2: Thermal Model and Properties (Continued)

The prior thermal model and the corresponding thermal properties are calibrated using an ensemble smoother with multi-data assimilation (4D-Var) approach (10). A compilation of available temperature data (1; 5) has been converted into regular spatial grids consisting of 2003 cells at depths between 0 - 4 km. For each grid cell, an uncertainty has been assigned based on the amount of data (fig. 3c, 5b, 5c, 12, 13) that are present within each grid cell and on the depth of the grid cell.

Aims:

1. Radiogenic heat generation in the upper crust (\(Q_{\text{rad}}\)).
2. Temperature data (x-axis) plotted against the prior model (y-axis). Blue colors indicate computed temperatures at 2 km of the prior temperature model compared to posterior mean model. Posterior mean model temperatures are too high.
3. Model Calibration

3: Model Calibration

The prior thermal model and the corresponding thermal properties are calibrated using an ensemble smoother with multi-data assimilation (4D-Var) approach (10). The thermal conductivity is iteratively updated for temperature and pressure. Each sedimentary lithotype consists of a lithology or a mixture of lithologies. Thermal properties are assigned accordingly. The thermal conductivity is iteratively updated for temperature and pressure.

According to the uncertainty ranges, probability density functions (pdf) are assigned to the prior model temperatures (y-axis). Temperature data plotted against the prior model temperatures showing an improved fit. Uncertainty ranges for the prior parameters:

- Temperature data (x-axis) plotted against the prior model temperature (y-axis). Blue colors indicate computed temperatures at 2 km of the prior temperature model compared to posterior mean model. Posterior mean model temperatures are too high.
- Temperature data (x-axis) plotted against the prior model temperatures showing an improved fit. Uncertainty ranges for the prior parameters:

- Temperature data (x-axis) plotted against the prior model temperature (y-axis). Blue colors indicate computed temperatures at 2 km of the prior temperature model compared to posterior mean model. Posterior mean model temperatures are too high.

References and Acknowledgements