

Review of "Analysis of surface soil moisture... "

by Korres et al.

November 21, 2009

Recommendation

Some minor revisions are required

Details

The authors apply empirical orthogonal function (EOF) method, using both S- and T-modes, to soil moisture in two test sites; a grassland and arable land fields. EOFs and PCs of the soil moisture are then correlated to various soil parameters. The discussion is then mainly focussed on the two leading modes of variability.

The paper is a good contribution to the hydrology literature regarding EOFs and can be useful for the scientific community. I have, however, a number of mainly technical points, as detailed below, for the authors to consider before final acceptance.

(1) p 5573, l 16-18: "but only the ...meaningful" -- > "Only $\min(n,p)$ eigenvalues are greater than zero, but only a subset (usually much smaller set) of these positive eigenvalues are meaningful/useful.

(2) p 5575, l 13-15: "Another calculation ...here." It is not clear what is meant by randomized. Better to delete this sentence.

(3) p 5576, l13-17:"The EOFs ... patterns". This is not entirely correct. What the

authors could do is to correlate, not the EOFs but the associated EC with, eg the temporal development of biomass.

(4) p 5579, end of paragraph 1: Clearly EC2 shows a trend of surface soil moisture. I think the authors should find out/discuss the origin of this trend.

Also, the S- and T-EOFs should in principle have the same spectrum (with may be different expressions of confidence intervals). This is not so in Figs. 6,7. Explanation is required here.

(5) p 5584, 2nd paragraph is a little clumpy with many details. Consider reduce this substantially.

Other minor points

(1) p 5572, l18: "for" -- > "from"

(2) p 5573, l3: "eigenvalues" -- > "eigenvalue"

17: "explains of the" -- > "explains the"

19: "due to" -- > "of"

(3) p 5575, l3: "to be significant" -- > "to be significantly non degenerate".

second paragraph: Explain briefly what is the I statistic and provide a reference.

(4) p 5578, l8: Practically speaking one can compute EOFs of "almost" everything, including data with missing values.

(5) p 5578, l22: Have the EOFs been normalised to unit length?

(6) p 5581, l25: "non-significant" -- > "non degenerate"

(7) pp 5583, l 3-4: "meaning that ...on drier days" -- > "meaning that EOF1 reflects more the structure of soil moisture during wet days than during dry days".