# Supplementary Material

## 1 SUMMARY

We have provided supplementary material to our article titled “Computational aspects of the equivalent-layer technique: review”. In this accompanying material, we present five additional synthetic data results with the equivalent layer estimated by using different methods.

## 2 SUPPLEMENTARY RESULTS WITH SYNTHETIC DATA

In the main paper, the subsection 8.3 “Stability analysis and gravity-gradient components” shows the results of the equivalent-layer technique using the iterative deconvolution, proposed by Takahashi et al. (2020), for processing gravity-gradient data.

In this accompanying material, we inverted the same noise-corrupted gravity disturbance presented in the main paper. Here, the gravity-gradient data (not shown) were predicted by the equivalent layer (not shown) estimated by using the following methods:

i) CGLS;
ii) Cholesky factorization;
iii) iterative method proposed by Siqueira et al. (2017);
iv) direct deconvolution with optimal value of $\zeta = 10^{-22}$; and
v) column-action proposed by Cordell (1992).

The algorithms for these methods are outlined in the main manuscript.

By using CGLS method, Figures S1**(A)**–**(F)** show the residuals (in Eötvös) between the predicted (not shown) and noise-free gravity-gradient data and Figure S1**(G)** shows the residuals (in mGal) between the predicted and noise-corrupted gravity disturbances.

By using Cholesky factorization, FiguresS2**(A)**–**(F)** show the residuals (in Eötvös) between the predicted (not shown) and noise-free gravity-gradient data and Figure S2**(G)** shows the residuals (in mGal) between the predicted and noise-corrupted gravity disturbances.

By using the iterative method proposed by Siqueira et al. (2017), Figures S3**(A)**–**(F)** show the residuals (in Eötvös) between the predicted (not shown) and noise-free gravity-gradient data and Figure S3**(G)** shows the residuals (in mGal) between the predicted and noise-corrupted gravity disturbances.

Figures S1, S2 and S3 show that the CGLS method, the Cholesky factorization, the iterative method proposed by Siqueira et al. (2017) yield acceptable data fittings despite their significant difference in floating-point operations.

By using direct deconvolution with optimal value of $\zeta = 10^{-22}$, Figures S4 **(A)**–**(F)** show the residuals (in Eötvös) between the predicted (not shown) and noise-free gravity-gradient data and Figure S4**(G)** shows the residuals (in mGal) between the predicted and noise-corrupted gravity disturbances.

By using the iterative method proposed by Cordell (1992), Figures S5**(A)**–**(F)** show the residuals (in Eötvös) between the predicted (not shown) and noise-free gravity-gradient data and Figure S5**(G)** shows the residuals (in mGal) between the predicted and noise-corrupted gravity disturbances.

Due to the border effects, the residuals from the direct deconvolution (Figure S4) are greater than those predicted using CGLS method, Cholesky factorization and the iterative method proposed by Siqueira et al. (2017) (Figures S1, S2 and S3). Finally, we stress that the iterative method proposed by Cordell (1992) produces the worst fit data fit. The main difficulty with this method is setting the depth of the equivalent sources for each datum.

## REFERENCES

Cordell, L. (1992). A scattered equivalent-source method for interpolation and gridding of potential-field data in three dimensions. *Geophysics* 57, 629–636

Siqueira, F., Oliveira Jr., V. C., and Barbosa, V. C. F. (2017). Fast iterative equivalent-layer technique for gravity data processing: A method grounded on excess mass constraint. *GEOPHYSICS* 82, G57–G69. doi:10.1190/GEO2016-0332.1

Takahashi, D., Oliveira Jr., V. C., and Barbosa, V. C. F. (2020). Convolutional equivalent layer for gravity data processing. *GEOPHYSICS* 85, G129–G141. doi:10.1190/geo2019-0826.1

## 3 SUPPLEMENTARY FIGURES

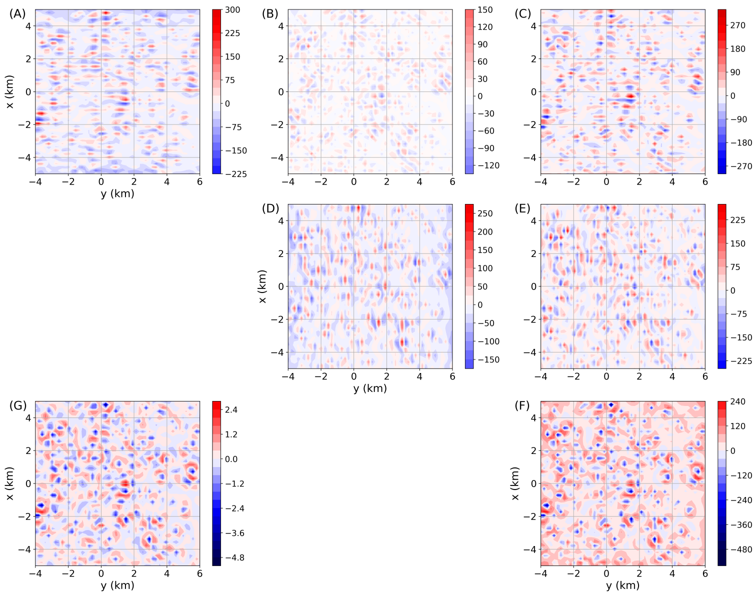

**Figure S1.** Residuals between the gravity data predicted by the equivalent layer estimated with the CGLS method. The inverse problems was solved by using the noise-corrupted gravity disturbance having the maximum noise level (not shown). Panels **(A)–(F)** show the residuals between the predicted and noise-free gravity gradient data. The values are in Eötvös. **(G)** Shows the residuals between the predicted and noise-corrupted gravity disturbances. The values are in milligals (mGal).

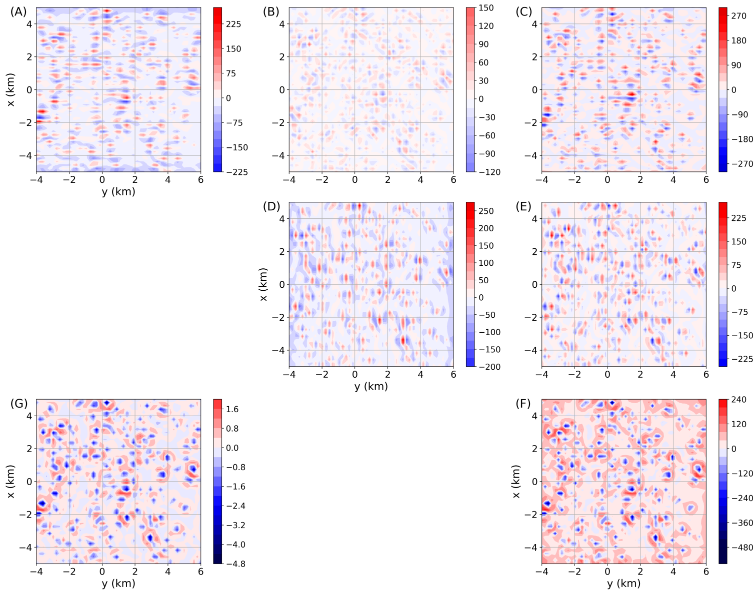


**Figure S2.** Residuals between the gravity data predicted by the equivalent layer estimated with the Cholesky factorization. The inverse problems was solved by using the noise-corrupted gravity disturbance having the maximum noise level (not shown). Panels **(A)–(F)** show the residuals between the predicted and noise-free gravity gradient data. The values are in Eötvös. **(G)** Shows the residuals between the predicted and noise-corrupted gravity disturbances. The values are in milligals (mGal).

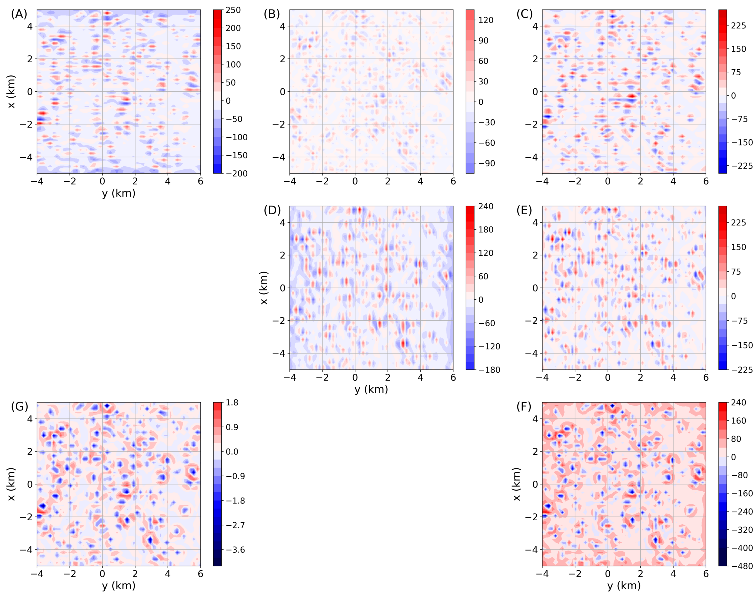


**Figure S3.** Residuals between the gravity data predicted by the equivalent layer estimated with the iterative method proposed by Siqueira et al. (2017). The inverse problems was solved by using the noise-corrupted gravity disturbance having the maximum noise level (not shown). Panels **(A)–(F)** show the residuals between the predicted and noise-free gravity gradient data. The values are in Eötvös. **(G)** Shows the residuals between the predicted and noise-corrupted gravity disturbances. The values are in milligals (mGal).

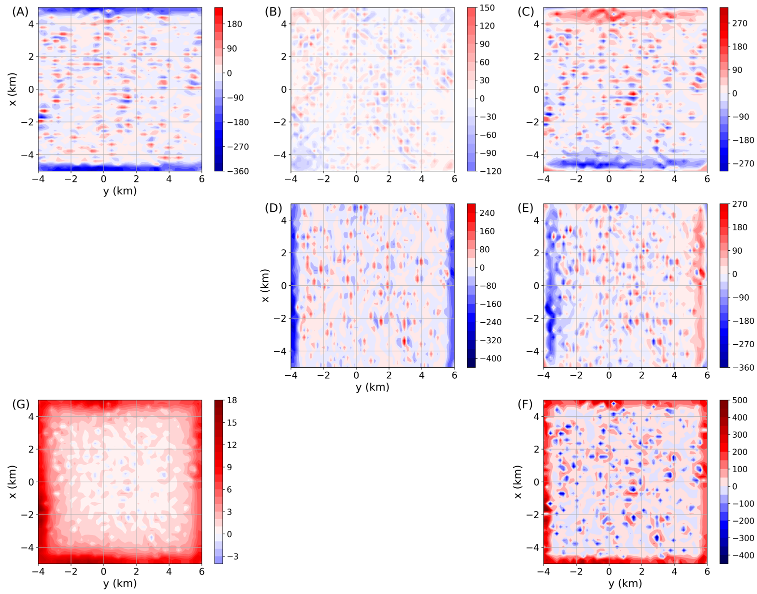


**Figure S4.** Residuals between the gravity data predicted by the equivalent layer estimated with the direct deconvolution with optimal value of $\zeta = 10^{-22}$. The inverse problems was solved by using the noise-corrupted gravity disturbance having the maximum noise level (not shown). Panels **(A)–(F)** show the residuals between the predicted and noise-free gravity gradient data. The values are in Eötvös. **(G)** Shows the residuals between the predicted and noise-corrupted gravity disturbances. The values are in milligals (mGal).

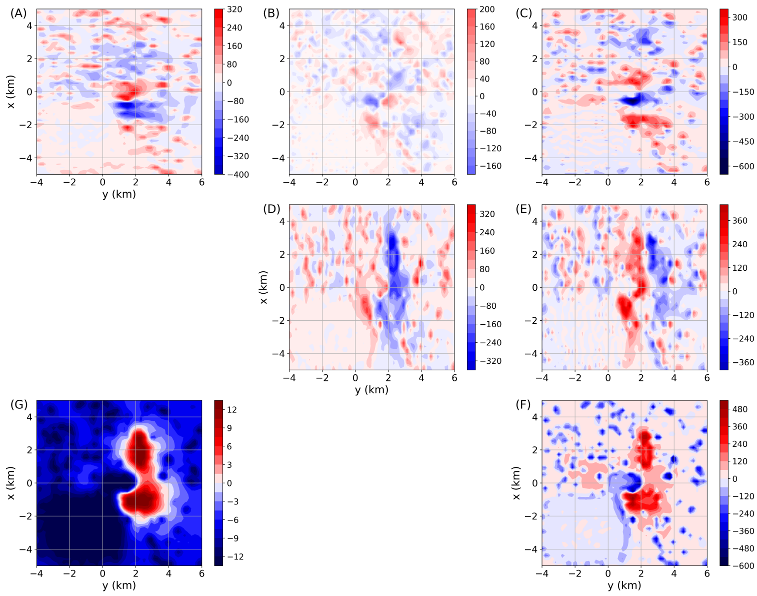


**Figure S5.** Residuals between the gravity data predicted by the equivalent layer estimated with the iterative method proposed by Cordell (1992). The inverse problems was solved by using the noise-corrupted gravity disturbance having the maximum noise level (not shown). Panels **(A)–(F)** show the residuals between the predicted and noise-free gravity gradient data. The values are in Eötvös. **(G)** Shows the residuals between the predicted and noise-corrupted gravity disturbances. The values are in milligals (mGal).