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www.nonlin-processes-geophys-discuss.net/1/C407/2014/

Nonlinear Processes in Geophysics
Discussions
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Interactive comment on "Site effect classification based on microtremor data analysis using concentration–area fractal model" *by* A. Adib et al.

A. Adib et al.

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Dear Natascha Töpfer

The reply to the comments related to the paper(npg- 2014-7)called "Site effect classification based on microtremor data analysis using Concentration-area fractal model", attached to this E-mail.

Best regards Ahmad Adib

1) Question: The novelty of this article is to propose to apply the well known Concentration Area multifractal classification model (Cheng et al., 1994), that was designed for extreme distribution detection on geochemical dataset, on the dataset on microtremor. The Concentration Area classification model (C-A) is not fractal but multifractal (see

Cheng et al., 1994). The text is often using fractal (supposed to be monofractal) and multifractal. Please clarify the text. My main concern is about the use of C-A classification for more than two classes. The basic idea of C-A is to simplify asymptotically, the multifractal statistics in two scale domains: close to alpha_min and close to alpha_max. In both cases, the area statistics follow a scaling power law with different slope. This was done originally in order to separate usual variability and extreme fluctuation. The C-A model in not adapted for more than two classes. Cheng et al., 1994 discuss another type of model: the bifractal, which consist to claim that the geophysical data follow two monofractal scaling laws separated by a threshold scale. Both asymptotic multifractal and bifractal can create apparent break in the power law slopes. 1) Answer: Concentration-Area fractal model could be used for both monofractal and multimodal nature for different data. This model has been used for the both and there are many references about it such as data characteristics have been determined even by multifractal method such as Cheng and Agterberg (1996), Sim et al (1999), Goncalves et al (2001) and Afzal et al. (2010). Cheng et al (1994) show a multifractal nature for Cu and Au in the Mitchel-Sulphurate area not mono-fractal. (Afzal, P., Khakzad, A., Moarefvand, P., Rashidnejad Omran, N., Esfan-diari, B., Fadakar Alghalandis, Y., 2010. Geochemical anomaly separation by multifractal modeling in Kahang (Gor Gor) porphyry system, Central Iran. Journal of Geochemical Exploration 104, 34–46)

2) Question: Another comment is about the lack of justification of the classification on the frequency. Why the authors are choosing frequency (table 6) instead of amplification or k-g?Please justify this choice. 2) Answer: As it is mentioned in the paper we perform the C-A method to improve the Nogoshi's classification results in the Meybod city. This Classification and many other standard classification are based on frequency or period. Additionally, it is said that the actual site amplification cannot be estimated from the amplitudes of HVSR peaks (Bard, 1998; Gosar et al., 2008; Sesame, 2004). Consequently, classification based on frequency is more reliable than amplification or k-g (as related to amplification).

3) Question: Figure 2: “cultivated land” is not a geological unit but a vague pedological concept. 3) Answer: Please replace the new figure 2 instead of the earlier.

4) Question: Figure 3: Both horizontal and vertical scales are missing 4) Answer: Horizontal and Vertical scales are the same and the figure has no exaggeration. The new figure has been attached.

5) Question: Figure 8 and figure 9: The comparison is hard between the two classification method. Please plot all the microtremor points for both figures. 5) Answer: By adding microtremor points and names to the figure 8, the figure becomes very crowded and distinguishing the results may not be possible easily.

6) Question: Please represent a classification map for figure 9, instead of an interpolated map. 6) Answer: The new figure 9 has been prepared and attached to the E-mail. Please replace it with the earlier.

Please also note the supplement to this comment:
http://www.nonlin-processes-geophys-discuss.net/1/C407/2014/npgd-1-C407-2014-supplement.zip

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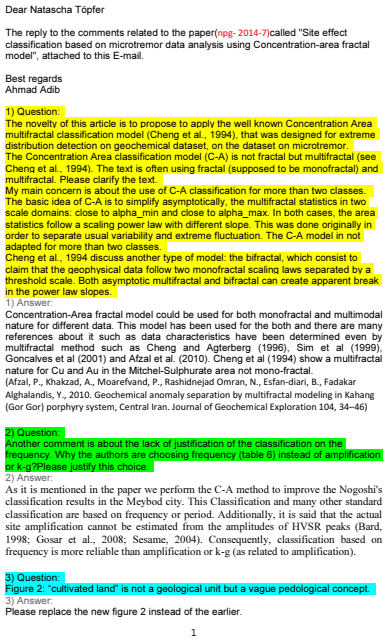
Interactive comment on Nonlin. Processes Geophys. Discuss., 1, 1133, 2014.



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3) Answer:
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1

Fig. 1.

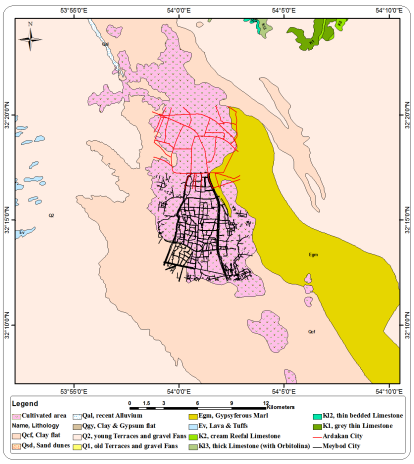

Fig. 2. Geological map around Meybod City. According to the map, the major units around the city are Quaternary deposits including cultivated land, Clay flat and young terraces and fans. The only other unit that is close to the city is Eocene gypsiferous Marls (Egm).

Fig. 2.

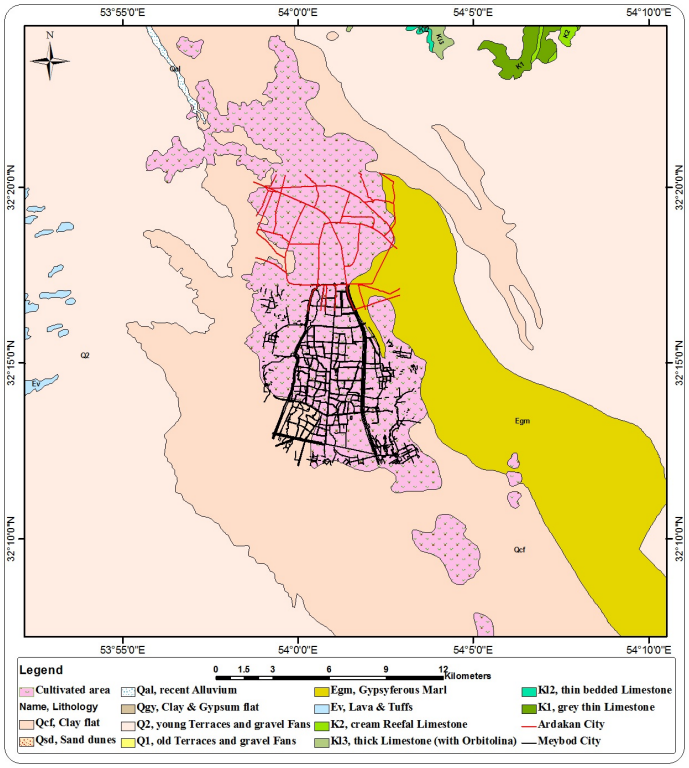

Fig. 3.

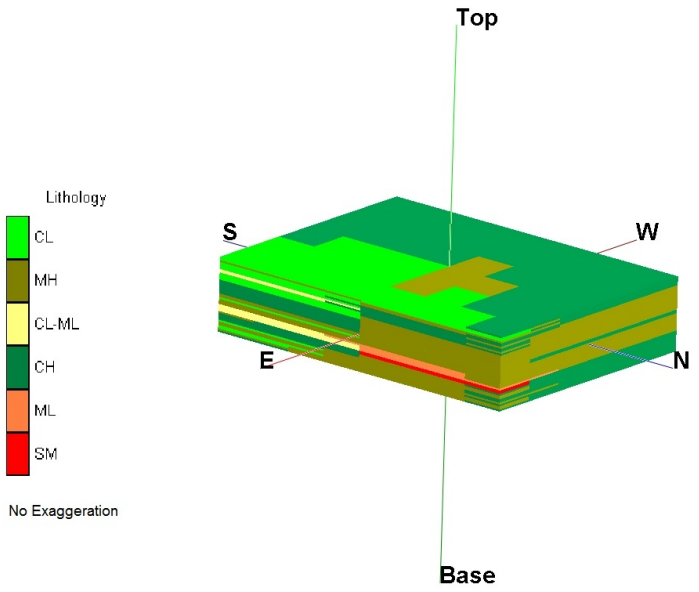
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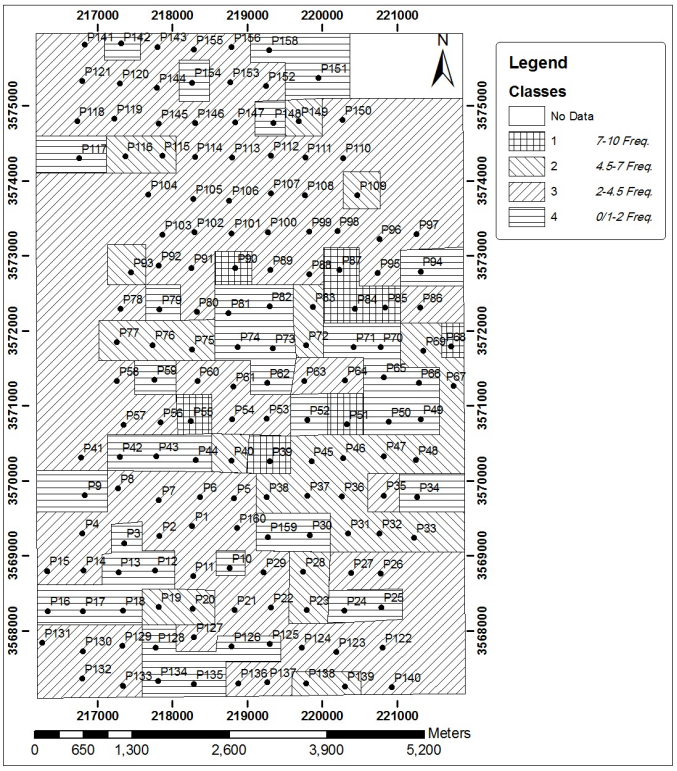
Fig. 4.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2 4.5-7 Freq.
3 2-4.5 Freq.
4 0/1-2 Freq.
Meters
0 650 1,300 2,600 3,900 5,200

Fig. 5.