**Hydrology and
Earth System
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Discussions

Interactive comment on "Hydrologic landscape classification assesses streamflow vulnerability to climate change in Oregon, USA" *by* S. G. Leibowitz et al.

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We thank Hongkai Gao for providing short comments on our discussion paper. Below are responses to his three issues:

1) The model may be over-parameterized: The hydrologic landscape (HL) approach is not a model in the sense that a set of equations are defined for some variable and then parameterized using some optimization approach. Rather, the five quantities we use in the HL maps are metrics that are conceptually defined and then evaluated using existing data sets. For example, the six climate classes (very wet, wet, moist, dry,

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semi-arid, and arid) are based on Feddama Moisture Index thresholds using Eq. 1 and calculated using precipitation and potential evapotranspiration (PET) data. The precipitation data are based on 400 m PRISM coverages, as are the temperature data used to calculate PET. Similarly, the aquifer permeability metric (high, moderate, and low) is based on binning of a statewide aquifer permeability map as described in Wigington et al. (2013). Thus the different classes are not the result of a single, parameterized model.

2) Land cover information not included: We agree that land cover is not included, and have explicitly stated on p. 2906, lines 4-6 that the HLs "do not deal with the influences of vegetation, land use, or other human activities – all of which could influence vulnerability to climate change." We also acknowledge that these factors could exacerbate or mitigate against climate impacts (p. 2906, line 8). The HL map was designed to represent the major geoclimatic factors influencing streamflow. Land use effects would be especially important to consider in heavily urbanized areas. However, these are fairly limited in Oregon.

3) Missing literature: We thank Hongkai Gao for making us aware of the FLEX-Topo papers. We will include reference to this model in the final revision. The Winter (2001) paper is the conceptual basis for our approach, and is cited as such in Wigington et al. (2013). We will include a reference to Winter(2001) in the final revision of the current paper.

References:

Wigington Jr., P. J., Leibowitz, S. G., Comeleo, R. L., and Ebersole, J. L.: Oregon hydrologic landscapes: a classification framework, J. Am. Water Resour. As., 49, 163–182, doi:10.1111/jawr.12009, 2013.

Winter, T.C., 2001. The Concept of Hydrologic Landscapes. Journal of the American Water Resources Association 37:335-349.

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