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Comment on bg-2021-206

Anonymous Referee #2

Referee comment on "Spatially varying relevance of hydrometeorological hazards for vegetation productivity extremes" by Josephin Kroll et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2021-206-RC2, 2021

This Paper **"SPATIALLY VARYING RELEVANCE OF HYDROMETEOROLOGICAL HAZARDS FOR VEGETATION PRODUCTIVITY EXTREMES"** presented very interesting research regarding the relationship between satellite-based Sun-induced chlorophyll fluorescence (SIF) as a proxy for vegetation productivity and Hydrometeorological extremities such as drought and cold spells.

Although this paper presents very interesting results, the overall study lacks detailed literature review. The authors claim that according to their knowledge this study is the first of its kind to analyze this relationship at a global scale. LINE 60. Such statements could have been avoided, there might be several studies discussing such topics, for example (Jonard et al., 2020) (Sun et al., 2015).

The authors also did not include any statistical analysis to validate their findings and explain how accurate their acquired results are? Statistical analysis of the acquired results and hydrometeorological data could have been done to evaluate/validate their claim.

Several papers are discussing spatial scale dependencies of SIF, its accuracy and biases. Authors could have extended the discussion to illustrate how their GOME SIF data justify its relationship with meteorological hazards.

It is also recommended to include GOSAT data to make this research more accurate (Guanter et al., 2012). This paper (Frankenberg et al., 2011) which authors have also cited discussed GOSAT findings so it is suggested to include GOSAT analysis as well. Also, there are a couple of reconstructed long term time series of SIF, which are available.

Authors could have included EVI for their analysis, as the NDVI might get saturated over the dense canopies., NDVI saturates under high biomass and is unable to replicate the actual biomass content of the vegetation. EVI is considered better among other vegetation indices for the identification of vegetating content (Bandopadhyay et al., 2021). Another very good paper discussing SIF and EVI relationship in Africa is (Getachew Mengistu et al., 2021).

Although this article deals with the hydrometeorological hazards and SIF there is no data displayed or discussion regarding the flux towers or evapotranspiration. Authors should include some literature related to its relationship with both SIF and meteorological phenomenon (Zuromski et al., 2018).

Although this paper deals with the time 2007 to 2015. The OCO-2, launched on July 2, 2014, has SIF Product with fine detail and a better retrieval algorithm. Authors should incorporate OCO-2 data to make their results more useful (Frankenberg et al., 2014) and advancement of knowledge and methods.

The authors also missed an important aspect of vegetation response to climate extreme which might be better represented with a lag time.

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