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AUTHORS' COMMENT TO
THE TOPICALITY OF GEONOMY paper by

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Dear Editor,

We received your reviewer's opinion regarding our article "The Topicality of Geonomy", on the basis of which we formulate our answer as follows:

Today, in practically all natural sciences (and even beyond!), there is – quite rightly so – a system of environmental relations, crosstalk, and demand, but these were (are) not built into a scientifically formulated environmental system approach. It is mandatory to ensure the publicity of environmental data in all EU Member States – however, the concept of ENVIRONMENT is undefined, and the nature of environmental data is the basis for legal disputes. The significance of this is crystallized in the application of IT technology: without an exact definition, digital data management is unsolvable; we cannot ensure the expectations formulated in the INSPIRE directive with a variable interpretation. Exact data interpretation is the basis for the management and organization of environmental data and for group formation, which is indispensable in network research – environmental modeling in our practical use.

As we have pointed out, in practically all natural sciences there is a scientific crosstalk, demand oriented towards environmental relations, but these were (are) not built into a scientifically formulated environmental system approach. Although this leads to great new discoveries in the relevant natural and social sciences, if the results of these cognitions and recognitions were (are) not integrated into the system approach to the unified environment, they remain unknown in environmental protection, while they exist on the periphery within their own field of science. But the need for integrative knowledge a unified scientific approach, a systemic basis is absent – which was already formulated by chairholder Pál Teleki in his Academic Inaugaration speech "The History of Geographical Thought" in 1917. The sciences have been segregated since then – in the ingenious wording of Konrad Lorenz, "we know more and more about less and less – until eventually we will know everything about nothing". In addition to its historical value, Szádeczky's GEONOMY can provide this as the basis of environmental science. That is why it is important to build on this. There is no literature on this outside of Hungary.

As for the significance of the scientific history of geonomy, it is important to mention that Elemér Szádeczky-Kardoss's scientific concept – which has since been forgotten – preceded the recognition and formulation of a unified system by Lovelock's well-known GAIA theory, and that the (Hungarian Academy of Sciences) (MTA) set up a special committee for its actualization in 2003. In addition, Professor Szádeczky built his scientific basis in Miskolc, another reason why it would be important to prove its relevance in your publication.

The reviewer's opinion also expresses the criticism that we did not rely on the extremely extensive international literature on GIS technology, nor did we refer to it in our paper.

Regarding this, similarly to the above, we need to point out that we are aware of and strive to gain knowledge of the results of this technology, and consequently we see that they are primarily aimed at solving and illuminating problems of application techniques. They ignore all the foundations of professional philosophy without which progress in the interpretation and modeling of the dynamic environmental SYSTEM cannot be made. (What is the environment? What are the environmental data and how are they related to each other?) Therefore, it was of great importance that we were able to publish the methodology of data collection and data sorting in Geodesy and Cartography, proving its functionality with practical, disaster management results. We also think it is important to mention here that this specific disaster management application for the Bódva river basin was also the result of our joint work with the University of Miskolc.

This method and system is suitable for fully satisfying the different data management needs and expectations of different disciplines with the possibility and need to study the processes and relationships taking place in the same space – the importance of which is well proved by the work of Hungarian researchers, notably of Tamás Rapcsák.

Please allow us to add a few words about a major figure in this area, Tamás Rapcsák (1947–2008). References given here can be found in the publication list attached to the obituary of Tamás Rapcsák that appeared in *Alkalmazott Matematikai Lapok* [Volume 26 (2009), pp. 129–142], available at aml.math.bme.hu/wp-content /uploads/2014/03/26-Rapcsak.pdf. In addition to working on decision support and expert systems and contributing to theoretical and methodological research work on spatial decision problems, Tamás Rapcsák was also happy to take part in working on applications. He was also involved in engineering sizing [27], production planning [32, 34] and transport optimization [58, 59, 65] projects. However, his most successful field of application is considered to be applications related to decision support systems.

Research in the field of decision support and expert systems began at the SZTAKI (Institute for Computer Science and Control) Operations Research Department of the Hungarian Academy of Sciences in the second half of the 1980s [45]. This research work continued on the WINGDSS system later developed by the Department of Operations Research and Decision Systems, which he led [46, 48, 55, 56, 57]. The software and the methodology behind it can be applied in decision

situations where a group of decision makers has to evaluate and rank several alternatives according to several aspects. Rapcsák led several application projects in which the developed methodology and software were also used. The range of applications is wide, from supporting decision-making in government and enterprise tendering [47, 51, 70, 82, 84, 103] to modeling and solving complex multi-faceted environmental and spatial problems [64, 74, 75, 76, 78, 83, 85, 90, 98, 101, 115].

In connection with multi-faceted environmental and spatial decision-making tasks, the name of Zoltán Verrasztó (Central Danube Valley Environmental Inspectorate) must be mentioned, who provided the professional background in many joint projects. He and Tamás Rapcsák recognized that environmental decision-making tasks are essentially multi-faceted decision-making tasks, as environmental aspects such as water, air, noise, vibration, etc. should be taken into account, among other social, economic and financial aspects. Multi-faceted environmental applications have also opened up new directions for development. GIS systems have been shown to be an effective tool for collecting information for the decision task, displaying it on a map, and examining time-dependent dynamic relationships. Developments and applications related to multi-faceted decision support have also raised important theoretical and methodological issues.

Together with Tamás Mészáros, Rapcsák developed an effective sensitivity test method [66, 102]. He co-authored an important article with Saul Gass (University of Maryland) on the synthesis of group decisions [71] and the application of singular value resolution in the AHP methodology [96]. Together with his student Sándor Bozóki, they investigated the inconsistency of pairwise comparison matrices [110].

With the above information, we hope to prove that the methodology we recommend for environmental modeling is an innovation based on Szádeczky's system approach – based on the concept of geonomy – and utilizes the possibility of GIS technology to study relationships in real space, which has no international literature.