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Interactive comment on "Correlations between climate network and relief data" *by* T. K. D. Peron et al.

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We also thank the comments of the second referee that helped to improve our manuscript. We hope that our manuscript paves the way for further research on extensions of climate network analysis. We also thank the referee for pointing out that a brief description of the community finding method would be appropriate. Therefore, in the last paragraph of Section 2.2 we have included the following text:

"Since the modularity Q quantifies how good a given partition is, many community detection methods are based on the optimization of this measurement. Different strategies for the modularity optimization have been adopted in the literature such as simulated annealing (Reichardt and Bornholdt, 2006; Guimera et al., 2004), greedy algorithms (Newman, 2004; Clauset et al., 2004) and extremal optimization (Duch and

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Arenas, 2005). Although these algorithms provide accurate results, most of them have a great computational cost. For this reason, we adopt the method proposed in (Newman, 2006) to obtain the community structure of climate networks. This method consists in mapping the modularity optimization in terms of the spectrum of the so-called *modularity matrix* $\mathbf{B}$ defined as

$$\mathbf{B} = \mathbf{A} - \frac{\mathbf{k}\mathbf{k}^{\mathbf{T}}}{2m}, \tag{1}$$

where $\mathbf{A}$ is the adjacency matrix, m is as defined before in eq. 5 and $\mathbf{k} = [k_1, ..., k_N]^T$ the vector whose element k_i is the degree of the i-th node. The spectral optimization of the modularity Q has complexity of order $O(N^2 \log N)$, which turns out to be faster than, for instance, simulated annealing and extremal optimization approaches, besides providing more accurate results for large networks (Newman, 2006; Fortunato, 2010)."

Finally, we have corrected all the typos pointed by the referee.

Interactive comment on Nonlin. Processes Geophys. Discuss., 1, 823, 2014.