Baking temperature estimation



Training school TS3 Prague, 29 – 31 March 2022





Dr. Simo Spassov Geophysical Centre of the Royal Meteorological Institute, Belgium

simo@meteo.be





Funded by the Horizon 2020 Framework Programme of the European Union



During the last cooling cycle in the past:

Baked material acquired a magnetisation parallel to the ambient Earth's field at that time.

This information is stored until present day.

Basic approach

Re-heating the sample in the laboratory to get the ancient absolute field intensity.





Sampling interval ~20 mm; 9 specimens

ancient heating milieu	-	oxidising	reducing
laboratory heating milieu	oxidising	oxidising	oxidising
changes expected	yes	no	yes



Powder specimens

- 1. Coercivity-spectrometer measurement of original sample
- 2. Laboratory re-heating of sample for 0.5 h @ elevated temperature
- 3. Susceptibility measurement
- 4. Coercivity-spectrometer measurement of heated sample
- 5. Next heating

steps 150, 250, 350, 450, 550, 650 °C



- IRM acquisition
- backfield curve
- hysteresis curves
- Time dependence of remanence









SAGA TS 3, Prague, 29-31. III. 2022

Model

1D-Heat conduction



Boundary conditions

At 0 cm

Temperature changes with time T = f(t)

1D-Heat conduction





1D-Heat conduction model





Spassov & Hus 2006 model