mixed pixels”.

P3, line 84, change “silted land formed” to “silt intercepted”.

P3, line 85, change “distinguish” to “be distinguished”. What is slope cropland? What is the difference between slope cropland and terrace? Are terraces used for planting crops? So, change “slope cropland and terrace” to “cropland”.

P3, line 87, change “identify” to “be identified”, and change “extraction” to “identified”.

P3, line 88, change “focus on” to “impacting on”, delete the first “and”, change “within the category” to “characteristics”, change “correlation” to “correlative”. Change “consider” to “refer to”.

P3, line 89, change “this method also produces” to “these methods also emerge”.

P3, line 90, change “integrity” to “accuracy”.

P3, line 91, delete “comprehensively” and “statistical”.

P3, line 91, change “considers” to “referring to”. Because the subject of “consider” is sb, not sth.

P3, line 92, delete “and”, and change “silted land extraction results combined with high-resolution” to “identified results combining with high spatial resolution”.

P3, lines 93-94, change this sentence to “Therefore, we attempt to identify the check dams on the CLP using object-based classification method in conjunction with high spatial resolution (0.3-1.0 m) and easily accessible Google Earth images in this study”.

P3, line 94, change “self-developed” to “self-development”.

P3, line 95, change “combined with” to “in conjunction with”, change “is” to “are”, change “extraction” to “identified”.

P3, line 96, change “test” to “testing”, change “This dataset” to “This study”

P3, line 97, delete “function”, change “to provide” to “offers”

P4, line 100, suggesting change “extraction” or “extract” to “identification” or “identify” through this manuscript.

P4, lines 100-101, suggesting change this sentence to “It is noticeable that the dam land mentioned in the study mean the eroded sediment captured by the check dam rather than the dam body”.

P4, lines 101-102, suggesting change this sentence to “Because the functions of check dams such as sediment retention, carbon sequestration, and grain supply are embodied by the dam land”.

P4, lines 104-106, who’s efficiency? Improve identified efficiency of dam land? Change “concentrated” to “dense”. The spatial distribution characteristics of check dams was concluded from the dataset of Liu et al., 2021a or the dataset manufactured in this study? Change “divide” to “divided”.

P4, line 106, change “concentrated” to “dense”.

P4, line 108, why the acquisition and processing of corresponding Google Earth images in dam sparse region are complex? Does the large area is the only reason? If you use some auto download software and some auto-processing script for the Google Earth images, I think the workload is not an obstacle in you study.

P4, lines 107-109, these two sentences can be merged into one sentence. For example, “However, owing to the large area but with just about 15% of the check dams in the dam sparse region, the acquisition and processing of corresponding Google Earth images is time-consuming.”

P4, line 110, do you directly identify the dam land in software of Google Earth? Is there no need to download the images? How do you ensure the consistency of dam land using two different identified methods? Change “Noticeable” to “Noticeably”.

P4, line 110, the authors listed three regions without check dams, but we found that they were not mapped on the Fig. 2a. Please remap that sub-figure. If you do that, the readers can quickly locate the positions of three regions on the sub-figure.

P4, line 111, change the comma to period (full stop) and insert a comma after “so”, change “so” to “So”.

P4, lines 110-112, these two sentences can be merged into one sentence. For example, “Noticeably, we masked three regions without check dams such as the Mu Us Desert in the northwest of CLP, the Guanzhong Plain in the middle of CLP, and the Rocky Mountains in the east of CLP, which has significantly reduced the workload of visual interpretation”.

P4, line 112, change “aggregate” to “aggregated”. Change this sentence to “Finally, we aggregated these two dam land datasets and verified their accuracy through....”. the sequent word of “finally” was suddenly appeared in the last sentence of this paragraph, but we cannot find other sequent words such as “firstly”, “secondly” in this paragraph.

P4, line 115, please adjust the workflow in this study. Please assign step 7 to Dam sparse region and reassign step 8 to Accuracy verification.

P4, line 117, delete “vast”, change “cultivated” to “cultivable”.

P4, line 118, change “of” to “in”, change “cultivated” to “cultivable”, and delete “dams”.

P4, line 119, what does “abandoned dam land” mean? How to distinguish cultivable dam land and abandoned dam land?

P4, line 119, insert “lived” before “on”, and insert “each year” after “May”.

P5, line 120, this sentence needs to be questioned. Because in Northern China, the growing of vegetation is not luxuriant in May. So, it will result in misjudgment for land cover type.

P5, line 121, change “from” to “on”.

P5, lines 121-122, this sentence can be readdressed as “The distinguishable difference can be confirmed by the field investigations”. Actually, the input data is the Google Earth images, you cannot find the similar or difference through comparing the images from same source although they were

achieved during different phases. Comparing Google Earth images with field photographs is feasible.

P5, line 123, change “ N_{dam} ” to “ N_{sur} ”.

P5, lines 123-124, in the brackets, three counties are Baota, Zizhou and Lin, but on the figure 3a, three counties are Zizhou, Linxian and Yan’an. Please check the names and make sure the writing of English name is correct (do not mix Chinese and English, for example, xian-county).

P5, lines 124-125, why do the authors select the images in 2019 to calculate NDVI? From the figure 2, we can see that the photographs were taken in May 2018. Moreover, the NDVI was calculated by Google Earth images or Sentinel-2 images or both? Finally, if the authors calculated the NDVI in Google Earth Engine, how do you deal with the noises for example cloud?

P5, line 125, insert “values” before “of”, change “are” to “were”.

P5, line 126, change “Fig .3” to “Fig .3b-d” and insert “, 2019” after “May”.

P5, line 127, what does “May images” mean? Does it mean the images in May? If so, move “May” before “2016” and “2020”. Moreover, do all available images mean only the images from 2016 to 2020 are available? Can the images before 2016 and after 2020 be available? delete “a”.

P5, line 128, change “taken” to “retrieved”.

P5, line 129, change “satellites” to “sensors”.

P5, lines 129-130, change the last half sentence to “which may result in potential chromatic aberration at the junction of two image scenes”.

P5, lines 130-131, this sentence confused me a little. Do the authors mean the images were regrouped according to the launching date of satellite sensors? And finally, the authors obtained 52 scenes of image in total.

P5, Figure 2a, P6, Figure 3a, where does the dam lands data come from? From this study or other resource? If it comes from this study, the logic of manuscript writing is reverse. If it comes from other source, please cite the source in the caption of figures. Moreover, suggesting assign the same color to dam lands on two sub-figures. Suggesting copy the same administrative divisions map of figure 2a to figure 3a. meanwhile, suggesting copy the same topographical map of figure 3a to figure 2a. Delete the graticules on

sub-figures 2a, 3a, because the authors have plotted the North arrow on these two sub-figures.

P5, Figure 2b-d, suggesting address the date with the format “MM DD YYYY”.

P6, Figure 3b-d, suggesting plot the axis (both x-axis and y-axis) ticks, so the readers can quickly find the date range filled by blue rectangle on the x-axis.

P6, line 141, insert the version and company of software after “eCognition Developer”.

P6, line 144, delete the first “parameters”.

P6, line 148, change “extraction” to “identification”.

P6, line 149, delete the two “the”, delete “parameters”, change “classification” to “identification”.

P6, line 150, how do the authors make combinations between shape and compactness? The authors should give a simple description at here.

P7, line 157, change “classification” to “identification”.

P8, line 158, change “assign” to “assigned”.

P8, line 159, delete “conditions”.

P8, line 160, change “some features”, “assign” and “classification” to “a feature”, “assigned” and “identification”.

P8, line 161, change “classification” to “identification”, because in this study, only dam land should be identified from images. Change “was” to “is”. Do the authors mean “as our goal is to identify more dam land in a target category”?

P8, line 162, change “first” to “firstly”, change two “land” to “lands”.

P8, line 163, change “size” to “amplitude”, change “thresholds algorithm” to “threshold algorithms”.

P8, line 164, change “classification” to “identification”.

P8, line 165, delete the second “the”.

P8, line 166, change “combined with” to “using”.

P8, line 167, change “land was” to “lands were”. What does “included in the classification range” mean? It confuses me a lot. Change “of” to “in”.

P8. Line 168, change “concentrated” to “dense”, change “mainly” to “main”, change “the cropland on slope land” to “the ambient croplands”.

P8, line 169, change “superposition” to “overlay”.

P8, line 171, give the full name of “SRTM-DEM”, insert “spatial” before “resolution”, insert the version and company of software after “ArcGIS”.

P8, line 172, change “superimpose the river network and the bare land layer to extract” to “overlaid the river network layer on the bare land layer to identify”.

P8, line 173, insert “identified” before “accuracy”, delete “extraction”.

P8, line 174, change “classification” to “identification”.

P8, lines 174-175, this sentence can be addressed as “The left window with showing high-resolution Google Earth image can link with the right window with representing the dam lands layer identified on the previous steps”.

P8, line 175, change “assign” to “assigned”, change “extracted” to “identified”.

P8, lines 176-178, change this sentence to “Finally, we merged the vector polygons identified from 52 images with the attribute value of 1 in ArcGIS”.

P9, line 183, change “take” to “took”.

P9, line 183, as addressed in the Introduction, two studies (Li et al., 2021; Tian et al., 2013) have explored the identification of check dam on Chinese Loess Plateau. Moreover, whether the latitudes and longitudes of check dams published by Ministry of Water Resource of the People’s Republic of China are available? So, the authors cannot be addressed as “there is no available spatial distribution dataset of check dams on the CLP”.

P9, line 184, which dataset should be verified? Check dams or dam lands?

P9, line 185, change “traditional” to “traditionally”.

P9, line 186, change “determine” to “determined”. Which dataset was taken as reference? The number of check dams published by Ministry of Water Resource of the People’s Republic of China?

P9, line 187, change “concentrated” to “dense”.

P10, lines 188-189, it confuses me a lot. What did the samples be used to verify? Check dams or dam lands?

P10, line 189, delete the second and third “the”.

P10, line 190, insert “accuracy” before “(PA)”.

P10, line 192, change “compare” to “compared”, change “official” to “officially”.

P10, line 194, change “check dam” to “dam land”.

P10, line 199, there is a cited error for Zeng et al. (2022). Zeng et al. (2022a) or Zeng et al. (2022b)? delete “method”.

P10, line 201, why not use the general unit of “km²”?

P10, line 205, change “in which” to “and”, change “check dam map” to “dam land”.

P10, line 206, delete “class”.

P10, line 208, change “maps” to “map”, change “2000” to “1947”.

P11, line 210, change “combined with” to “used”.

P11, line 213, delete “a slope of 1.1185 and”.

P11, lines 213-215, suggesting change this sentence to “The number of check dams in this study is closer to that in official statistics reported in 2013 (58, 446) rather than that reported in 2003 (110, 000)”.

P11, line 217, change “statistical” to “statistic” of the labels on the y-axis.

P11, line 218, please revise the caption of figure 6. For example, Area (a) and number (b) comparison of check dams between this study and official statistic.

P12, line 223, what does the significance of figure 7? Do the 12 sub-images represent the check dams in typical region or with special feature?

P12, line 226, change “number of” to “total”, delete “are”.

P12, line 229, what does “which” indicate? The spatial distribution of check dams or regional soil erosion? Suggesting split this long sentence into two short sentences.

P12, line 230, change the second “in” to “cited from”, and insert the citation after “GBT16453.3-1996”.

P12, line 231, delete the second “the”, change “ranges from” to “of”.

P12, line 232, transfer the unit of “hm²” to “km²”, insert a comma after “2, 250”.

P13, line 233, change “the highest” to “high”.

P13, line 234, delete “number of”, change “basically” to “almost”, change “the results previously reported” to “the previously reported results”.

P13, line 236, change “in different regions” to “at provincial level”.

P13, line 237, change “Region” to “Province”, change “Area” to “Silted area”, change “Volume” to “Sediment volume”.

P13, line 239, change “account for” to “accounting for”, change “billion” to “ $\times 10^9$ ”.

P13, line 240, change “estimated” to “calculated”, change “previously reported” to “in previous report”.

P13, line 241, insert “on the CLP” before “intercept”, change “billion” to “ $\times 10^9$ ”, change “to” to “into”.

P13, line 242, delete “the period”.

P13, line 243, suggesting change the x-labels with legend labels. That is to say, the x-labels are listed as Micro, Small, Medium, and Large, but legend label are listed as 0-0.2 km², 0.2-2 km², 2-7 km², >7 km².

P14, line 249, change “role” to “roles”.

P14, line 250, change “of” to “among”. “to date” is always located at the head or end of a sentence.

P14, line 251, change “laborious” to “laboriously”, change “find check dams suitable for the research objectives” to “find suitable check dams satisfied with the research objectives”.

P14, line 252, change “precise” to “precisely”.

P14, line 253, change the first “of” to “for”, change “provides” to “also offers”.

P14, line 254, change “, which are crucial for those studies using” to “for those studies which use”.

P14, lines 256-257, do not use the phrase “fill the gap” and the word “unprecedented”. The authors should use euphemism in the manuscript as far as possible. Please revise this sentence.

P14, line 260, change “billion” to “ $\times 10^9$ ”.

P14, line 261, delete “the period”.

P14, lines 261-262, change “which equals 46% of the sediment load of the Yellow River, once the largest sediment contributor to the global ocean” to “equaling 46% of the sediment load of the Yellow River, which was once the largest sediment contributor to the global ocean”.

P14, line 263, change “unprecedented” to “enormous”, delete “reduction”.

P14, lines 263-265, change “studies” to “article”, change “emphasize” to “emphasizes”, change “point” to “points”, because only one citation was listed in the brackets at end of this sentence. Change “potential” to “potentiality”, delete “important”.

P14, line 266, change “large scale” to “macro-scale”, change “or” to “with”. Does literature compilation mean meta-analysis?

P14, lines 267-268, change this sentence to “Moreover, the soil silted by the check dams has higher moisture than that of terrace and slope cropland”.

P14, line 268, change “shows” to “showed”.

P14, line 270, change “determine” to “estimate”.

P14, line 271, it is unbelievable that the Chinese government plans to build 56161 new check dams on the CLP till 2030. Because, as shown in this

study, there are 50226 check dams on the CLP from 1970s to 2018. I cannot believe the government has so ambitious planning to build the nearly same check dams as that in the past 50 years during the short term of future seven years. I do not think the more check dams are good for local ecosystem. It even will break the balance between agricultural land and ecological land.

P14, line 272, change “provide” to “provides”.

P14, line 275, change “Combined” to “combining”.

P14, line 276, delete “for the first time”, change “extraction” to “identification”.

P14, line 277, delete the first “the”.

P14, line 278, change “extraction” to “identification”.

P15, line 280, change this sentence to “and their characteristics and functions are same as small reservoirs”.

P15, line 281, change “separate” to “distinguish”, change “have led to” to “lead to”.

P15, line 283, change this sentence to “it is difficult to obtain the images for the entire CLP in April and May of the same year”.

P15, lines 285-286, change this sentence to “Therefore, we collected all available images covering most study areas in May from 2016 to 2020”.

P15, lines 286-287, change the sentence in the brackets to “e.g., the check dam was constructed in 2018, but it was not imaged in 2016”.

P15, line 288, change “combined” to “combing”.

P15, line 289, the Sentinel-2A was launched at 23 June, 2015. Its accessible images were not earlier than that of Quickbird. Moreover, the highest spatial resolution of Sentinel-2A is 10 m, which is far lower than that of Quickbird (0.3-1.0 m). Its most advantage is for free downloading. So, if the authors want to achieve check dam dataset with higher spatial resolution, the Quickbird images are the best choice, although you should pay much more fee on them.

P15, line 290, change “extraction process” to “identification script”.

P15, line 293, change the initial letter of “Digital” and “Model” to lowercase.

P15, line 301, delete “first”.

P15, line 302, delete “of check dams”, change “provided” to “manufactured”, change “classification” to “identification”, change “combined with” to “in conjunction with”.

P15, line 303, change “self-developed” to “self-development”.

P15, line 304, change “extraction” to “identification”.

P15, line 305, change “extracted” to “identified”, change “billion” to “ $\times 10^9$ ”

P15, line 306, change “to” to “into”, delete “the period”.

P15, line 309, delete “to further verify the accuracy of this dataset”.

P15, line 312, change “accuracy of extraction” to “identified accuracy”, change “extraction” to “identification”.

P15, line 313, change “extraction” to “identification”.

P15, line 314, change “extraction” to “identification”.