We would love to thank you for allowing us to revise the manuscript and we highly appreciate your time and consideration. We have carefully considered the review comments and revised the manuscript thoroughly. We sincerely hope the revised manuscript is more complete and can be considered for publication.

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Response to Editor:

- Thanks for positive changes.
- One necessary change: at line 346 term “slums”: represents an ill-defined and (at least in USA) a perjorative term. Use a different / better description?
- Authors make valid point about 800GB of GE imagery: difficult to upload and download. Do alternatives exist? Do GE images also exist on Google Earth Engine? As authors wait to complete upload, can users expect or find browse capability, so users do not need to download 800GB? Could authors provide a statistical description of GE images as used (date, resolution, source if known) plus a few snapshot examples (using e.g. five or six cites as in Figure 14) with, in those cases, GE images uploaded to Zenodo? Something that serves authors as well as users?

Response:

We feel great thanks for your careful review work on our article. According to your suggestions, we have made modifications to the article.

Here are responses to the two issues mentioned above:

(1) Thanks for your kindly reminder. We have replaced the term “slums” at line 352 into “urban villages” for a more appropriate expression.

In the process of urbanization, housing in cities can be mainly divided into two categories, one is the formal residential area such as apartment complex and villas, and the other is informal housing space, such as urban villages. As one of the largest developing countries in the world, China is also exposed to the problem of housing differentiation, especially in the megacities after rapid urbanization. The last a few decades have witnessed the emergence of urban villages in many megacities in China during and after rapid urbanization. Compared with formal housing, urban villages have a very high building density to accommodate as many nonlocal residents as possible.

In addition, due to the lack of reasonable planning and formal property management, urban villages have problems such as low green space coverage. Therefore, under the requirements of sustainable development, how to measure the degree of housing differentiation between formal and informal housing space, including green space coverage, is of great importance. We think the UGS-1m can help and provide fine-grained UGS distribution for such research.

(2) Thanks for your valuable suggestions.

a) After individual zip packaging of the GE images of each city, the final size of all city images is 392GB. At present, we have succeed uploading all ".zip" files of the GE images to OneDrive (https://mail2sysueducn-my.sharepoint.com/:f:/g/personal/liumx23_mail2_sysu_edu_cn/EuILVq8vbopKu_juqg4ams8BythT7i1Oe7X-9kQaVn-LAw?e=9aBqSq), which also have been made openly available through the project link of this paper (https://liumency.github.io/UGS-1m/) . Besides, according to your kind suggestions, we also have attempted to upload all image files and datasets to Zenodo as a new version (new DOI will be created). However, we had some difficulties to do this, including:

1) Limited by the network speed at our area, the file upload process is usually interrupted and failed;

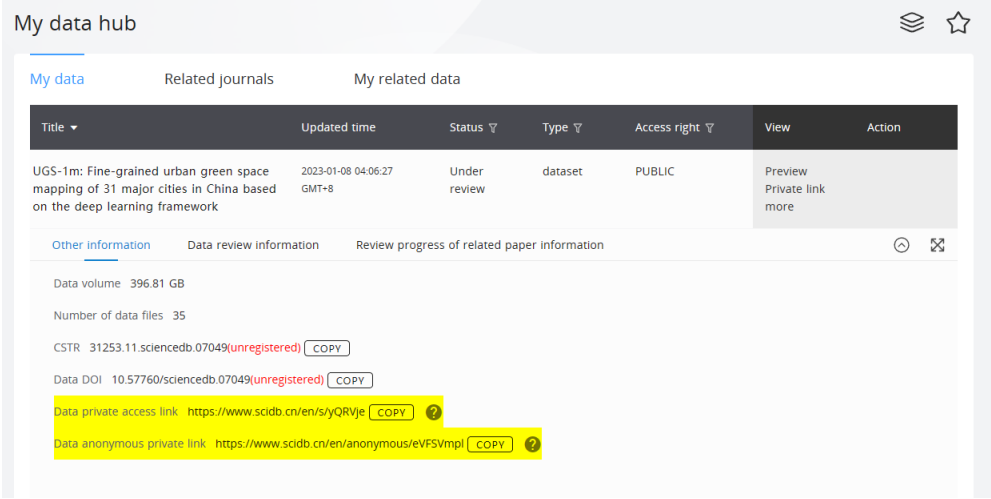
2) The Zenodo has restricted the size of free dataset release (only 50G), which made it hard to upload all our data (up to 392G) of this paper to Zenodo.

Therefore, we have checked other available papers on ESSD to find out if there are alternative solutions. And we found that some previous papers had upload their datasets to Science Data Bank (ScienceDB, https://www.scidb.cn/en), such as Ref [1]. Similar to Zenodo, the ScienceDB dedicates to facilitating data dissemination and reusing, and making research data citable, discoverable and persistently accessible. More importantly, data less than 1TB can be easily uploaded to the ScienceDB without restrictions. Therefore, we finally upload all of our relevant data of this paper to ScienceDB. Corresponding statements have also been changed in the manuscripts. We hope the new approach for data release is acceptable.

Until now, the dataset has been submitted to the ScienceDB, which is now undergoing review. The preset data DOI and Link are as follows, but they are now "unregistered". They will take effect when the dataset is finished with review status and published. While the deadline of the

revision is due, we cannot wait for the review process to complete, which may still need some time for the platform to check the dataset. At present, the dataset can be reviewed through the following private access link.

- Data DOI: 10.57760/sciencedb.07049 (unregistered)
- Data Link: https://doi.org/10.57760/sciencedb.07049 (unregistered)
- Data private access link: https://www.scidb.cn/en/s/yQRVje



Refs:

[1] Tian, T., Cheng, L., Wang, G., Abraham, J., Wei, W., Ren, S., Zhu, J., Song, J., and Leng, H.: Reconstructing ocean subsurface salinity at high resolution using a machine learning approach, Earth Syst. Sci. Data, 14, 5037–5060, https://doi.org/10.5194/essd-14-5037-2022, 2022. (Link: https://essd.copernicus.org/articles/14/5037/2022/)

b) To our knowledge, it seems that the Google Earth Engine does not have access to GE images. Besides, due to the large number of images used in our experiments (up to 2,179 images) and the difficulty in traceability of GE images, as you mentioned earlier, we are sorry that we cannot provide the exact date and source of each image. Therefore, in order to better supplement the information of GE images and facilitate the use of users and authors, we also provided the grid data of the image coverage in ".shp" format together with the dataset (the "GE_Imagery_DataFrame.zip"), which can provide the image composition of each city and assist in the traceability of GE images.

Moreover, we have also supplemented a statistical description of the GE images in Table 2 of the new version, which concludes the 1) spatial resolution, 2) image size, 3) total image number, and 4) image number of each city of the GE images.

Corresponding statements have been revised in the paper:

"Therefore, in order to obtain fine-grained UGS maps in the study area, a total number of 2,179 Google Earth images covering 31 major cities in China are downloaded, each with a data frame of 7'30" in longitude and 5'00" in latitude, and a spatial resolution of nearly 1.1 meters. In the download process, we give priority to the images of each data frame in 2020. However, if there is no clear and cloud-free image available for the data frame within the selected period, we can only download the image of the adjacent date for replacement." (Line 147-152).

"The statistical description of the Google Earth Imagery is summarized in Table 2. All of the Google Earth images can be accessed through the dataset link together with the UGS-1m product." (Line 153-154).

Table 2. Statistical description of the Google Earth Imagery.

Spatial Resolution	1.1 meters			
Image Size	7'30" in longitude and 5'00" in latitude			
Total Image Number	2,179			
Image Number of Each City Covering GUB Area	City	Number	City	Number
	Beijing	112	Lhasa	10
	Changchun	121	Nanchang	28
	Changsha	46	Nanjing	70
	Chengdu	79	Nanning	46
	Chongqing	166	Shanghai	81
	Fuzhou	60	Shenyang	101
	Guangzhou	65	Shijiazhuang	108
	Guiyang	34	Taiyuan	36
	Haikou	13	Tianjin	134
	Hangzhou	80	Urumqi	45
	Harbin	168	Wuhan	63
	Hefei	84	Xian	57
	Hohhot	46	Xining	22
	Jinan	97	Yinchuan	32
	Kunming	59	Zhengzhou	75
	Lanzhou	41		

c) According to your advice, we have added some snapshot examples of six cites to the paper, that is, the new Figure 10 and Figure 11. In addition, we also mapped all UGS results of the 31 cities and displayed them in the form of Gif in the project site (https://liumency.github.io/UGS-1m/), which aims to provide a faster overview of results in UGS-1m.

The corresponding modifications in the text are:

"An overview of the UGS-1m product is provided in Figure 9. In order to further show the detailed information of the UGS-1m, two groups of zoom-in snapshots are also provided in Figure 10 and Figure 11. It can be seen that the results of UGS-1m are well consistent with the green space on the image, no matter for the three developed municipalities in Figure 10 or the

three capital cities in development in Figure 11. While these comparisons can initially display the good visualization effect of UGS-1m, the accuracy evaluation is also conducted to test it from a quantitative perspective." (Line 277-281).

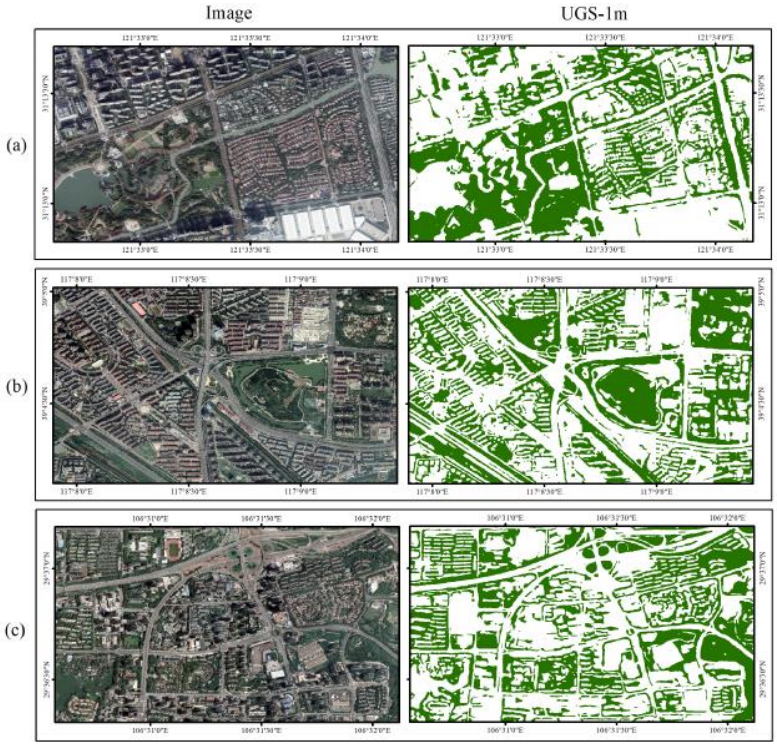


Figure 10. Detailed UGS results in UGS-1m from three municipalities (Images © Google Earth 2020). (a) Shanghai; (b) Tianjin; (c) Chongqing.

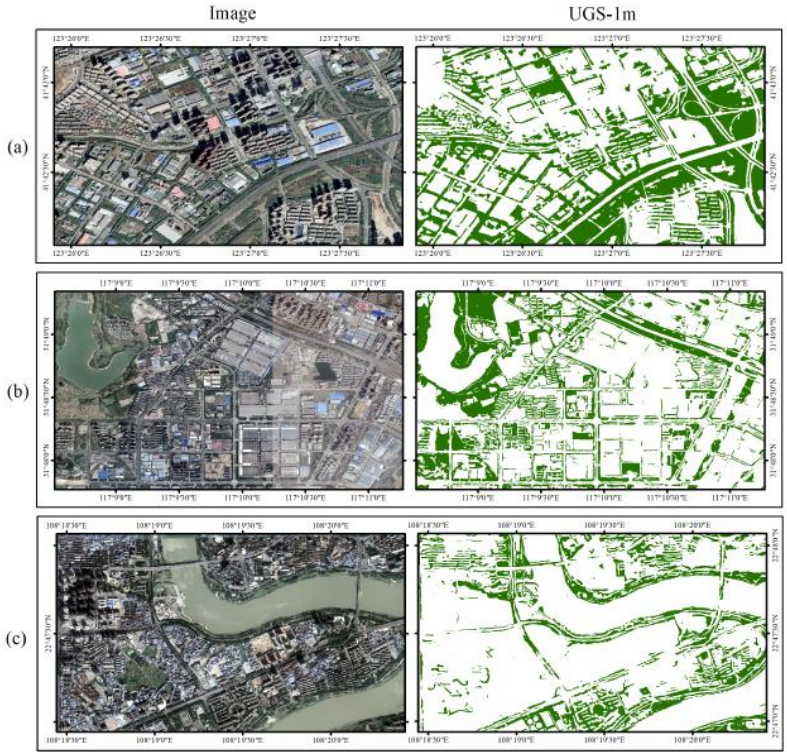


Figure 11. Detailed UGS results in UGS-1m from three capital cities (Images © Google Earth 2020). (a) Shenyang; (b) Hefei; (c) Nanning.

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Hope these responses are clear enough for your further reviewing and we are prepared to discuss on possible issues if necessary.