

## ***Interactive comment on “Influence of climate variability on water partitioning and effective energy and mass transfer (EEMT) in a semi-arid critical zone” by X. Zapata-Rios et al.***

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Interactive comment on “Influence of climate variability on water partitioning and effective energy and mass transfer (EEMT) in a semi-arid critical zone” by X. Zapata-Rios et al.

Anonymous Referee #2 Received and published: 16 October 2015 This manuscript presents the detailed analysis of the trends in climate variables which is robust and interesting, and subsequently the trend in EEMT which is also interesting but could be deepened with more process understanding.

C5444

EEMT has two components as explained in line 53 in the paper, Eppt and Ebio. Eppt is considered as the energy from water that percolates into the critical zone. According to the EEMTmodel, Eppt has been estimated as the difference between Precipitation and Potential Evapotranspiration, known in hydrology as effective precipitation and traditionally used to quantify monthly water balances (Arkley, 1963). On the other hand, for the EEMTemp model, baseflow (U) is used as an indicator of water that has effectively percolated into the critical zone. (Lines 209-211) Arkley, R.J.: Calculation of carbonate and water movement in soil from climate data, Soil Sci., 96, 239-248, 1963

There is a need to clearly demonstrate what is the innovative scientific understanding on EEMT gained from this site and can be generalized to other regions. For example, the abstract and summary are somehow dominated by the increasing/decreasing trends of climate variables, which seems a bit trivial. More unique insights on EEMT itself and its linkages to the critical zone structure and processes would be very helpful.

The abstract and summary have been modified. The discussion about trends in climate were erased from the abstract

EEMT has been quantified for the entire US (Rasmussen and Tabor, 2007) and entire globe (Rasmussen et al., 2011). However the study of the relationships between EEMT and CZ structure and function such as pedogenic indices and WTT and mineral weathering dissolution has been only investigated in high elevation semi-arid to sub-humid regions in the Southwestern US. The link between EEMT and CZ processes in humid and tropical regions has not been explored so far. However, we hypothesize that EEMT can be used in other regions as well. (Lines 458-464)

Figure 1a is not of good quality so should be improved. C4305 We have increase the quality of figure 1a

Please also note the supplement to this comment:

<http://www.hydrol-earth-syst-sci-discuss.net/12/C5444/2015/hessd-12-C5444-2015->

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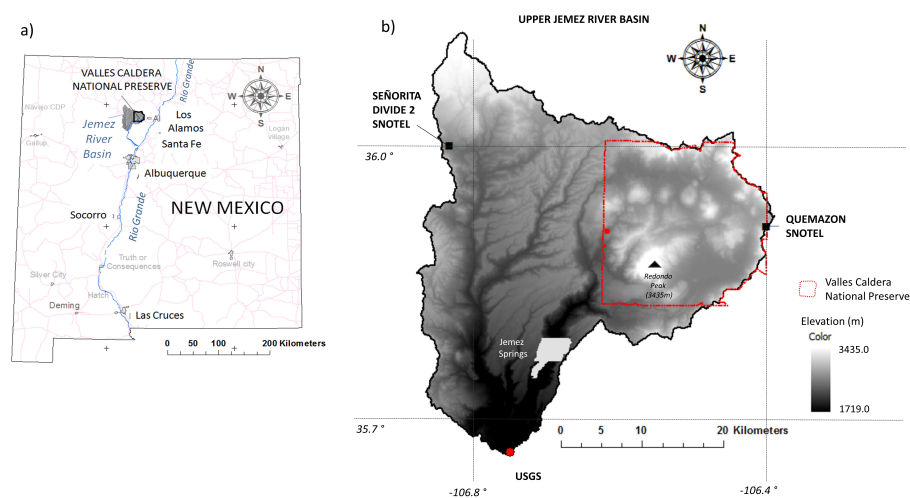
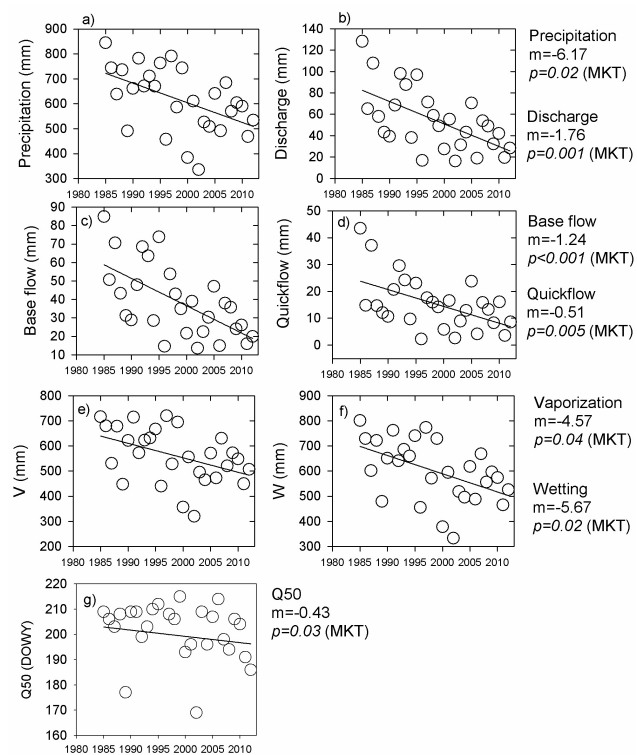


Fig. 1.

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**Fig. 2.**

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