Comments to the TC1 model
(global Thermal model for the Continental lithosphere constrained on a 1^{o}x 1^{o} grid)

Format:

- lat
- lon
- z1300, km (lithosphere thermal thickness defined by 1300 deg C)
- T50, deg C (temperature at a depth of 50 km, see comments below)
- gradTlith, degC/km (temperature gradient in the subcrustal lithosphere)
- z550, km (depth where temperature reaches 550 deg C, see comments below)
- region (=location, see comments below)

I. "Locations"

Codes to the cratons:
1 - Africa
2 - India
3 - Antarctica
4 - Europe
5 - Siberia (10 - West Siberia)
6 - China
7 - Australia
8 - North America
9 - South America

The column "region" was put together solely for my personal convenience. However, I decided to leave it since it helps with geographical orientation. Please note that some entries may have wrong labels for "location" (e.g. probably one can find "Iran"in Africa). Some country-names are used sometimes as an identifier of a large region parts of which can be, in fact, a territory of a different country(ies). Since the database had a long way of modifications, now it's too painful to correct wrong labels since in any case they are just for convenience, and nothing more. The age data and thermal data for these entries are verified to be correct.

II. Thermal model

1. Thermal constraints have a ca. 25% uncertainty for the lithospheric thickness. The uncertainty for temperatures in the uppermost mantle is ca. 100 deg C and up to 150 deg C below 150 km!

2. Because the thermal model was partly constrained by the ages, some adjacent cells may have significantly different thermal structure (in particular if they have significantly different ages and no heat flow data, or if constraints based on heat flow exist only for few cells within a tectonic region and do not follow the global trend). Since in the real Earth, obviously, such short-wavelength temperature variations are smoothed by horizontal heat

transfer, for the thermal part of the model I include values interpolated with a low-pass smoothing filter. These data provides the best "physical" model of the thermal regime of the lithosphere.

3. At present, the crustal structure is not incorporated into the model. That's why temperatures at 50 km depth are given as a proxy for Moho temperatures (note that global average for thickness of the continental crust is 42 km, while there are also many places where the crust is thicker than 50 km). Together with data on lithospheric thickness and temperatures gradient in the lithospheric mantle, they can be used to calculate temperature at any depth within the subcrustal lithosphere.

4. For convenience, I also provide the depth to 550 deg isotherm, it can be used as a proxy for the "magnetic" crust and thickness of elastic lithosphere (assuming its homogeneous bulk and fluid-phase composition).

5. Since both lithospheric thickness and temperatures have been interpolated (except for Antarctica), locations with the same thickness may have slightly different values of temperatures at 50 km depth. This is the case, in particular, for the regions with a strong gradient in lithospheric thickness since temperature gradient in such regions is weaker than gradient in thickness.

III. General comments

1. The coordinates refer to the centers of the cells.

2. Some off-shore regions or regions with oceanic crust (e.g. the Red Sea, the central part of the Peri-Caspian Basin) are included for interpolation purposes.

3. There cam be some discrepancies between the published maps (accepted in July, 2005) and the data-base in its present form (continuously updated).

4. Despite my efforts, some cells can be missing, while others can be in duplicates (typically at the boundaries between different continents, because the model was constrained continent by continent).

I would be grateful if you can report to me any errors/inconsistencies in the model.

IV. Citation

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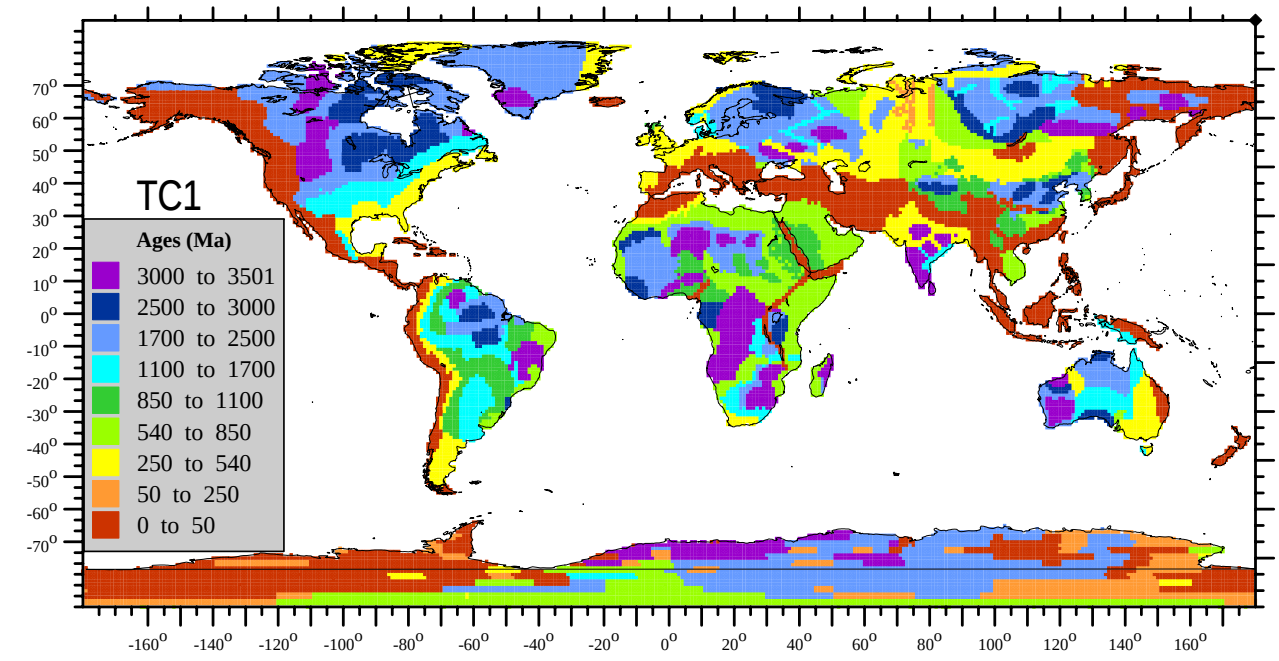
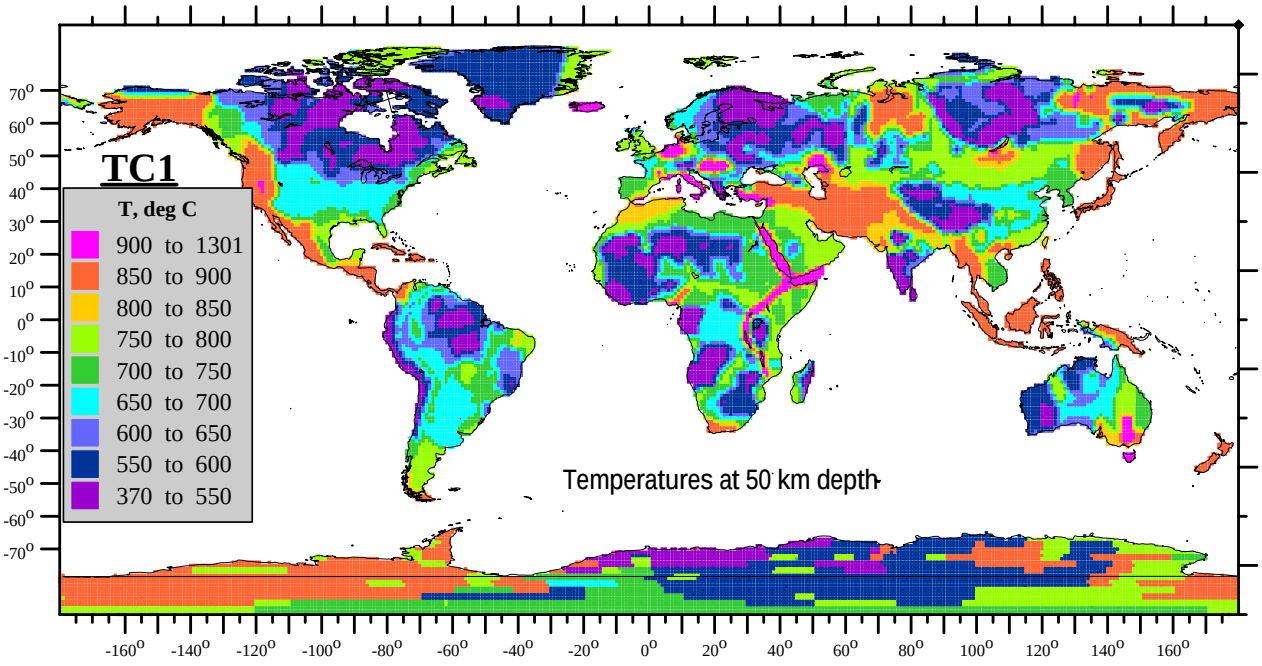
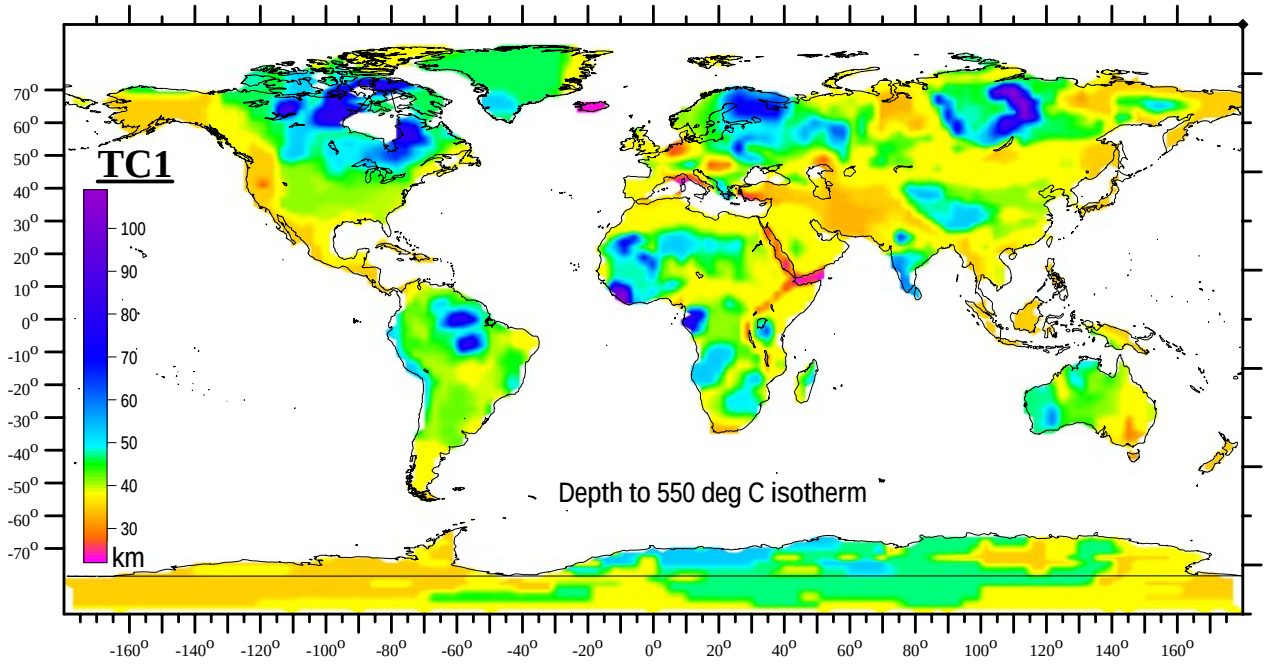
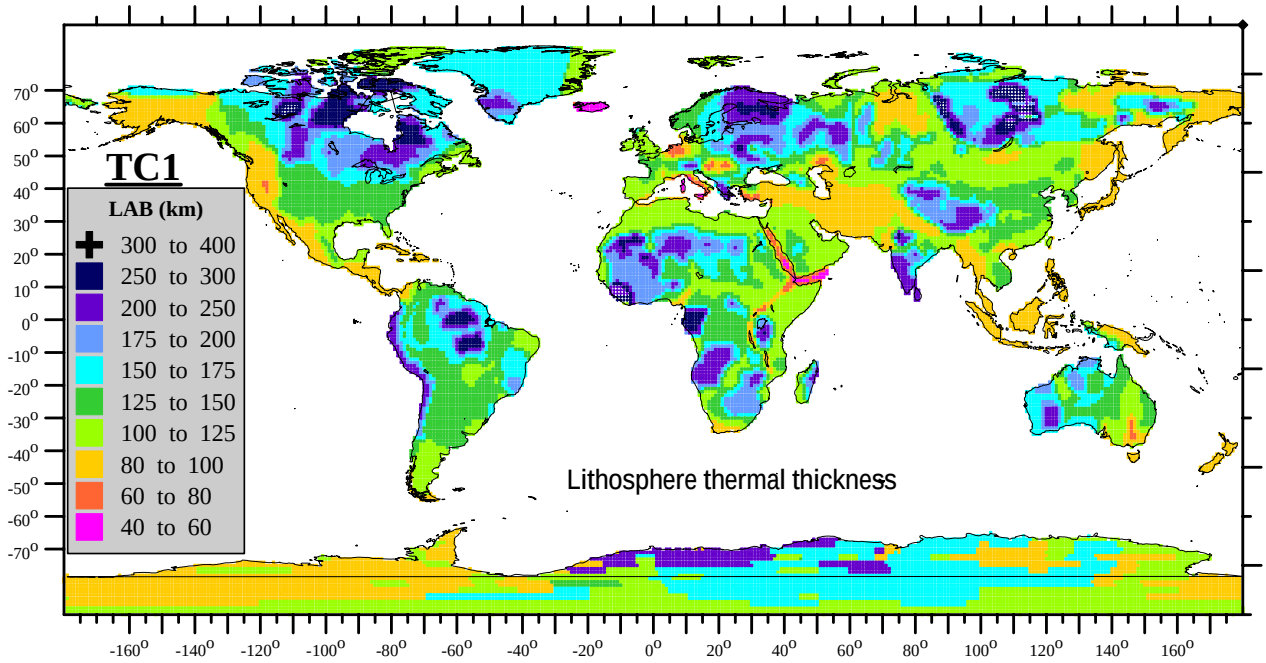

TC1
Ages (Ma)
3000 to 3501
2500 to 3000
1700 to 2500
1100 to 1700
850 to 1100
540 to 850
250 to 540
50 to 250
0 to 50
70° 60° 50° 40° 30° 20° 10° 0° -10° -20° -30° -40° -50° -60° -70°
-160° -140° -120° -100° -80° -60° -40° -20° 0° 20° 40° 60° 80° 100° 120° 140° 160°


TC1
T, deg C
900 to 1301
850 to 900
800 to 850
750 to 800
700 to 750
650 to 700
600 to 650
550 to 600
370 to 550
Temperatures at 50 km depth
70° 60° 50° 40° 30° 20° 10° 0° -10° -20° -30° -40° -50° -60° -70°
-160° -140° -120° -100° -80° -60° -40° -20° 0° 20° 40° 60° 80° 100° 120° 140° 160°


TC1
100
90
80
70
60
50
40
30
km
Depth to 550 deg C isotherm
70° 60° 50° 40° 30° 20° 10° 0° -10° -20° -30° -40° -50° -60° -70°
-160° -140° -120° -100° -80° -60° -40° -20° 0° 20° 40° 60° 80° 100° 120° 140° 160°


TC1
LAB (km)
300 to 400
250 to 300
200 to 250
175 to 200
150 to 175
125 to 150
100 to 125
80 to 100
60 to 80
40 to 60
Lithosphere thermal thickness
70° 60° 50° 40° 30° 20° 10° 0° -10° -20° -30° -40° -50° -60° -70°
-160° -140° -120° -100° -80° -60° -40° -20° 0° 20° 40° 60° 80° 100° 120° 140° 160°