APPLICATIONS TO SYNTHETIC DATA - SENSITIVITY TO THE INITIAL APPROXIMATION

We tested the sensitivity to the initial approximation and show the results of steps 2 and 3 by five different initial approximations used in Step 1 (not shown) and Step 2. Parameters defining the interpretation model are shown in Table 1. We used the same parameters for inversion used in the synthetic applications of the paper.

Figure 1 and Figure 2 shows the estimated model obtained at the Step 2 and Step 3 of our algorithm with the initial approximation adopted in the applications of the paper. Figure 1 shows initial approximation surfaces nearly flat with geometry far of the true surfaces.

Figure 3 (test 1) and Figure 5 (test 2) show initial approximation surfaces with geometry closer of the true surfaces, besides Figure 5 considers the known depths at basement and Moho. Figure 7 (test 3) show initial approximation surfaces with geometry not too closer of the true surfaces and considers only the known depths at basement and Moho. Figure 9 (test 4) and Figure 11 (test 5) exhibit flat initial approximation surfaces with thick crust and thin crust, respectively. These models (Figures 3, 5, 7, 9 and 11) presented basement and Moho reliefs closer to the estimated surfaces in the Figure 1, except at the region between 100 and 200 km of the basement presented in the Figure 11. These results (Figures 3, 5, 7, 9 and 11) show predicted gravity disturbance and lithostatic stress curves with the same behavior that presented in the Figure 2.

Figures 4, 6, 8, 10 and 12 show the estimated model obtained at the end of Step 3. We used the same σ constant of the applications of the paper ($\sigma = 21$) for all tests. These models presented Moho relief closer to the estimated Moho in the Figure 2. Figures 4 (test

1), 8 (test 3) and 12 (test 5) show basement relief closer to the estimated basement in the Figure 2. Figures 6 (test 2) and 10 (test 4) show basement uplift at the region between 100 and 200. These results (Figures 4, 6, 8, 10 and 12) show predicted gravity disturbance and lithostatic stress curves with the same behavior that presented in the Figure 2.

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Geological meaning	$\rho^{(\alpha)}$ (kg/m^3)	$\Delta\rho^{(\alpha)}$ (kg/m^3)	α
water	1030	-1840	w
sediments	2350	-520	1
SDR	2855	-15	2
continental crust	2870	0	cc
oceanic crust	2885	15	oc
mantle	3240	370	m

Table 1: Properties of the volcanic margin model. The model extends from $y = 0$ km to $y = 383$ km, the Continent-Ocean Transition (COT) is located at $y_{COT} = 350$ km and the reference Moho is located at $S_0 + \Delta S = 43.2$ km, where $\Delta S = 2.2$ km. The density contrasts $\Delta\rho^{(\alpha)}$ are defined with respect to the reference value $\rho^{(r)} = 2870$ kg/m^3, which coincides with the density $\rho^{(cc)}$ attributed to the continental crust.

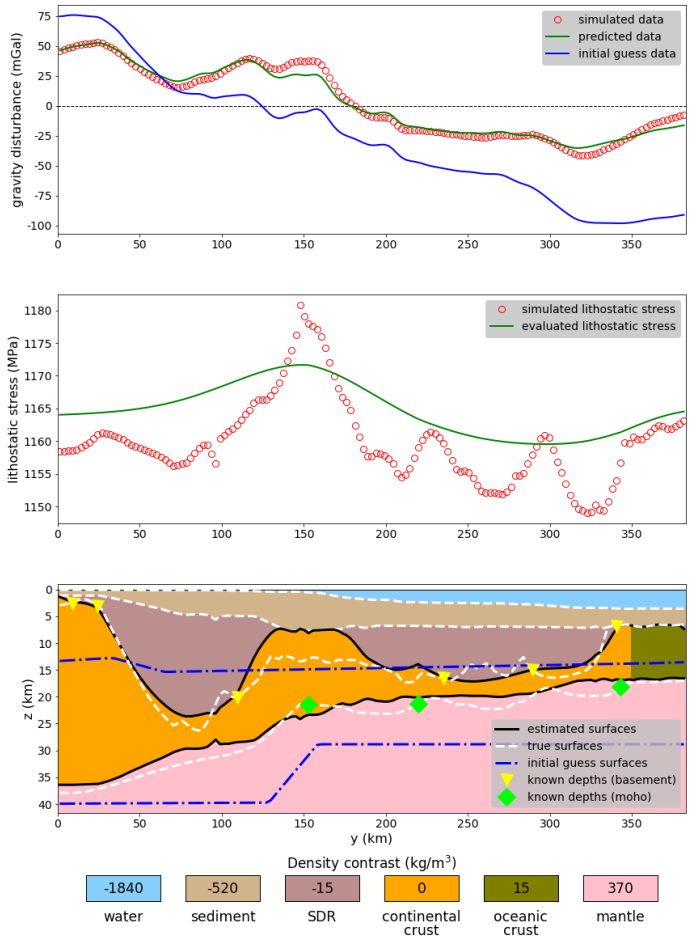

Figure 1: Application to synthetic data. Results obtained in Step 2. (Bottom panel) Estimated and true surfaces, initial basement and Moho used in the inversion (initial guess) and known depths at basement and Moho. (Middle panel) True and estimated lithostatic stress curves computed by using equation **??**. The values are multiplied by a constant gravity value equal to 9.81 m/s^2. (Upper panel) Gravity disturbance data produced by the volcanic margin model (simulated data), by the estimated model (predicted data) and by the model used as initial guess in the inversion (initial guess data). The contour of the prisms forming the interpretation model were omitted. The density contrasts were defined according to Table 1.

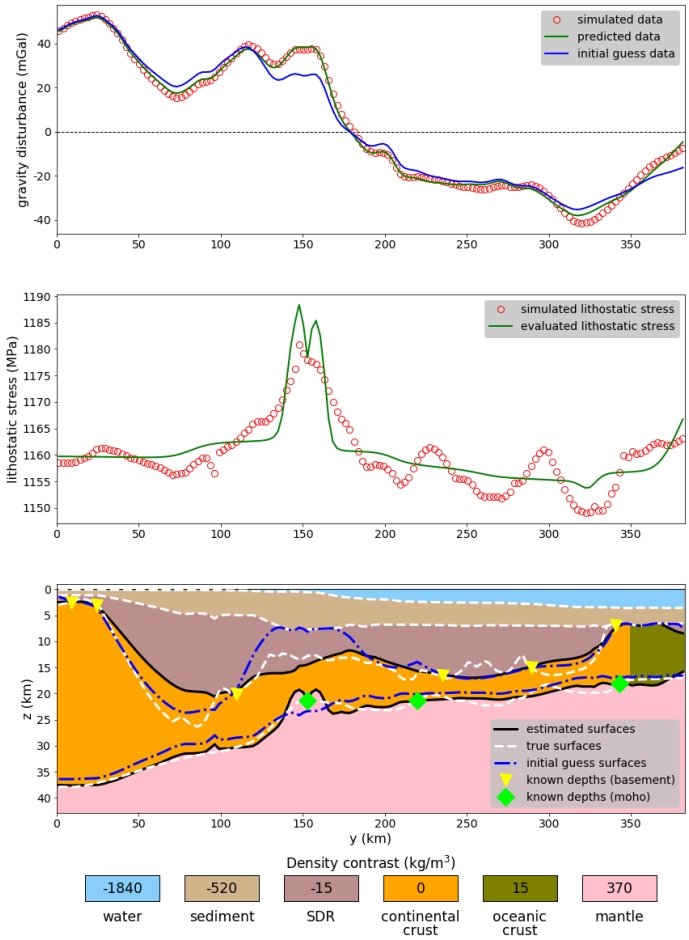

Figure 2: Application to synthetic data. Results obtained in Step 3 by using $\sigma = 21$ (equation **??**). The remaining informations are the same shown in the caption of Figure 1.

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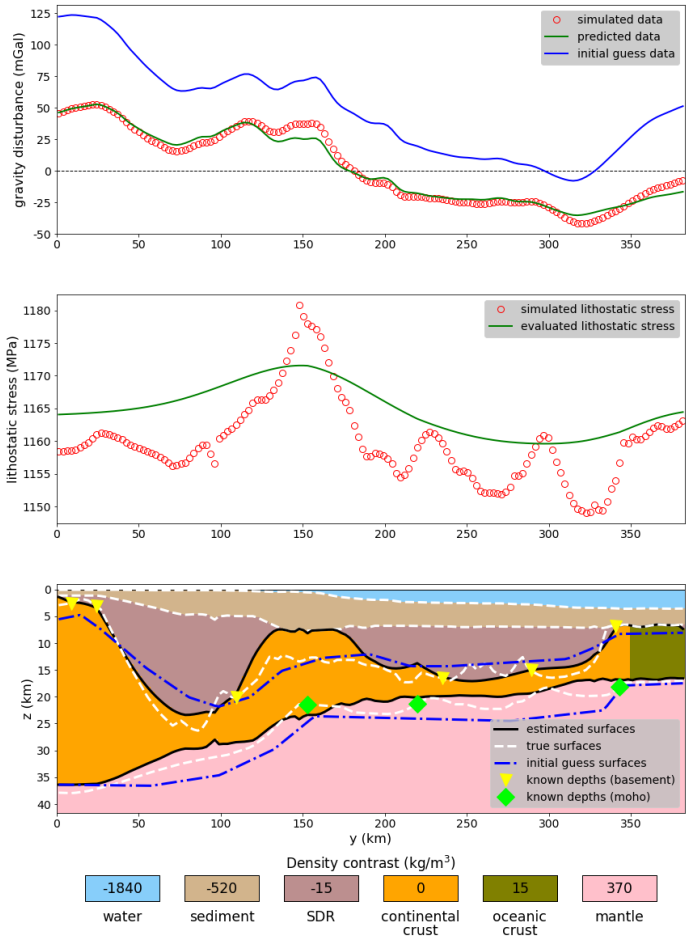

Figure 3: Application to synthetic data. Results obtained in Step 2 by using initial approximation of test 1. The remaining informations are the same shown in the caption of Figure 1.

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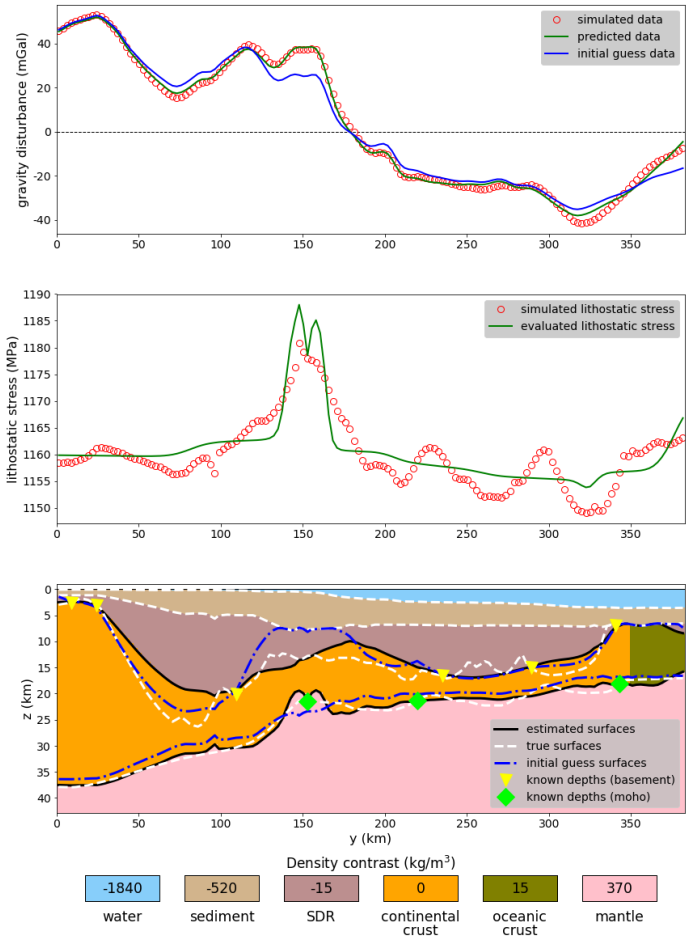

Figure 4: Application to synthetic data. Results obtained in Step 3 by using initial approximation of test 1 and $\sigma = 21$ (equation **??**). The remaining informations are the same shown in the caption of Figure 1.

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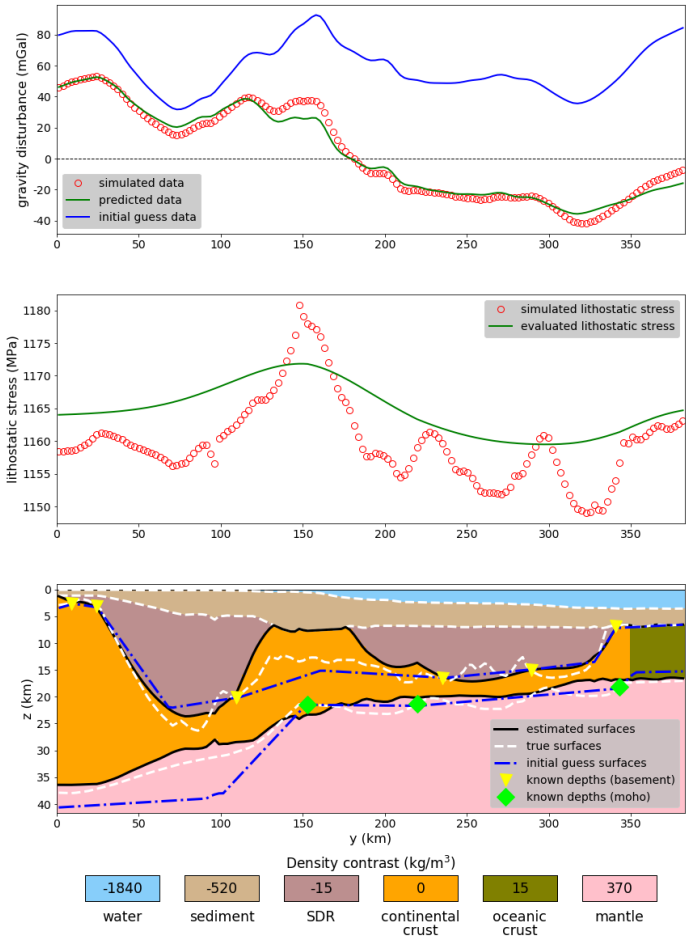

Figure 5: Application to synthetic data. Results obtained in Step 2 by using initial approximation of test 2. The remaining informations are the same shown in the caption of Figure 1.

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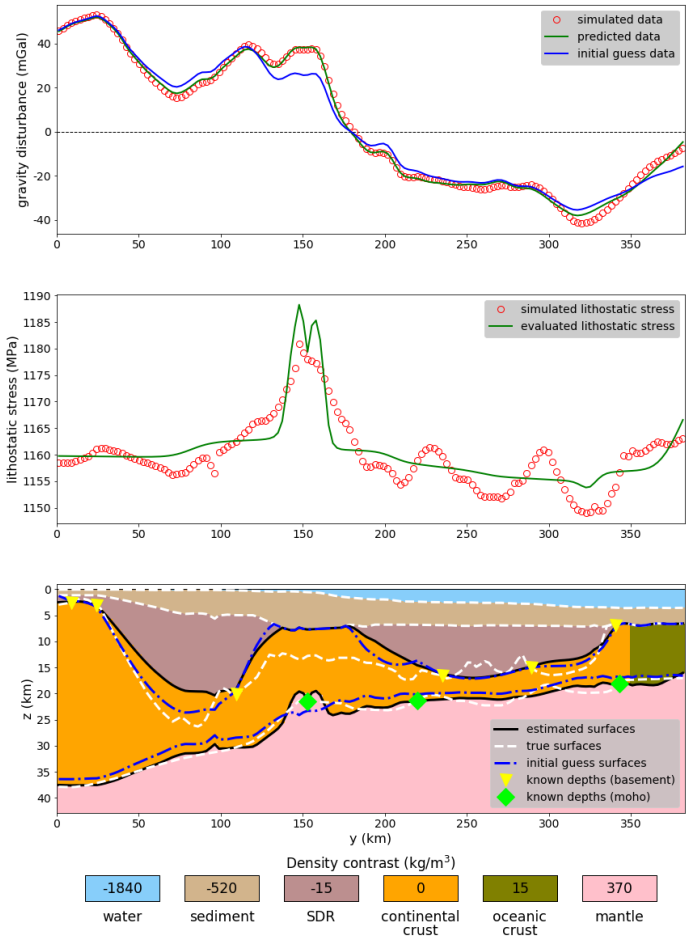

Figure 6: Application to synthetic data. Results obtained in Step 3 by using initial approximation of test 2 and $\sigma = 21$ (equation **??**). The remaining informations are the same shown in the caption of Figure 1.

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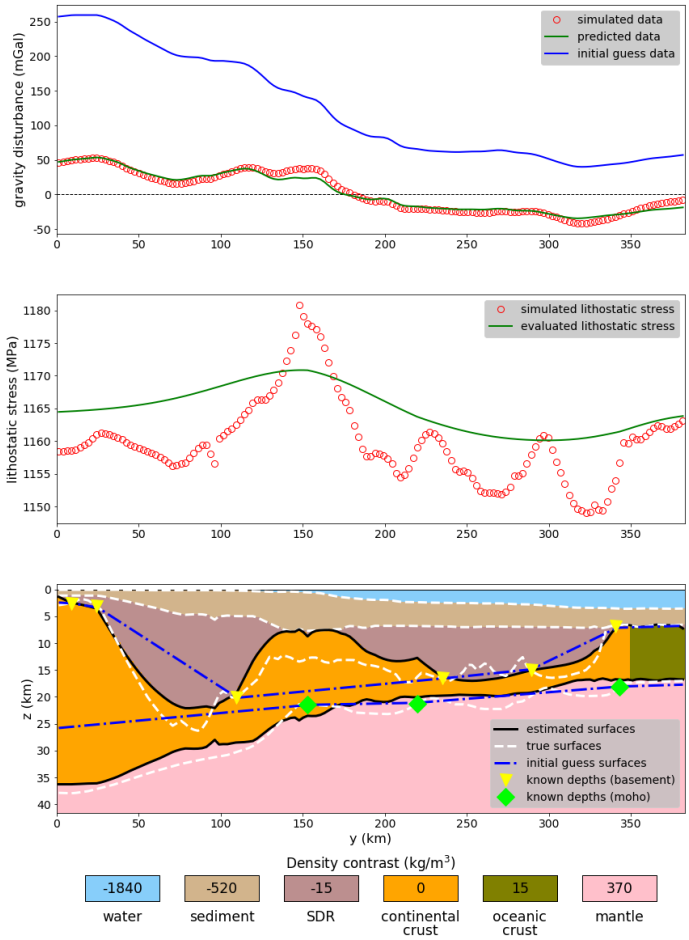

Figure 7: Application to synthetic data. Results obtained in Step 2 by using initial approximation of test 3. The remaining informations are the same shown in the caption of Figure 1.

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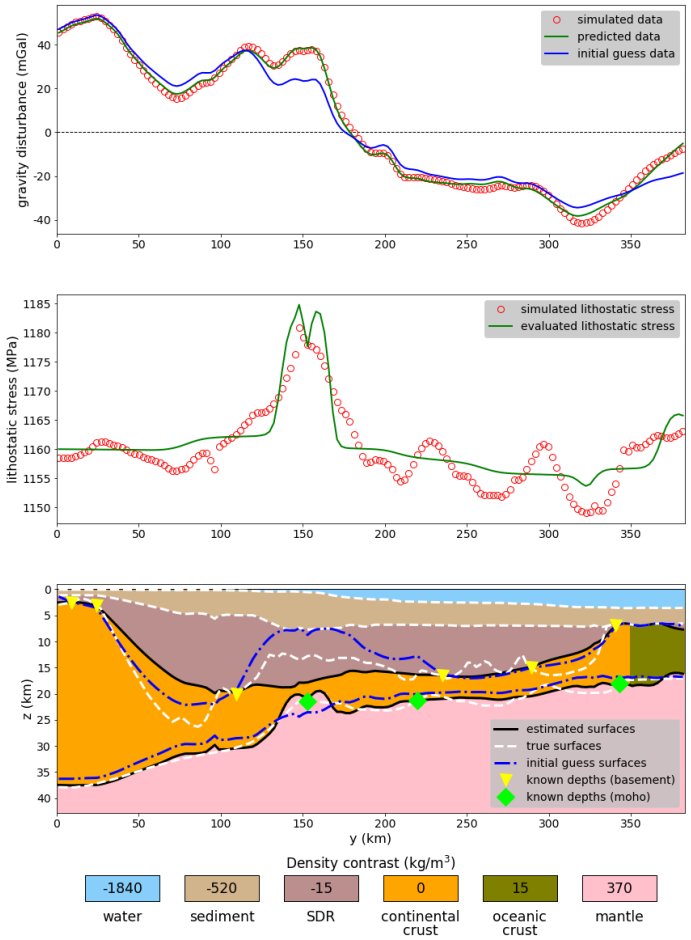

Figure 8: Application to synthetic data. Results obtained in Step 3 by using initial approximation of test 3 and $\sigma = 21$ (equation **??**). The remaining informations are the same shown in the caption of Figure 1.

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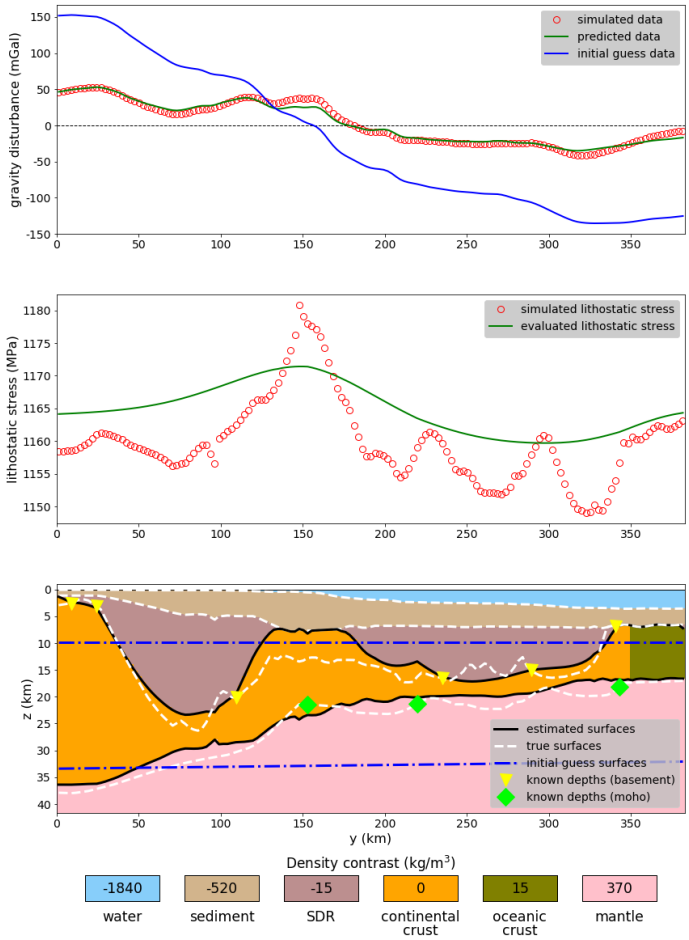

Figure 9: Application to synthetic data. Results obtained in Step 2 by using initial approximation of test 4. The remaining informations are the same shown in the caption of Figure 1.

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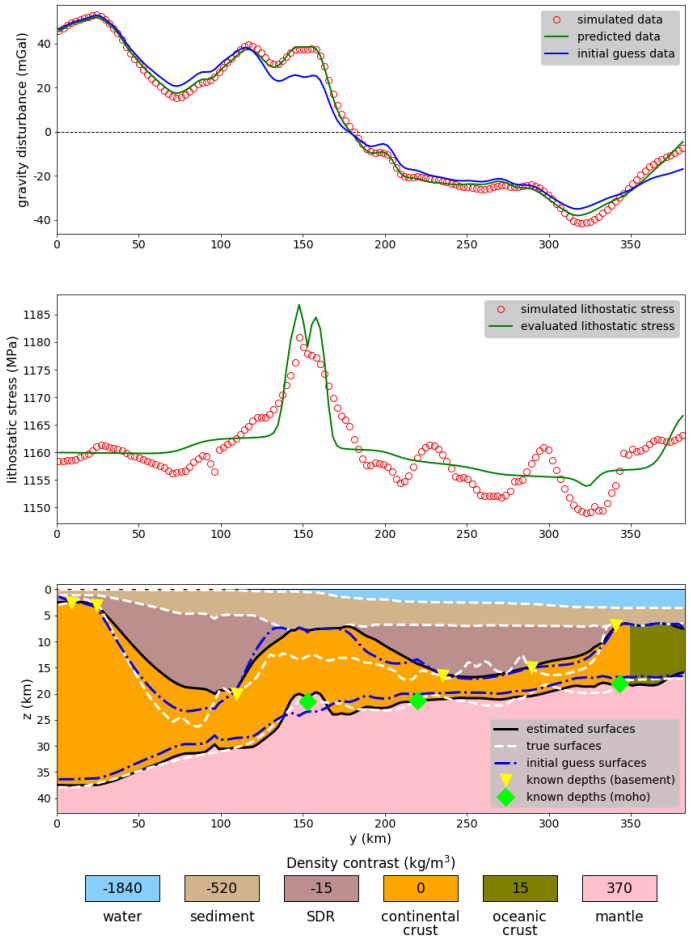

Figure 10: Application to synthetic data. Results obtained in Step 3 by using initial approximation of test 4 and $\sigma = 21$ (equation **??**). The remaining informations are the same shown in the caption of Figure 1.

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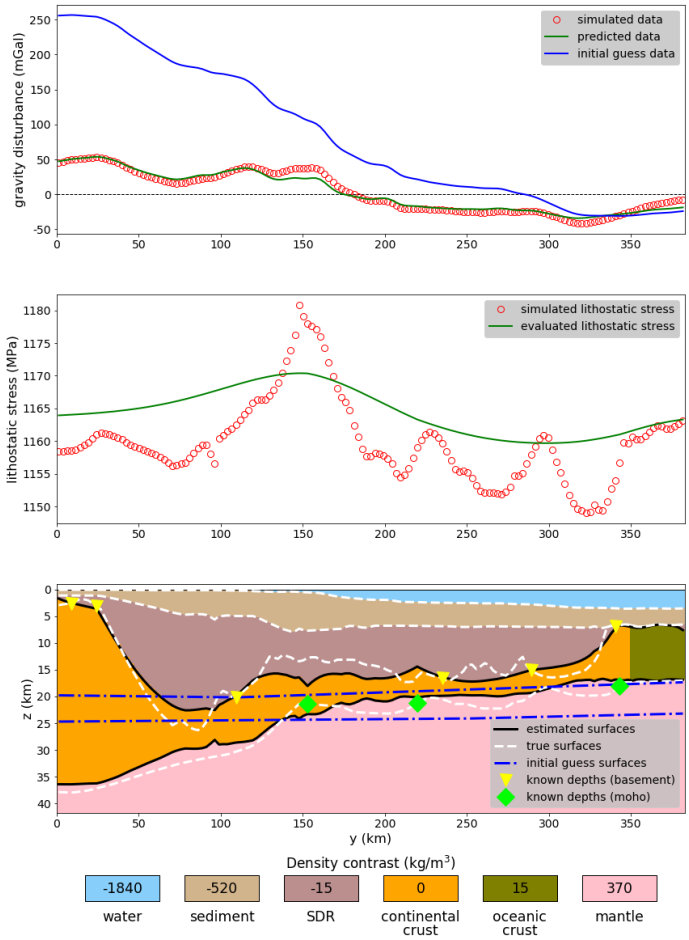

Figure 11: Application to synthetic data. Results obtained in Step 2 by using initial approximation of test 5. The remaining informations are the same shown in the caption of Figure 1.

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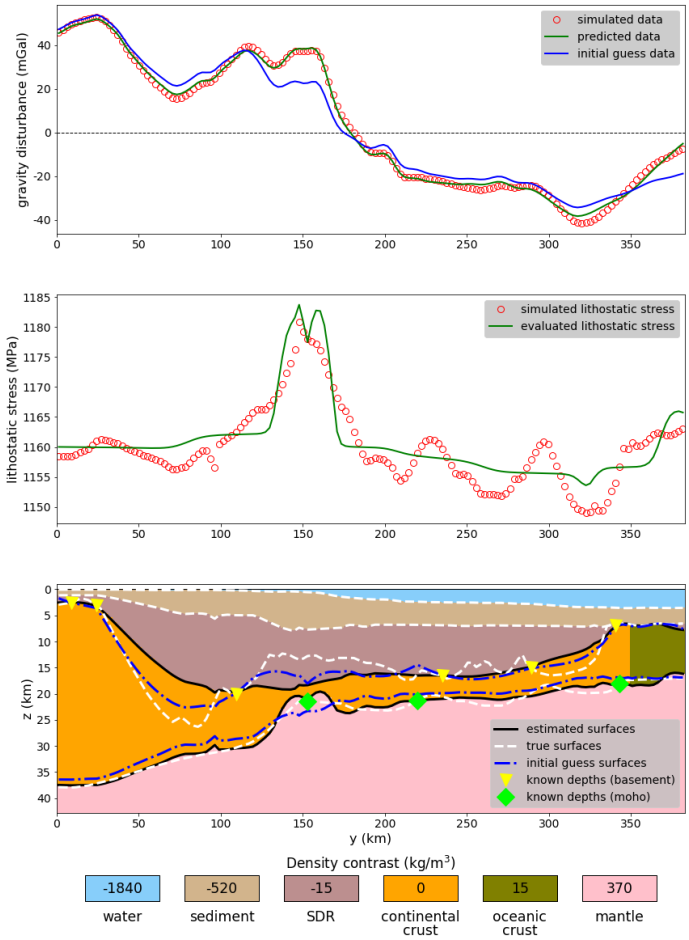

Figure 12: Application to synthetic data. Results obtained in Step 3 by using initial approximation of test 5 and $\sigma = 21$ (equation **??**). The remaining informations are the same shown in the caption of Figure 1.

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