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## RESPONSE TO THE “REACTION OF THE PHYSICAL TRANSFORMATION OF THE GRAVITY DATA AND LINEARITY DILEMMA”

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Reply

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There is not any filter such as the “apparent gravity linear filter”, which is mentioned by the criticizer, in the literature of geophysical potential methods.

The “apparent density filter” was used in the study. As the name implies; the crustal structure of Turkey was investigated in the article of “Investigation of the Seismic Velocity Distribution and the Crustal Structure of Turkey” (Akın, 2016). So; the article had different findings. The “Conrad discontinuity” has been one of the findings of this article. Or else; the distribution related to the Conrad discontinuity has not been the main topic of the article as it had been understood by the criticizer. In this study, the density and seismic velocity took their highest values within first 20 km’s of the continental crust as; 2.74 gr/cm<sup>3</sup> and 5.86 km/s, respectively. This zone was considered at the same time as the Conrad discontinuity between the lower and upper crusts, and it had an approximate depth of 16 km.

The statement of “Although their densities are 2-2.2 gr/cm<sup>3</sup>, the velocities are very high (4.5-5 km/s). That is; the response given to the parameter transformation by these formations, which is the subject of the article, is false” made by the criticizer is rather thought-provoking.

Therefore; the article was reviewed. However; the density of 2-2.2 gr/cm<sup>3</sup> and the corresponding velocity

of 4,5-5 km/s mentioned by the criticizer were not encountered in the article. The article has not been carefully read by the criticizer.

Density and velocity maps in this publication were prepared for depths of 20 m as emphasized in figure captions. The apparent density map of Turkey for depth of 20 m in figure 4 in the article showed variation within intervals of 2.55-2.98 gr/cm<sup>3</sup>. Also; the seismic velocity values of Turkey for 20 km depth in Figure 6 were estimated within intervals of 4.91-6,78 km/s. Basins mentioned by the criticizer by giving examples for Çankırı and Lake Salt is considered as very shallow structures.

Apart from the example basins, which the criticizer mentions about, there are many basins in many places of Turkey. The investigations regarding these basins can surely be carried out by me or by other investigators in the future. However; it can never anticipated personally to answer for some basins in this article.

Therefore; in this study the gravity apparent density data were estimated and different characteristics of the crustal structure were investigated. Besides; simple relationships between the tectonic units and structural zones were utilized. As the name of the article implies, this study was performed in Turkey scale, however; the interpretations of shallow and small scale basins or

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other geological structures as the criticizer mentions have never been targeted in this article.

Simeoni and Brückl (2009), applied power spectrum on to gravity Bouguer data. The data of  $0,3 \text{ gr/cm}^3 = 300 \text{ kg/m}^3$ , which is mentioned in the article, was given as the reference of previous information. The criticizer thought that the density information here had entered into estimations or interpretations. Thus, he completely misunderstood the article. Besides; the information about the Conrad discontinuity have come up due to the abnormal increase in the gravity apparent density at mentioned depth in the article.

The description of “ $\omega$ ” symbol, which is said to have not been explained in formula in the article, is already present. The article has not been carefully read by the criticizer.

$$\rho(x,y) = \rho_o + (1/2\pi G) F^{-1}\{(\omega / 1-e^{-\omega h}) \cdot \Delta g(u,v)\}$$

$\omega$ : total number of waves

The formula in the article is in medium of wave number. However; the estimation of prediction value of “ $\rho_o$ ” between the values of  $2.7-3.3 \text{ gr/cm}^3$  were continued with  $0,1 \text{ gr/cm}^3$  increments until the mean value of the crust is attained. As a result of the estimation, the lowest and the highest densities at different levels of Turkey were obtained as;  $2.23 \text{ gr/cm}^3$  and  $3 \text{ gr/cm}^3$ , respectively. Nevertheless; the mean density value were estimated as;  $2.698 \text{ gr/cm}^3$ .

It is also stated by the criticizer for Figure 8 that, the vertical exaggerations are different and caused confusions in interpretations. Nonetheless; the vertical axes of all sections shown in figure 8 are in the same scale. Almost all sections have different lengths from each other. Therefore; depths and distances on vertical and horizontal axes in interpretations were already described on sections in order to prevent any misunderstanding. The article has been carefully read by the criticizer.

The author would like to thank the criticizer for taking the time to read the article during his very intensive work.

As the general assessment, I could say that the article, which is called the “Investigation of the Seismic Velocity Distribution and Crustal Structure of Turkey by means of Gravity Data”, is a significant

research topic. I also believe that the article findings will enlight the solution of earth science problems from a different point of view. Every researches are open to conceptual contributions and renovations. Therefore; this investigation too will be developed and remediated more as it is in all other research topics by the supports of related earth scientists.

## References

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