

List of all relevant changes

Line #	RC#	before the revision	after the revision
38	2, 3	States Hashimoto	States. Hashimoto
40	2	(Hashimoto et al., 20021)	removed
83	3	N/A	Currently, the Level-2 LST data is available only for North America (i.e., Canada, U.S., and Mexico).
99	1, 3	N/A	For instance, the TOA band 1 reflectance data has 0.01° spatial resolution at nadir, and thus its GeCGO data consists of 9x9 pixel value data
106	1	N/A	Add Figure 2
108	1, 3	Table 2. The product summary of the GeCGO. Each product has several bands with different spatial resolutions.	Table 2. The product summary of the GeCGO. Each product has several bands with different spatial resolutions and grid sizes.
114	1, 3	N/A	add grid size columnne
120	2	Phenocam	PhenoCam
157	3	LST downward	LST, downward
210	1	3.2.1 AmeriFlux: Which NDVI or NIRv can represents annual GPP is more representative of annual GPP?	3.2.1 AmeriFlux: Which NDVI or NIRv can represents annual GPP?
215	1	MODIS provides only one observation at a specific time of the day	each MODIS on TERRA or AQUA provides only one observation at a specific time of the day in the daytime
250	1	or Maximum Value Composite (MVC) for the composite of VIs (Zhao et al., 2022).	N/A
261	1	The aerosol has large diurnal variability in Aerosol Optical Depth (AOD).	The Aerosol Optical Depth (AOD) has large diurnal variability.
279	1	PhenoCam is the phenology ground observation network.	PhenoCam is the phenology ground observation network using time-lapse cameras.
280	2	Richardson et al., 2018a	Richardson et al., 2018b
285	2	phonological	phenological
287	2	Richardson et al., 2018b	Seyednasrollah et al., 2019
291	1	harvardfarmnorth	Harvard Farm North
292	1	harvardfarmsouth	Harvard Farm South
293	1	harvardfarmsouth	Harvard Farm South
299	2	N/A	The detailed observations and analysis at Harvard Forest Environment Measurement Site (EMS) revealed that the GCC peak can be explained only by combination of change in leaf traits and canopy structure (Keenan et al., 2014).
306	1	N/A	Revise Figure 8
315	1, 3	You can download the We will add more products on the data portal and announce the updates on the NEX website	We will add more products on the data portal and announce the updates on the NEX website
402	2	N/A	Keenan, T. F., Darby, B., Felts, E., Sonnentag, O., Friedl, M. A., Hufkens, K., O'Keefe, J., Klosterman, S., Munger, J. W., Toomey, M., and Richardson, A. D.: Tracking forest phenology and seasonal physiology using digital repeat photography: A critical assessment, Ecological Applications, 24, 1478–1489, https://doi.org/10.1890/13-0652.1 ;PAGE:STRING:ARTICLE/CHAPTER, 2014.

note: All the Figure number after Figure 2 was added 1 because we added the new Figure 2.

#RC1

Much hope has been placed on the hyper-temporal observations from the new generation geostationary satellites to complete the polar-orbiting satellites for environmental remote sensing. Yet a major barrier for the users is the standard, high-level science products from the GEO sensors that can be readily used in the specific applications, hence saving significant amount of time in going through the sophisticated satellite data preprocessing, which is nearly impossible for scientists working in ecology or environmental sciences. In this context, this study by Hashimoto and colleagues made a good effort in eliminating the GEO data barrier and provide a well-organized dataset containing processed high-level variables such as surface reflectance, LST, and solar radiation for more than one thousand of ecological and environmental network sites. In my opinion, this dataset and the R toolbox provided, which is functionally similar to the widely used TESViS MODIS data subset tool maintained by ORNL, is much needed and will be well welcomed by the ecologists and the carbon and water cycle science community. I have no major concerns with regard to workflow employed in creating the dataset. I do have some minor comments that the authors can consider in working on the revised version. The manuscript is well written and was a joy to read. I believe it can be accepted for publication in ESSD with a minor revision.

We appreciate your recommendation to publish the manuscript in ESSD. We revised the manuscript following your comments.

Specific comments:

L100: I suggest to add figures to illustrate the pixel numbering scheme of the image stamps with different sizes, something similar to TESViS did for various MODIS products.

We clarified it with adding more explanations; as

“For instance, the TOA band 1 reflectance data has 0.01° spatial resolution at nadir, and thus its GeCGO data consists of 9x9 pixel value data”

and revising the Table 2 by adding a GeCGO grid-size column.

[Line#: 99, 106, 112]

L210: just to be a bit more accurate, MODIS onboard Terra/Aqua can in together provide four instantaneous measurements per day;

We revised the sentence as

“each MODIS on TERRA or AQUA provides only one observation at a specific time of the day in the daytime”

[Line#: 215]

L230: when presenting correlation coefficients, suggest to provide p-value for knowing the significance of the correlation;

We agree that it is better to provide the exact value in most of the cases. However, the p-values in the figures were too small (a: $3.82\text{e-}18$, b: $5.31\text{e-}13$, c: too small to calculate (statistic library returned 0.0), d: $1.38\text{e-}7$) to show the values in the figure. Therefore, we decided to write “ $p < 0.001$ ”.

Figure 5: the data points on L1G plot is much less than that of L2G, perhaps due to cloud screening during the MAAIAC. Just to be fair with L1g, I wonder if the L2G is still superior than L1g when same subset of data (i.e., sites) is used.

If we use the same sites for L1G analysis, the correlation coefficients are almost same. That means the cloud screening is important for this analysis.

L245: I am not sure what is the relevance of “MVC” here, as it is not recommended for generating multi-day VI composite due to its tendency of chose off-nadir observations (see, van Leeuwen et al. 1999);

* van Leeuwen, W.J.D., Huete, A.R., Laing, T.W. (1999) MODIS Vegetation Index Compositing Approach: A Prototype with AVHRR Data. Remote Sensing of Environment, 69, 264-280.

We removed it.

[Line#: 250]

L260: “The aerosol has large diurnal variability in Aerosol Optical Depth (AOD).” suggest change to —> “The Aerosol Optical Depth (AOD) has large diurnal variability.”

We changed the sentence as you suggested.

[Line#: 261]

L280: Just to be specific, PhenoCam is one kind of phenology ground observation network focusing on using time-lapse cameras, with another one is the USA National Phenology Network.

We revised the sentence as:

"PhenoCam is the phenology ground observation network using time-lapse cameras"

[Line#: 279]

L290: "harvardfarmnorth", this sounds like a site-code not site name;

We changed the site ID to actual site names.

[Line# 291,292, 293]

Fig. 7: please add legend on the plot. Besides, I suggest to have y-axis title for each sub plot to facilitate the interpretation;

We added legend and y-axis title as you suggested.

[Line #: 306]

L310: 'You can download the We will add...', please revise.

We revised the sentence.

[Line#: 315]

The title for Sub-section 3.2.1 "Which NDVI or NIRv can represents annual GPP is more representative of annual GPP?" is grammarly incorrect and can be revised;

We revised the title.

[Line#: 210]

#RC2

General comment:

This is a well-written manuscript that presents an invaluable dataset and a practical tool. The authors clearly describe the development and application of the GeCGO and GeoNEXTools resources, which will greatly facilitate the use of GEO data. I found no major issues.

We greatly appreciate your useful comments. The references you kindly provided was so helpful to revise the manuscript.

Line comments:

L39: Typo - comma is missing after “the Western United States”.

We corrected it.

[Line#: 38]

L41: Typo – can be removed “(Hashimoto et al., 2021).”.

We removed it.

[Line #: 40]

L115: ‘PhenoCam’ is perfferd name.

We corrected it.

[Line#: 120]

L278: For a general introduction to the PhenoCam and its network, Richardson et al. (2018b) is more appropriate.

We corrected it.

[Line#: 280]

L283: Typo – phonological --> phenological

We corrected it.

[Line#: 285]

L285: For V2 data, the appropriate citation is: Seyednasrollah, B., Young, A.M., Hufkens, K., Milliman, T., Friedl, M.A., Froking, S. and Richardson, A.D., 2019. Tracking vegetation phenology across diverse biomes using Version 2.0 of the PhenoCam Dataset. Scientific data, 6(1), p.222.

We corrected it.

[Line#: 287]

L295-296: About the issue of early spring peak in GCC time series, would be better to refer to the second paragraph in the discussion section of the following paper, which provides a quite different perspective on this: Keenan, T.F., Darby, B., Felts, E., Sonnentag, O., Friedl, M.A., Hufkens, K., O'Keefe, J., Klosterman, S., Munger, J.W., Toomey, M. and Richardson, A.D., 2014. Tracking forest phenology and seasonal physiology using digital repeat photography: a critical assessment. Ecological applications, 24(6), pp.1478-1489.

We added discussion as

“The detailed observations and analysis at the Harvard Forest Environment Measurement Site (EMS) revealed that the GCC peak can be explained only by combination of change in leaf traits and canopy structure (Keenan et al., 2014).”

[Line# 299]

#RC3

This is a well-written paper that provides a detailed introduction to the GeoNEX dataset, GeCGO, and GeoNEXTools, along with a clear comparison and relationship to existing work. It offers comprehensive demonstrations of how to utilize the data through several practical examples. The documentation and codebase are well structured and accessible. The only concerns are related to occasional instability of the data download page and a few recommendations for improving the data structure. I recommend **minor revisions** before publication.

Thank you for your time and consideration to review our paper. We corrected our manuscript as your comments.

Specific comments:

1. There is a missing period at line 39 after "United States" and a missing comma at line 152 after "LST".

We corrected it.
[Line#: 38, 157]

2. Line 311 contains an unfinished sentence that needs revision.

We revised it.
[Line# 315]

3. The website (<https://data.nas.nasa.gov/gecgo/data.php>) appears unstable; it often takes a long time to load or fails to open entirely. Please double-check its accessibility.

The stability issue of NAS data portal was caused by hardware. The NAS team is working to replace the hardware and expects to solve the problem soon. We will also look for alternative public platforms to host the data so that the user community can have multiple access options.

4. Although the naming convention follows ORNL's Terrestrial Ecology Subsetting & Visualization Services (TESViS), I suggest including a site inventory file. Not all TESViS sites are available here, and such a file would help users filter and identify sites of interest more efficiently.

We created an inventory file:

https://github.com/nasa/GeoNEXTTools/blob/main/data/site_list.csv.

5. I did not find the Level 2 data mentioned in the manuscript. Please verify its availability or clarify.

The Level-2 data is available as Level-1b. However, LST data is available only for North America. We added the following sentence,
"Currently, the Level-2 LST data is available only for North America (i.e., Canada, U.S., and Mexico)."

[Line#: 83]

6. It is unclear which files correspond to the 17×17, 9×9, and 5×5 spatial subsets. Please clarify this in the documentation or metadata.

We clarified it by adding an example in section 2.2 and added a column in Table 2.

[Line#: 99, 108, 114]