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Supporting Information for

Moho depth and crustal thinning in the Marmara Sea region from gravity data inversion

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Introduction

This supporting information presents and discuss the result of calculating the Moho topography using the geological model described in the main article and the 3Dinver inversion method.

Text S1.

The Parker-Oldenburg method, as computed in the 3Dinver algorithm by Gomez-Ortiz and Agarwal [2005], is also based on Parker's equation. First, gravity anomalies from the known geology are removed with the Parker method, as we did here. Then, the Parker equation is re-arranged and the first order is used to determine a first approximation of the Moho topography, before increasing the orders in a recursive process. At each step, the current Moho topography is filtered using a high-pass filter.

$$F\big(h_0(x)\big) = -\frac{F[\Delta g(x)]e^{(-kz_0)}}{2\pi G\rho}$$

$$F\big[h_{nf}(x)\big] = F[h_n(x)] * filter$$

$$F[h_{n+1}(x)] = -\frac{F[\Delta g(x)]e^{(-kz_0)}}{2\pi G\rho} - \sum_{i=1}^{n+1} \frac{k^i}{(i+1)!} F[{h_{nf}}^{i+1}(x)]$$

Using this method, we computed a Moho interface with varying filter parameters. We then looked for the solution with a frequency signature as close as possible to the frequency signature of our result by comparing the correlation coefficient of the two Fourier Transforms. We discarded a 20 km width outline at the edge of the area to avoid interferences from edge effects. The best result gives a correlation coefficient of 0,998. As shown in Figure 8, the results are very similar. However, the 3Dinver solution shows variations with higher amplitude and a thinning with a less pronounced asymmetry. As for the quantitative assessment of the two results, our model gives a standard deviation for the residual gravity of about 3.54 mGal before the looped post-processing and 2.92 mGal after, compared to 4.13 mGal for the 3Dinver solution which, is, again, close to our result.

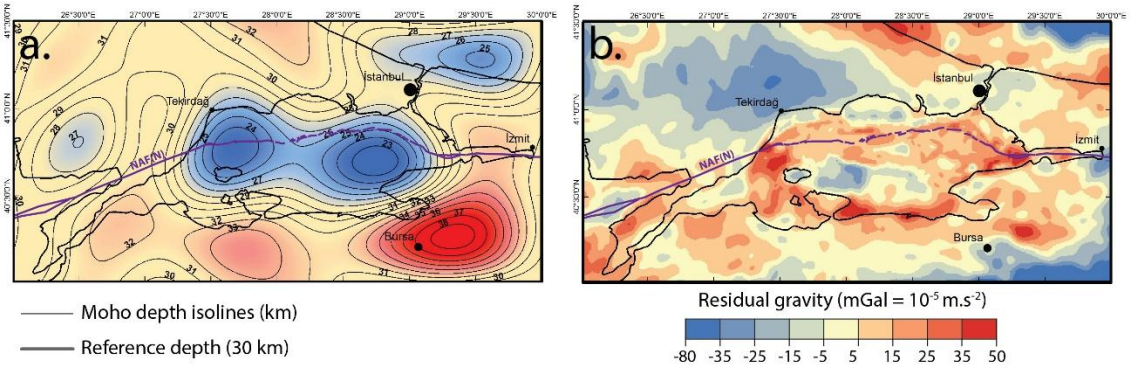

Figure S1. a. Moho depth and b. Gravity residual obtained with the 3DINVER program [Gomez-Ortiz and Agarwal, 2005] and an isostatic model. Geological setting, gravity data and sediment characteristics used as inputs are the same as in the main article.