This is a well-written paper describing the methodology used to produced CONUS-wide, 30 m resolution maps of annual irrigation status. This paper effectively presents results from analysis showing the time series of irrigated area state-by-state, irrigated change at the county and state level, and maps change spatially over the CONUS. Figures are clear and easy to read.

*** Response: Thank you for your comments and your time invested on this paper. We have responded to each comment (except for some positive ones) and revised the manuscript accordingly.*

Abstract is appropriately specific and clearly states the need for this product, general methodological approach, and utility of the produced data.

-- The link to data seems to be the data published with the RSE manuscript, and appears not to contain maps showing the new LANID_V2 data mapping irrigated hay and pasture. Should this be updated, or another repository offered for the examination of the new data described in this manuscript?

*** Response: Thanks for your comment on data link, which might be misleading because we set our RSE paper as the preview option. We did this because this RSE paper describes the detailed methods used to create Version 1.0 LANID (i.e., irrigated pasture and hay were not included). The data link provided in the Abstract and Data Availability Sections of this paper is definitely for the Version 2.0 LANID, which covers all maps (i.e., annual irrigation extent maps, irrigation frequency, and change) and our collected ground reference data. We do have the Version 1.0 LANID, but its link was only provided in the RSE paper (Google Earth Engine Asset Id: "users/xyhuwmir4/LANID/LANID_v1_rse").*

Upon publication of the current ESSD dataset and paper, we will update the Zenodo repository accordingly to ensure clarity and to include the ESSD manuscript to reduce confusion.

Introduction is well-written and provides a good summary of why irrigation is important, and the impacts and benefits of irrigation. Literature review is appropriately specific and comprehensive. Table 1 is comprehensive and appropriate.

Methods section is clear and concise, and describes a sound approach given the challenge of detecting irrigation from Landsat images. The doption of two different approaches for detection in the humid East and semi-arid West US, while adding complexity, is justified given the low contrast between irrigated and non-irrigated lands in the East.

Map evaluation and comparison designs seems to choose appropriate, previously produced maps for comparison to LANID.

Figure 4 is epecially attractive. Should Figure 4 take into account uncertainty estimates?

*** Response: Thanks for this consideration. Figure 4 shows LANID-derived temporal trends of irrigation area per state. As we did not have sufficient ground reference data to evaluate map accuracies per state (instead by regions in this manuscript – West, NKOT, and East), it is not currently possible for us to provide uncertainty estimates by state. We will provide such* *information in our future versions of LANID when we have more ground reference data, especially for the Mississippi Alluvial Plain region.*

Given clear pattens shown in Figure 4, we did not conduct trend analysis (e.g., linear regression) and associated trend uncertainties. For readers who want to investigate more, please refer to the time-series state-level irrigation area provided in Table A1.

Figures 5, 6, and 7 are informative and well done.

Irrigated pasture and hay: where is this data in the repo referred to in the abstract?

*** Response: The annual maps under the link include both irrigated croplands and pasture/hay, so the thematic maps of irrigated pasture and hay can be easily created by overlaying our LANID maps and "pasture/hay" classes from publicly available USGS National Land Cover Database and USDA Cropland Data Layers, like the maps showed in Figure 8. To be more convenient for users, we have updated the Zenodo repository to include this layer as "irrFreqPasture_West.tif". The DOI of the new version is https://doi.org/10.5281/zenodo.5548555, which is also updated in the manuscript (the old one still works).*

Maximum extent, frequency, and formerly irrigated and intermittent irrigated land: interesting findings. Line 259: what is meant by 'energy sorghum'? Table 3 is interesting and informative.

*** Response: Thanks for pointing out this need for clarification! There is no formal definition for energy sorghum, but the term generally refers to those varieties that are high-yielding, photoperiod sensitive, and potentially suitable as bioenergy feedstocks, as explained by Cui et al. 2018. We have added citations to this and two additional articles that help clarify and further describe this concept.*

Cui, X., Kavvada, O., Huntington, T., & Scown, C. D. (2018). Strategies for near-term scale-up of cellulosic biofuel production using sorghum and crop residues in the US. Environmental Research Letters, 13(12), 124002.

Mullet, J., Morishige, D., McCormick, R., Truong, S., Hilley, J., McKinley, B., ... & Rooney, W. (2014). Energy Sorghum—a genetic model for the design of C4 grass bioenergy crops. Journal of experimental botany, 65(13), 3479-3489.

Enciso, J., Jifon, J., Ribera, L., Zapata, S. D., & Ganjegunte, G. K. (2015). Yield, water use efficiency and economic analysis of energy sorghum in South Texas. Biomass and Bioenergy, 81, 339-344.

Figures 11 - 13 clearly display the improvement in mapping resolution and accuracy over previous maps.

The comparison of irrigated area maps is clear and offers cogent explanations of why differences in the maps exist, in terms of differences in irrigated lands' definition and classification methodology.

The discussion of uncertainty, limitations, improvements and potential applications is appropriate.