Supporting Information for "Gravity, topography, and melt generation rates from simple 3D models of mantle convection"
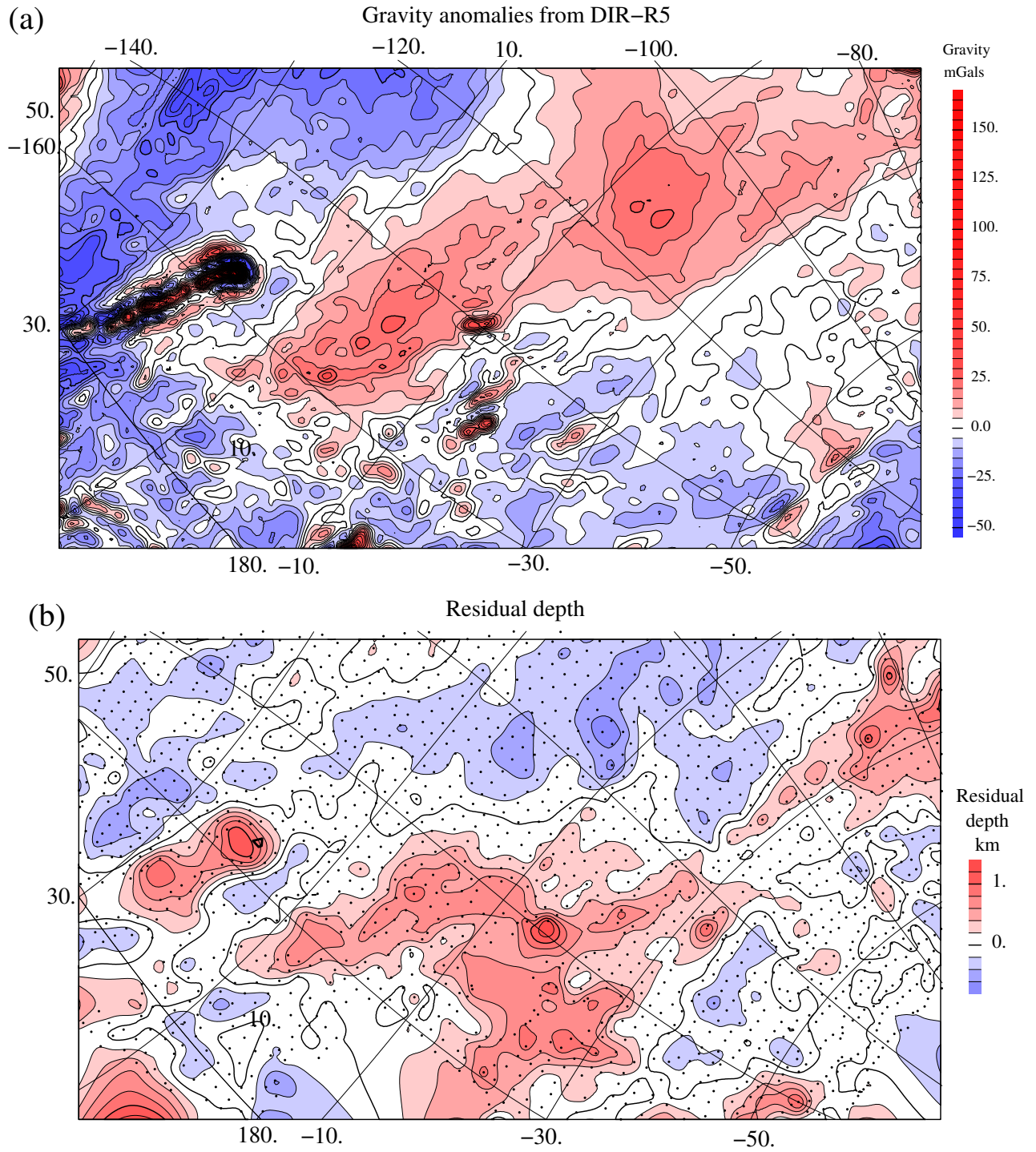
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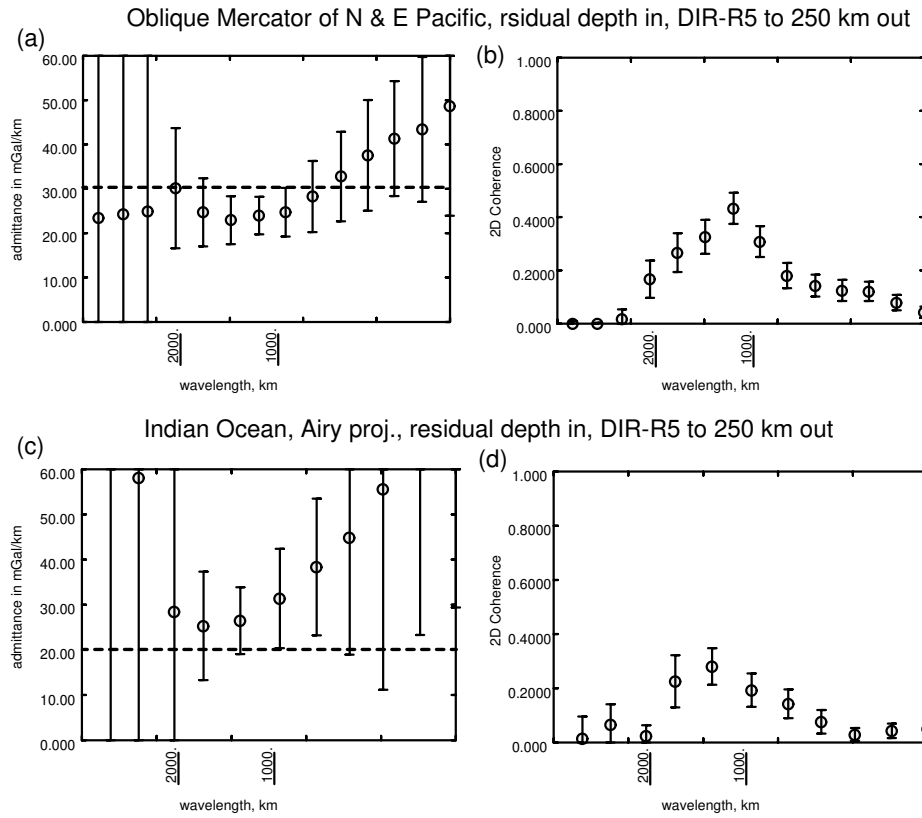
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(a)

Gravity anomalies from DIR−R5

(b)

Residual depth

Figure S1. (a) Gravity field for the Pacific from DIR-R5, with coefficients $l = 2$ set to 0 and a filter applied, falling to 1/2 at 250 km, to remove the short wavelength components. (b) Residual depths, averaged over $2° \times 2°$ boxes (Crosby et al. 2006). The dots show the locations of the resulting averages. Oblique Mercator projection with axis 40°N, −50°E.

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Oblique Mercator of N & E Pacific, rsidual depth in, DIR-R5 to 250 km out

(a)

(b)

Indian Ocean, Airy proj., residual depth in, DIR-R5 to 250 km out

(c)

(d)

Figure S2. Admittance and coherence from the same regions used for Figure 12 (c)-(f), calculated using Hoggard et al.'s (2017) estimates of residual depth rather than those of Crosby et al. (2006).
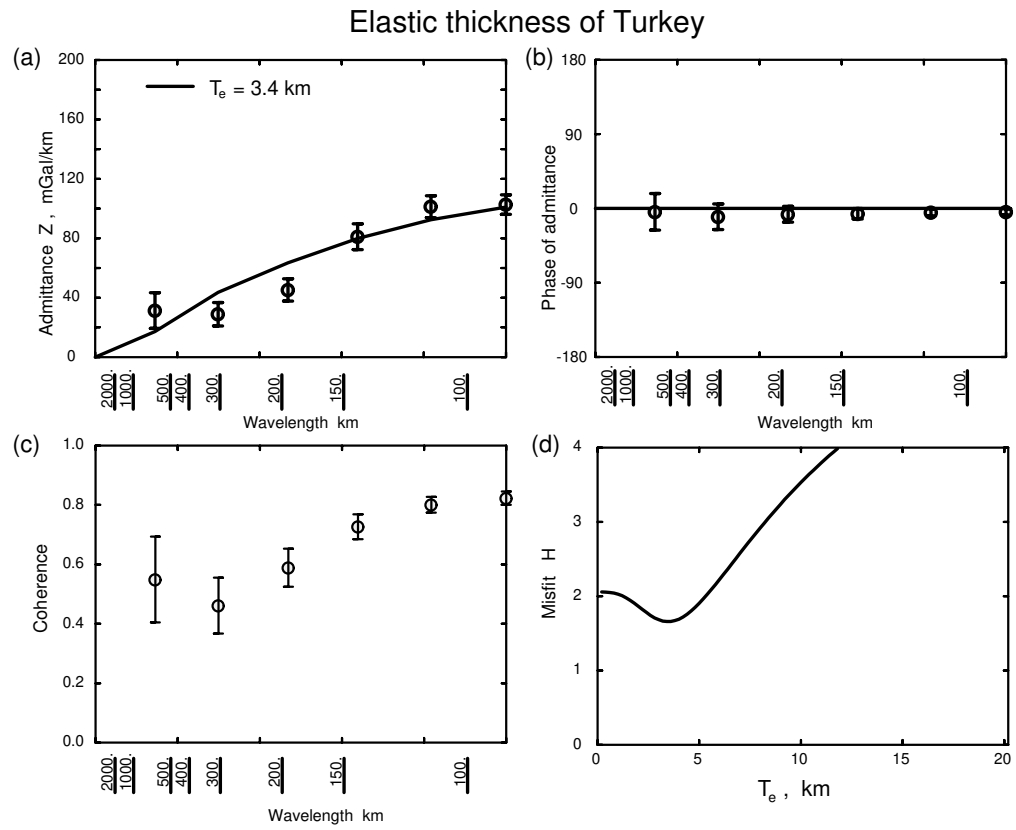
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Elastic thicknesses
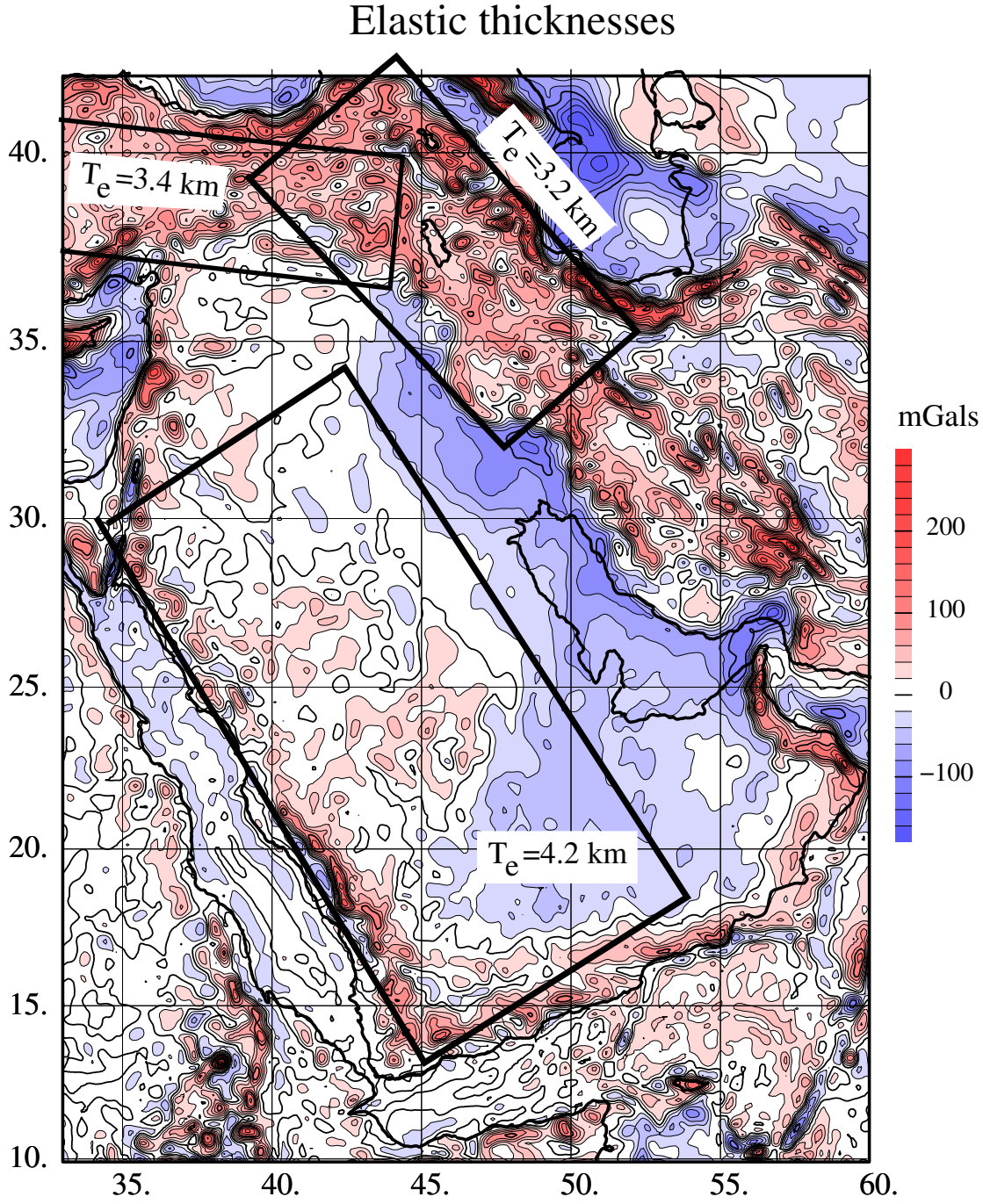
Figure S3. Boxes used to estimate the elastic thickness T_e of different parts of the Middle East, superimposed on gravity anomalies from Eigen6c (Förste et al. 2011), with the coefficients from $l = 2$ to 7 to 0, and applying a taper $f, = (l - 7)/5$, to those from $l = 8$ to 11. A low pass filter falling to 1/2 at 50 km was applied to the coefficients to remove the short wavelength anomalies from uncompensated topography.

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Elastic thickness of SW Arabia

(a)

(b)

(c)

(d)
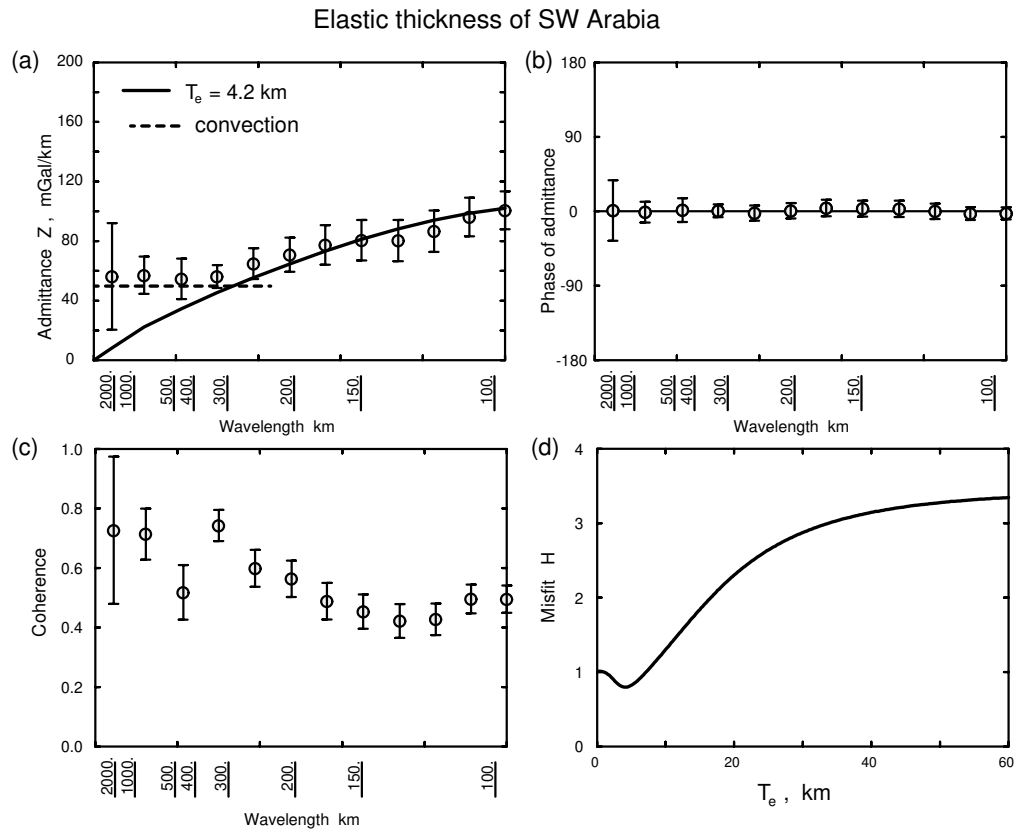
Figure S4.   Estimate of the elastic thickness for S and W Arabia (see Figure S3) from the admittance, taking the topography as input, gravity from Eigen6c as output.

Elastic thickness of NW Iran and E Turkey
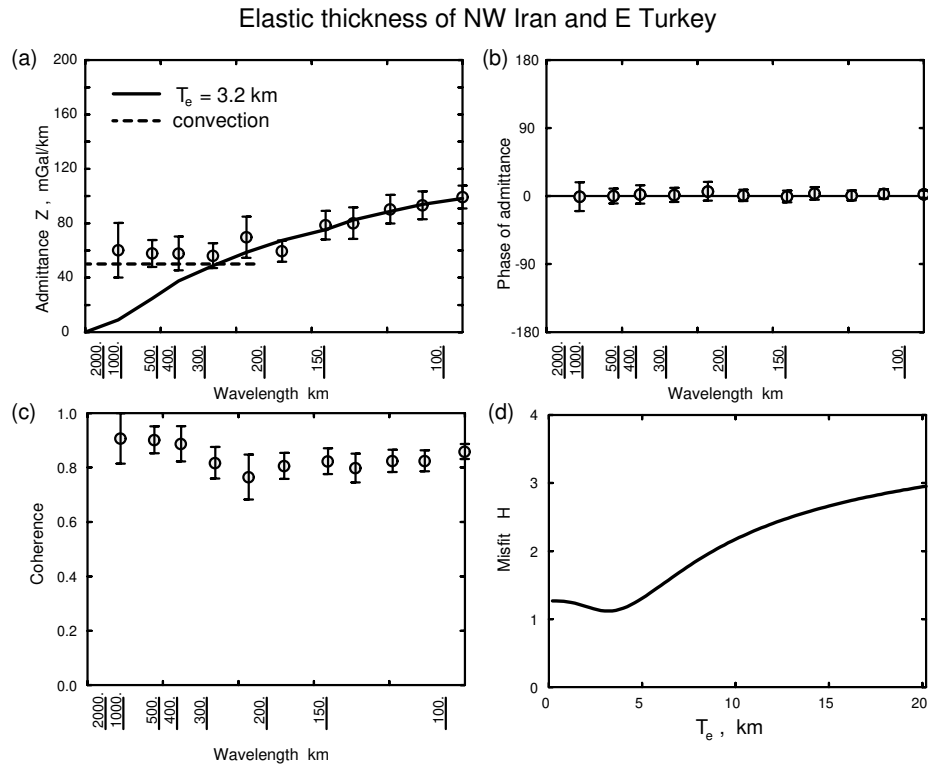
Figure S5.   Estimate of the elastic thickness for E Turkey and NW Iran (see Figure S3) from the admittance, taking the topography as input, gravity from Eigen6c as output.

Elastic thickness of Turkey

(a)

Admittance Z , mGal/km

T_e = 3.4 km

Wavelength km

(b)

Phase of admittance

Wavelength km

(c)

Coherence

Wavelength km

(d)

Misfit H

T_e , km

Figure S6. Estimate of the elastic thickness for Anatolia (see Figure S3) from the admittance, taking the topography as input, gravity from Eigen6c as output.

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