

## ***Interactive comment on “Large-scale vegetation responses to terrestrial moisture storage changes” by Robert L. Andrew et al.***

### **Anonymous Referee #1**

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General comments: This is an interesting study, which extends a previous analysis by Yang et al. (2014) to examine how different-frequency components of the GRACE signal affect the temporal changes of surface greenness. It is packed with information, concepts, and unifying principles that are of great potential value in water and carbon cycle science. I am generally supportive of publication. However, I have one major concern that is needed to be addressed by the authors.

Major concern: It reads to me that the authors used a combination of different-frequency components of the GRACE data to correlate with monthly NDVI anomaly. I still do not understand what is the scientific and physical basis of comparing monthly NDVI with water storage components at a longer time scale, for example, D1 for 2 months and D4 for 16 months.

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Additional minor comments: 1. I would add a figure showing different components of the GRACE signal (i.e., A1-A4 and D1-D4). This will give readers a more intuitive understanding of these components. 2. Section 2.3 Please specify which year of the MODIS Land cover data was used? 3. Page 7 Line 5. Should be TWS\* data is better associated. Delete “the”. 4. I am wondering if the higher-frequency GRACE components (i.e., level-1 and level-2) are more related with variations of soil moisture within shallower soil zones, and lower-frequency ones are more related with moisture changes within deep zones or groundwater. If this were the case, it could somehow answer my major concern.

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