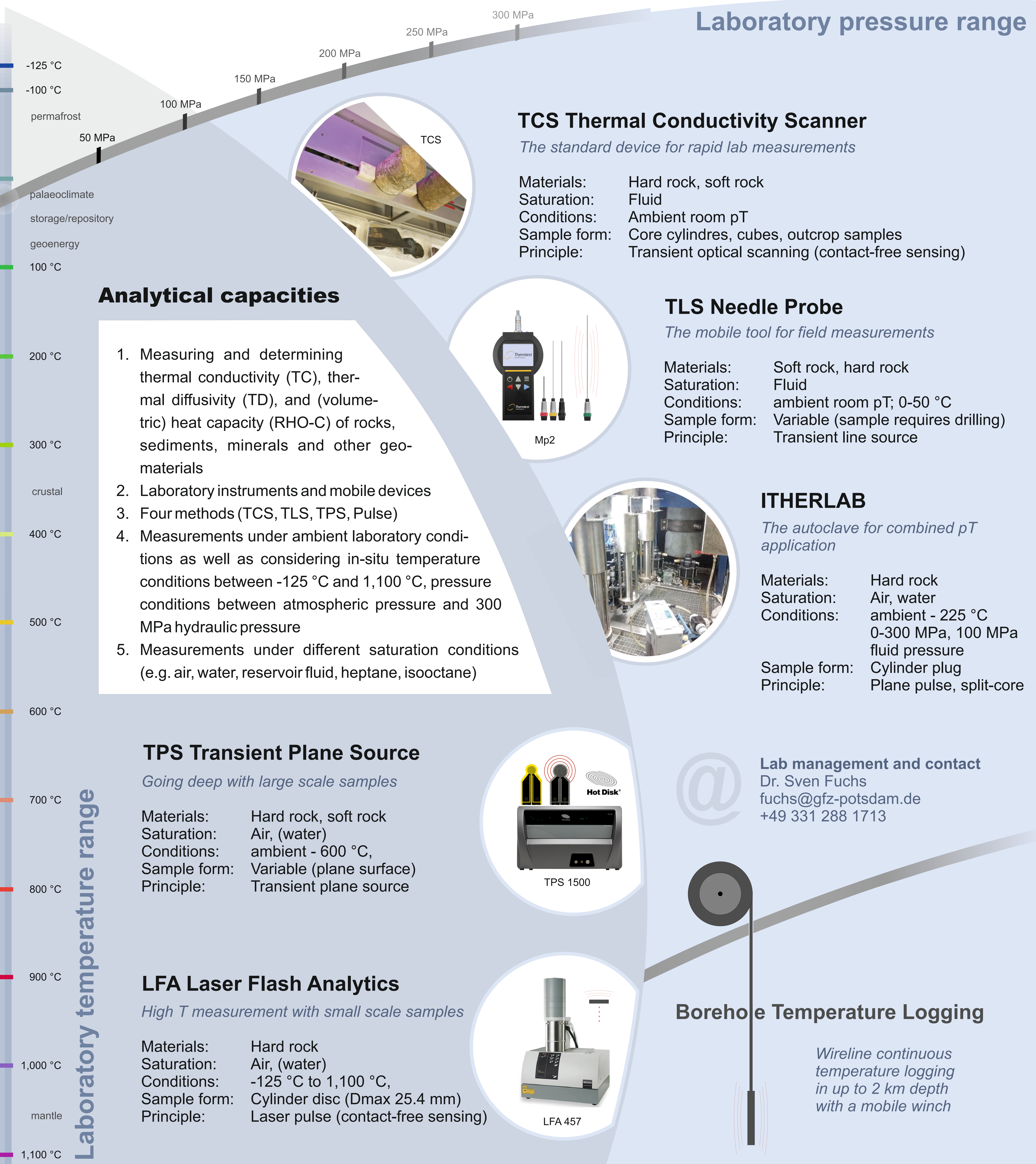


# GFZ Thermal Petrophysics Lab

Measuring thermal properties of geomaterials - Laboratory and wireline techniques at GFZ

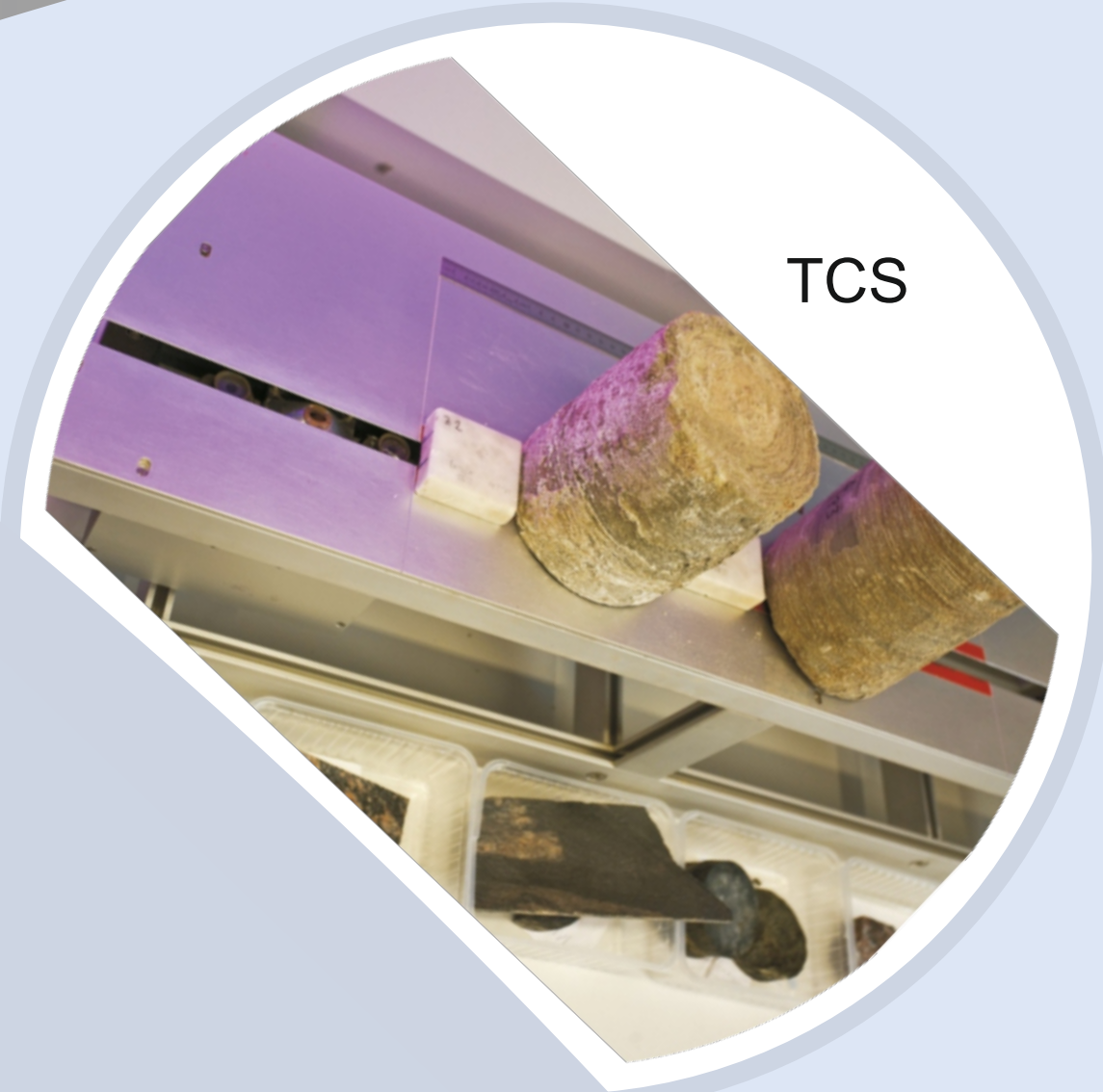


## Laboratory pressure range

### TCS Thermal Conductivity Scanner

*The standard device for rapid lab measurements*

Materials: Hard rock, soft rock  
 Saturation: Fluid  
 Conditions: Ambient room pT  
 Sample form: Core cylinders, cubes, outcrop samples  
 Principle: Transient optical scanning (contact-free sensing)



### Analytical capacities

1. Measuring and determining thermal conductivity (TC), thermal diffusivity (TD), and (volumetric) heat capacity (RHO-C) of rocks, sediments, minerals and other geomaterials
2. Laboratory instruments and mobile devices
3. Four methods (TCS, TLS, TPS, Pulse)
4. Measurements under ambient laboratory conditions as well as considering in-situ temperature conditions between -125 °C and 1,100 °C, pressure conditions between atmospheric pressure and 300 MPa hydraulic pressure
5. Measurements under different saturation conditions (e.g. air, water, reservoir fluid, heptane, isooctane)



### TLS Needle Probe

*The mobile tool for field measurements*

Materials: Soft rock, hard rock  
 Saturation: Fluid  
 Conditions: ambient room pT; 0-50 °C  
 Sample form: Variable (sample requires drilling)  
 Principle: Transient line source



### ITHERLAB

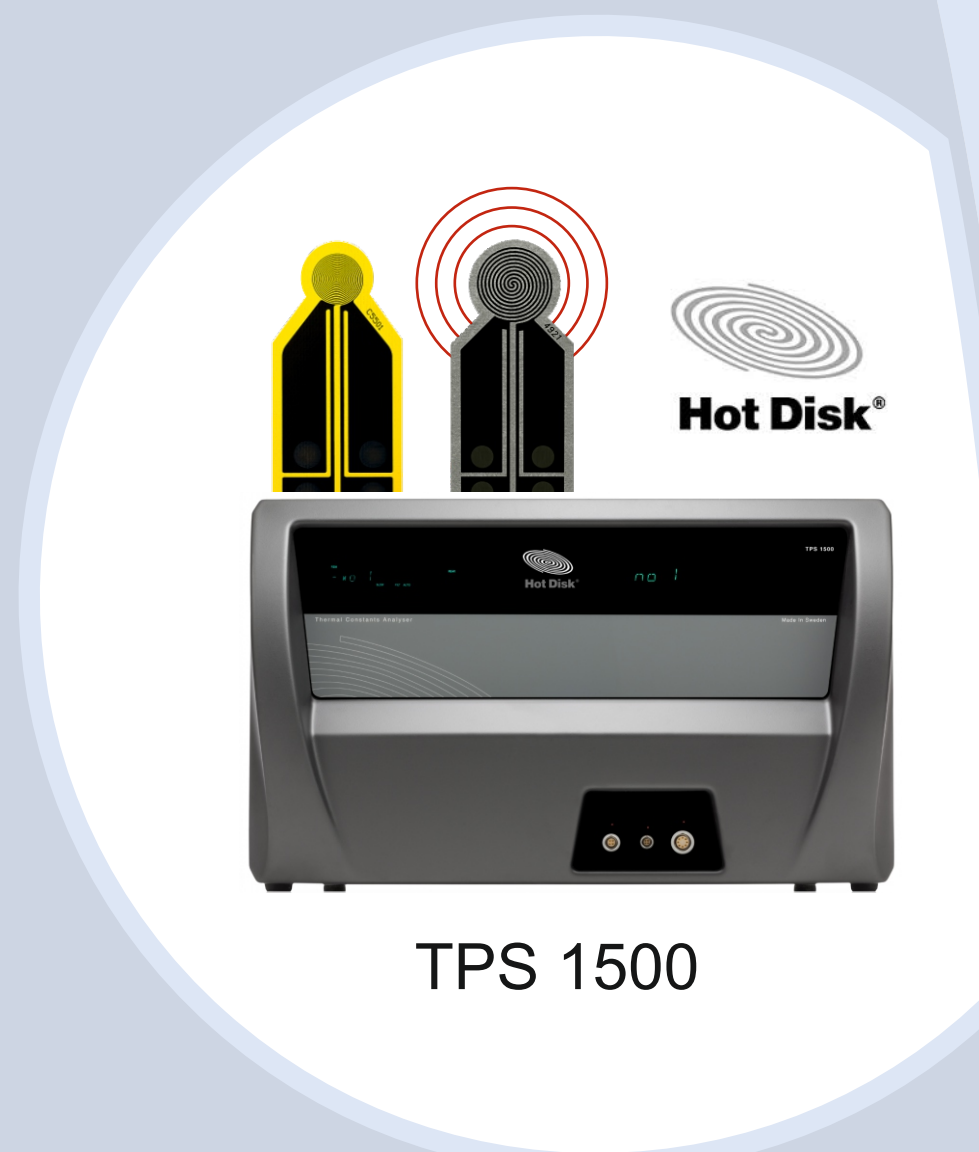
*The autoclave for combined pT application*

Materials: Hard rock  
 Saturation: Air, water  
 Conditions: ambient - 225 °C  
 0-300 MPa, 100 MPa fluid pressure  
 Sample form: Cylinder plug  
 Principle: Plane pulse, split-core

### TPS Transient Plane Source

*Going deep with large scale samples*

Materials: Hard rock, soft rock  
 Saturation: Air, (water)  
 Conditions: ambient - 600 °C,  
 Sample form: Variable (plane surface)  
 Principle: Transient plane source



### Lab management and contact

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### LFA Laser Flash Analytics

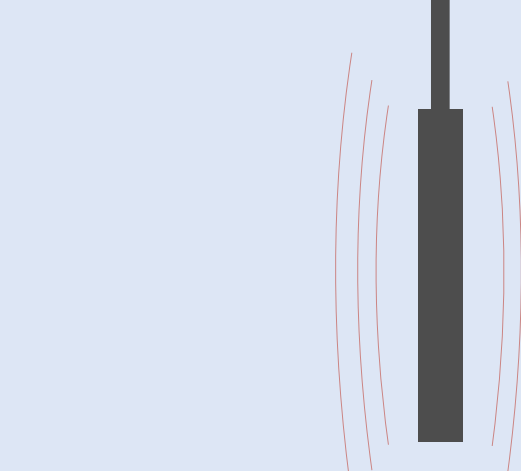
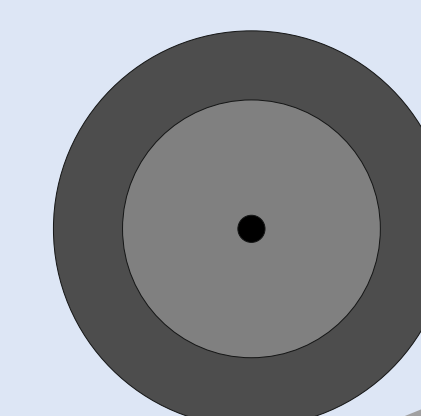
*High T measurement with small scale samples*

Materials: Hard rock  
 Saturation: Air, (water)  
 Conditions: -125 °C to 1,100 °C,  
 Sample form: Cylinder disc (Dmax 25.4 mm)  
 Principle: Laser pulse (contact-free sensing)



### Borehole Temperature Logging

*Wireline continuous temperature logging in up to 2 km depth with a mobile winch*



Laboratory temperature range