

## **Interactive comment on “Universal multifractal Martian topography” by F. Landais et al.**

### **Anonymous Referee #1**

This manuscript is well written and provides new results. I have several rather minor comments:

- P. 1012, line 24: the parameter  $\alpha$  is estimated using a second derivative. Furthermore it is a local estimate, around the moment  $q=1$ . The authors could estimate it by a best fit among all values admissible for  $\alpha$ , chosen over a given range (moments  $q$  in  $(0,2)$ ).

**answer :** We thank the referee for his positive evaluation. The short answer is yes, there are other ways of estimating  $\alpha$ . We do however need to be cautious since due to multifractal “phase transitions”, the universal form breaks down for  $q$  larger than a critical value beyond which,  $K(q)$  becomes linear. This is why we only considered  $0 < q < 2$ .

- It seems that the analysis of this 2D topography field is done along 1D cuts. Why? Could the authors perform analyses spatially in 2D? This is possible using structure functions. Is it possible using Haar wavelets?

**answer :** The study of anisotropy is certainly a good idea. Haar wavelets may be generalised in 2D but given the fact that MOLA data are not a regular grid of points, a global 2D analysis would require a considerable amount of time. Furthermore, the study of anisotropy is different from the multifractal property that we would like to focus on.

- P. 1017 line 18. The value  $H=0.75$  for small scales could be related to the fracture value which was found to be close to 0.80 (e.g. Schmittbuhl et al, JGR, 1995). Some discussions on this point may be added in the manuscript.

**answers :** We added this discussion in the manuscript

- Typo P. 1017, line 17: "with": there are here some missing words

**answers :** We simply removed the word “with” placed here by mistake

- Table 1: negative values for  $\alpha$  and  $C1$ : this is not possible and should be removed. The text indicates that the experimental curve is linear, hence these values are not relevant and only the  $H$  value should be given.

**answers :** we have replaced the irrelevant value of  $\alpha$  by NaN

- Figs. 2, 5, 7: C302 please put the units for horizontal axis, and instead of  $\log_{10}$  linear scale, choose real values and a logarithmic scale (which is much more legible).

**answer :** ok