

Comments from Referees: Anonymous Referee #1

General Comments: This manuscript repeatedly evaluates soil water storage (SWS) across an transect consisting of 128 individual measurement points by multifractal and joint multifractal analysis. In each point SWS was determined at seven depth increments, and this several times per year during a five years period. Therefore the relationship between several multifractal parameters obtained from SWS transects as a function of depth and time were investigated. This study follows previous studies carried out with in the same site, with the same experimental design and using similar methods of analysis. The rationale and the objectives exposed in the Introduction are worthwhile and in general the work appears well justified and appealing for the international reader of this journal. The main findings, such as the usefulness of either multifractal or monofractal parameters to assess patters of heterogeneity and evenness of SWS transects with increasing soil depth and for different seasons of the year. In general, the paper is well written and organized, and represents an original contribution, even if it follows previous similar work. The results are based in robust data analysis. This study also is compatible with the aims Nonlinear Processes in Geophysics and may fit well into the scope of the current special section titled "Multifractal analysis in soil systems". In my opinion, it should be acceptable for publication following minor to moderate revisions. In my opinion the manuscript could be ameliorated by plotting selected multifractal parameters (for example, the amplitude of the singularity spectrum, $\bar{\alpha}_{\max}$ - $\bar{\alpha}_{\min}$, or the information dimension D1) as a function of depth and time, or both, depth and time. Next I'm indicating two places where plots are recommended, but this is not exhaustive.

Response: Thank you very much for your detailed comments. It really helped modify the manuscript. We have addressed the comments individually and documented the responses below.

Specific Comments 1. Page 4, Lines 95-100. I recommend to briefly describe the methods used to measure soil water content and to evaluate soil water storage (SWS), even if they have been already detailed described before.

Response: We have included a brief description of the data collection in the materials an methods (L102-111).

2.- Page 9, Lines 226-243. I suggest to draw a graphic with these statistical information; then check if including this graph increases readability.

Response: We have included a new figure (Fig. 11) showing the joint multifractal spectra between two spatial series of soil water storage measure on 22 October 2008.

3.- Page 12 and 13, Lines 342-352. Again, I suggest to draw a graphic plotting ($\bar{\alpha}_{\max}$ - $\bar{\alpha}_{\min}$) as a function of depth for several mesarument periods.

Response: Thanks for the suggestion. We have included two figures; Fig. 5 showing the α_{\max} - α_{\min} values for all the measurements at all depths and Fig. 8 showing the D1 values for all the measurements at all depths.

4.- Page 23, Table 2. I suggest to include figures showing some multifractal spectra either in the main manuscript or as supplementary content.

Response: We have included a new figure (Fig. 11) as an example showing the joint multifractal spectra between two spatial series of soil water storage measure on 22 October 2008.

5.- Page 25, Figures 2 and 3. I recommend to show only two or four selected plots of mass exponent functions to increase visibility. (because of thee small size of the Figures, differences are hardly to vew).

Response: We have modified the figures. Now we have only included only 3 measurement dates for both the figures. The figure numbers have been changed. The new numbers are Fig. 3 and Fig. 4.

6.- Page 26, Figures 4 and 5. I suggest to take into account the shape of the singularity spectra and not only the amplitude in the Results and in the Discussion sections; also these shapes should provide valuable information, I guess.

Response: Thank you very much for the comments. We discussed about the shape of the spectra specifically the non-uniformity and the tails of the spectra and their meaning in terms of the distribution of scaling indices (L360-371).

7.- Page 28, Figure 8. I suggest to move Figure 8 (scheme of the vegetation growth patterns) either to the Material and Method section, or to the section 3.1 (Spatial pattern of soil water storage at different depths). Indeed this Figure is related to the Discussion section, but it is also pertinent to previous section.

Response: We have moved the figure into materials and methods section and first introduced in L 95. Now the new figure is marked as Fig. 1.