Answer to reviewer comments

Manuscript: AnisoVeg: Anisotropy and Nadir-normalized MODIS MAIAC datasets for satellite vegetation studies in South America

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Reviewer comments are colored black, our answers are colored blue

Reviewer #2 – RC2

This study introduced the AnisoVeg product consists of monthly 1-km composites of ANI and NAD surface reflectance obtained from the MODIS over the entire South America. The paper needs a minor revision before it can be considered for publication.

1. The MODIS product MCD43 relies on multiple observations over a 16-day period, while in this study the period is extended to a month. A period of month may represent significant changes in surface especially during the vegetative stage. That would cause an inaccuracy anisotropy information of surface. Explain the possible implications of this change.

Addressed in revision: This is a good point. Land cover changes can act in two different ways, first at BRDF retrieval in MAIAC processing, and second in the compositing process. To clarify this in the text, we added two sentences:

First, in Methods section: "The MAIAC algorithm detects significant land cover changes (e.g. fire, deforestation) within the 8-day period and does not use those observations for the BRDF inversion (Lyapustin et al., 2018).".

Second, in "Time series availability and uncertainty" section, we added: "Although we use the median values to aggregate observations within months and mitigate potential land cover changes, stand-replacing changes may cause inaccurate anisotropy estimates for the given monthly estimates. Hence, we advise filtering data for land use and land cover changes before using them to obtain the most accurate anisotropy estimates."

2.To generate accurate surface anisotropy, the weight of different observations should be inconsistent in the retrieval of surface BRDF by RTLSR model. The quality and the time of the observation need to be considered together.

Addressed in revision: We expect the quality of the product is already guaranteed due to the rigorous processing of MAIAC data using time-series filtering, improved cloud and surface changes detection, and atmospheric correction to provide the best possible surface reflectance data. This could be better highlighted in the Methods section, thus we edited a sentence adding some more details about MAIAC:

"This product provides surface reflectance data corrected for atmospheric effects by the MAIAC algorithm, and controlled for cloud-free and clear-to-moderately turbid conditions with Aerosol Optical Depth (AOD) at 0.47 μm below 1.5 (Lyapustin et al., 2018). The MAIAC algorithm uses a time series approach for improved cloud filtering amongst other filters such as surface reflectance change in order to provide the most accurate surface reflectance estimates."

Regarding the time of observation, we don't understand 100% what the reviewer means, but we corrected the daily data and aggregated to monthly time scale to obtain the best possible wall-to-wall

coverage of estimates both in nadir-viewing as well as anisotropy. When we aggregate the daily data into monthly, we use the median metric to get a snapshot of the median behaviour of the estimates, that is, the more stable result within the pool of available observations. If significant changes in land cover may occur within the month, as pointed out in the previous comment, the data should still be accurate to represent most observations. If there are only a small set of observations, the user can choose not to use that pixel by filtering data out with the ‘number of observations’ layer.