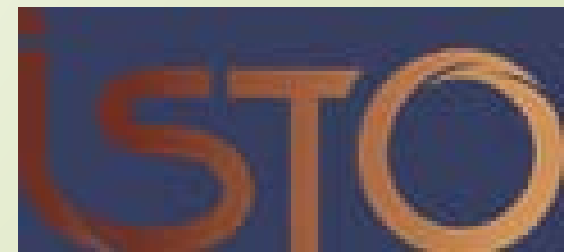


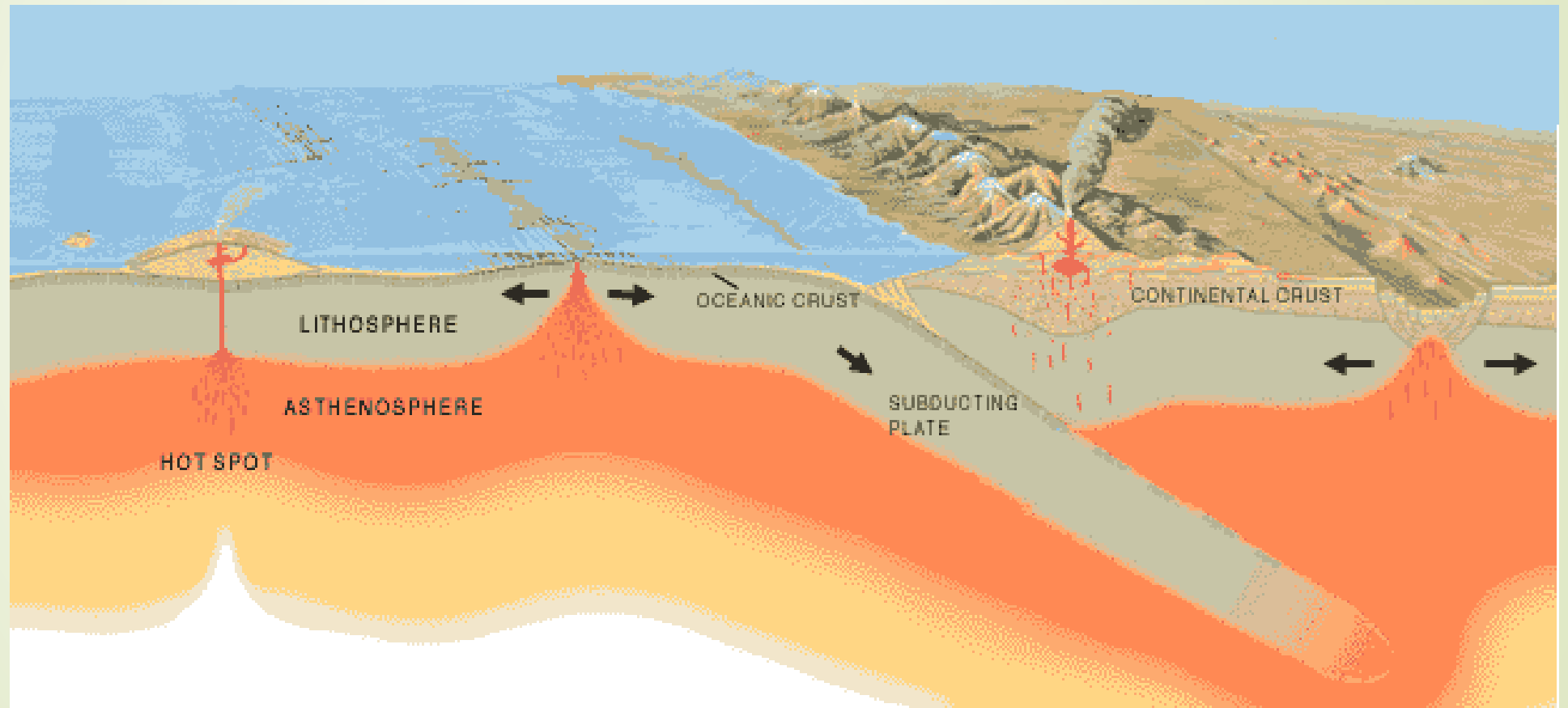
MESURES EXPÉRIMENTALES DES CONDUCTIVITÉS ÉLECTRIQUES DE LIQUIDES SILICATÉS ET CARBONATÉS EN PRESSION ET TEMPÉRATURE & QUELQUES APPLICATIONS GÉOPHYSIQUES

Fabrice GAILLARD

Institut des Sciences de la Terre d'Orléans- ISTO



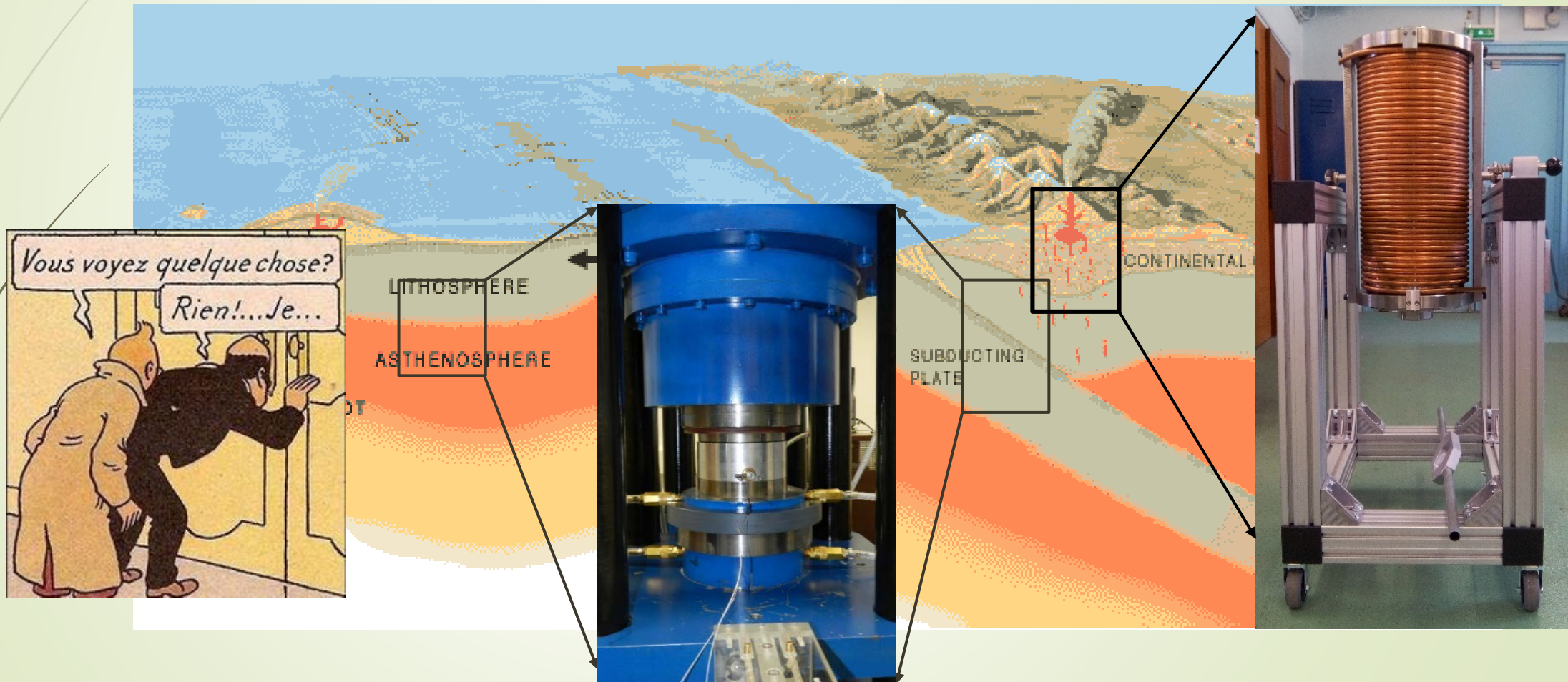
- Systèmes Magmatiques → Vecteurs chimiques / chaleur



EQUIPE Magmas



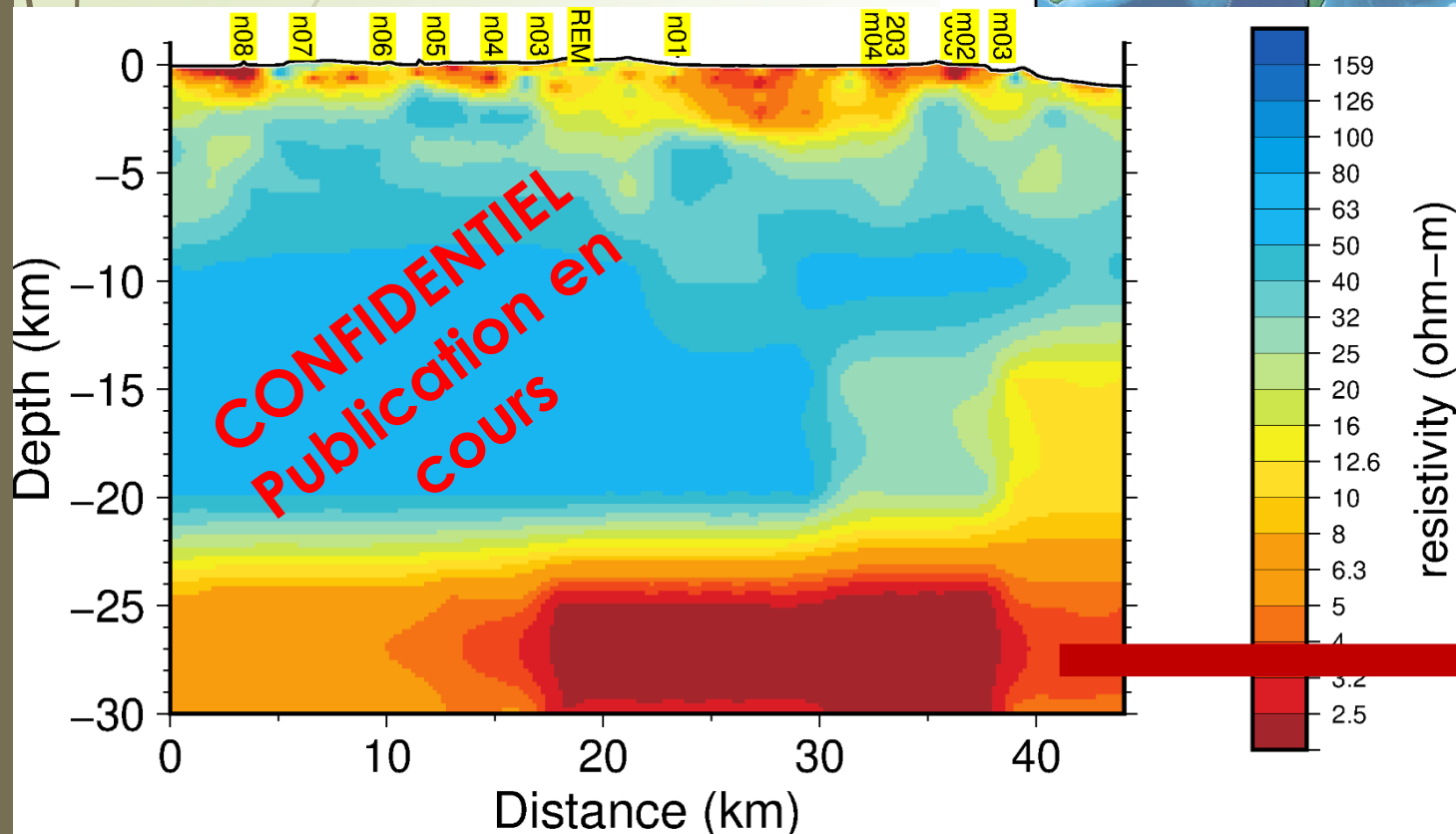
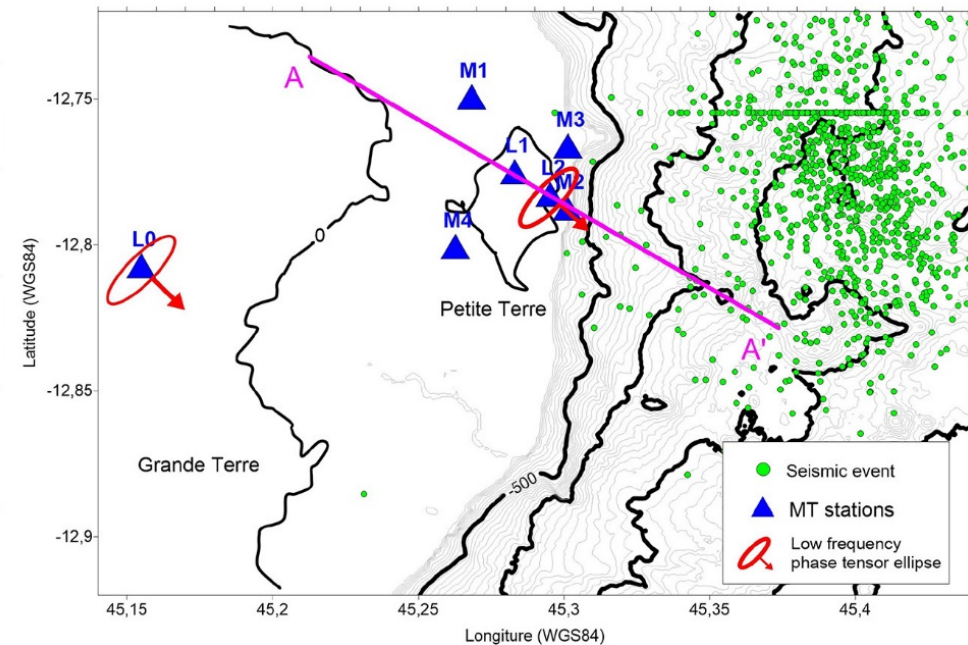
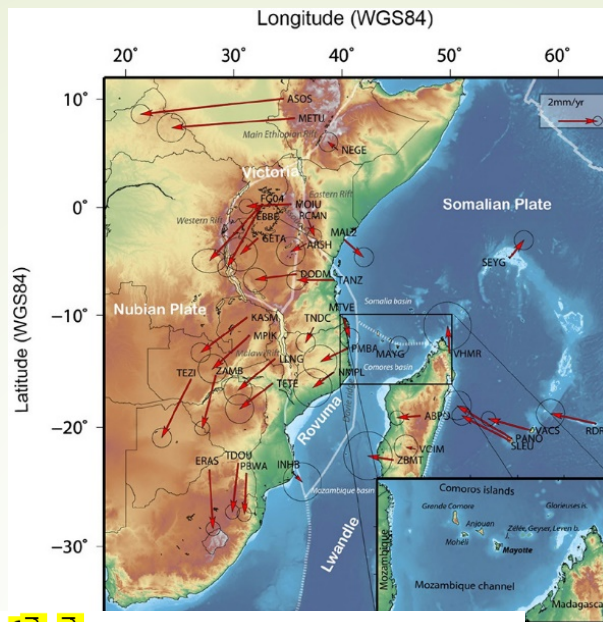
- Simulation du magmatisme → **Expérimentale**



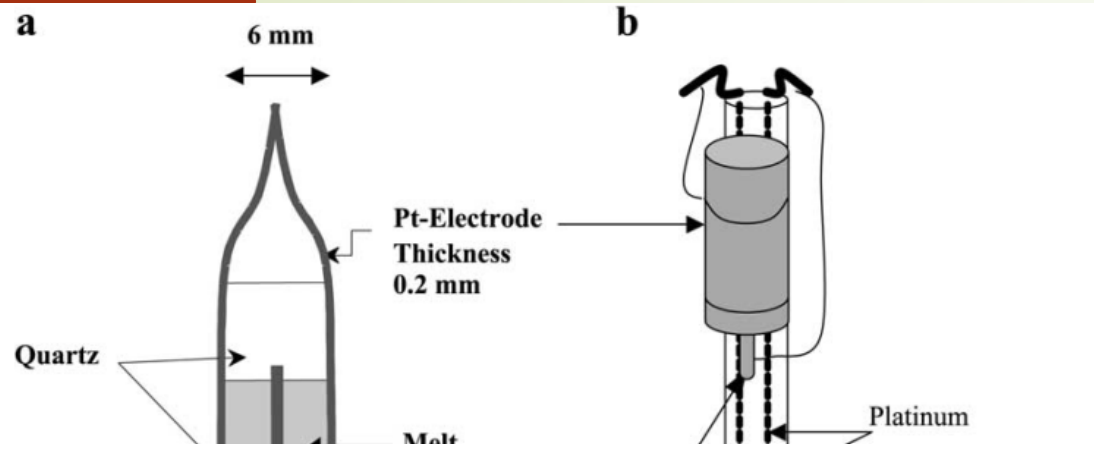
MOTIVATIONS:

Magnéto-Tellurique

ex: MAYOTTE



Anomalie de conductivité électrique



Laboratory measurements of electrical conductivity of hydrous and dry silicic melts under pressure

Fabrice Gaillard *

Bayerisches Geoinstitut, Universität Bayreuth, D-95440 Bayreuth, Germany

After a run of 12 hours at

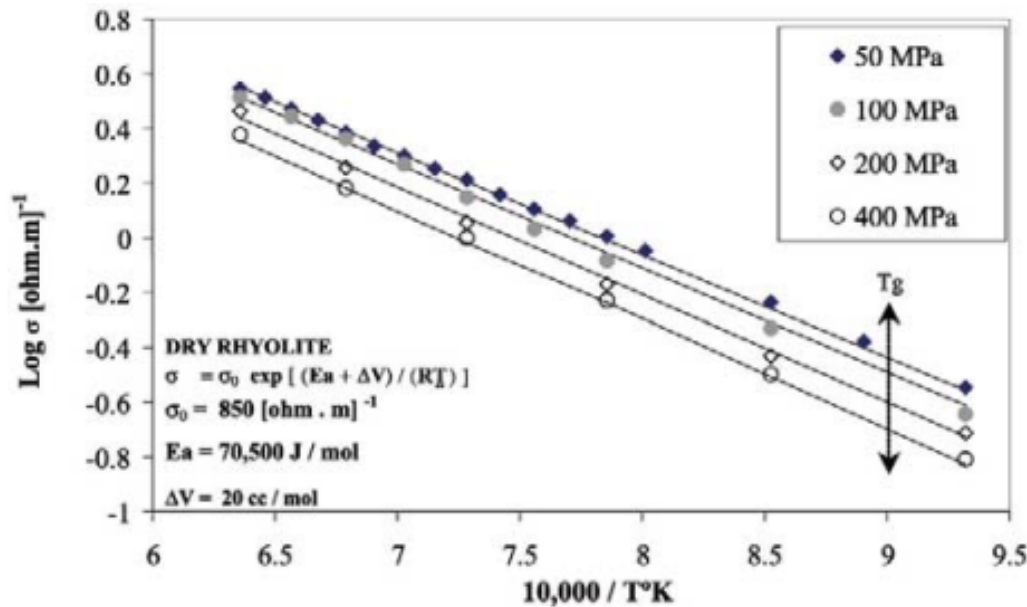


Fig. 5. Arrhenius plot of the conductivity results for the dry obsidian in the temperature range of 1300–800°C. Both tem-

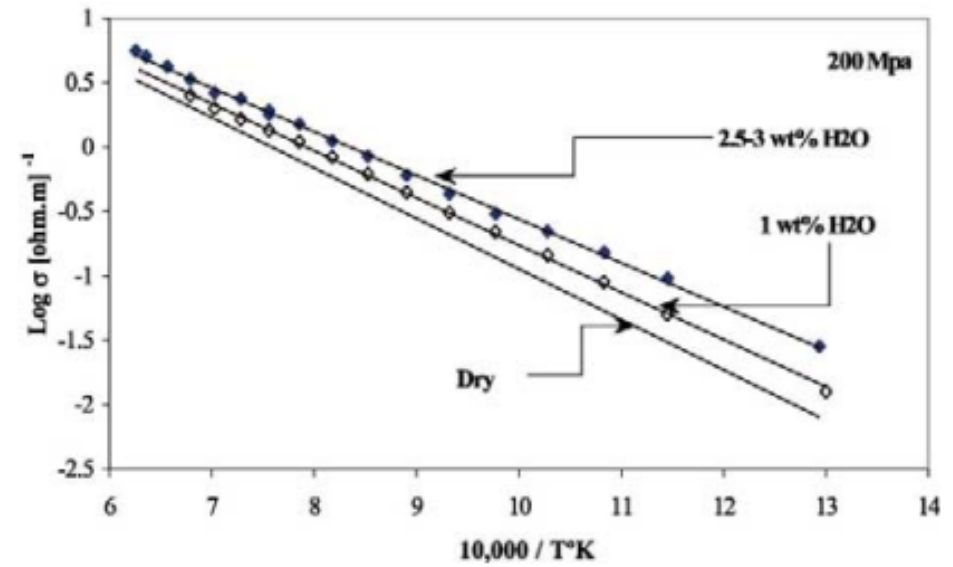


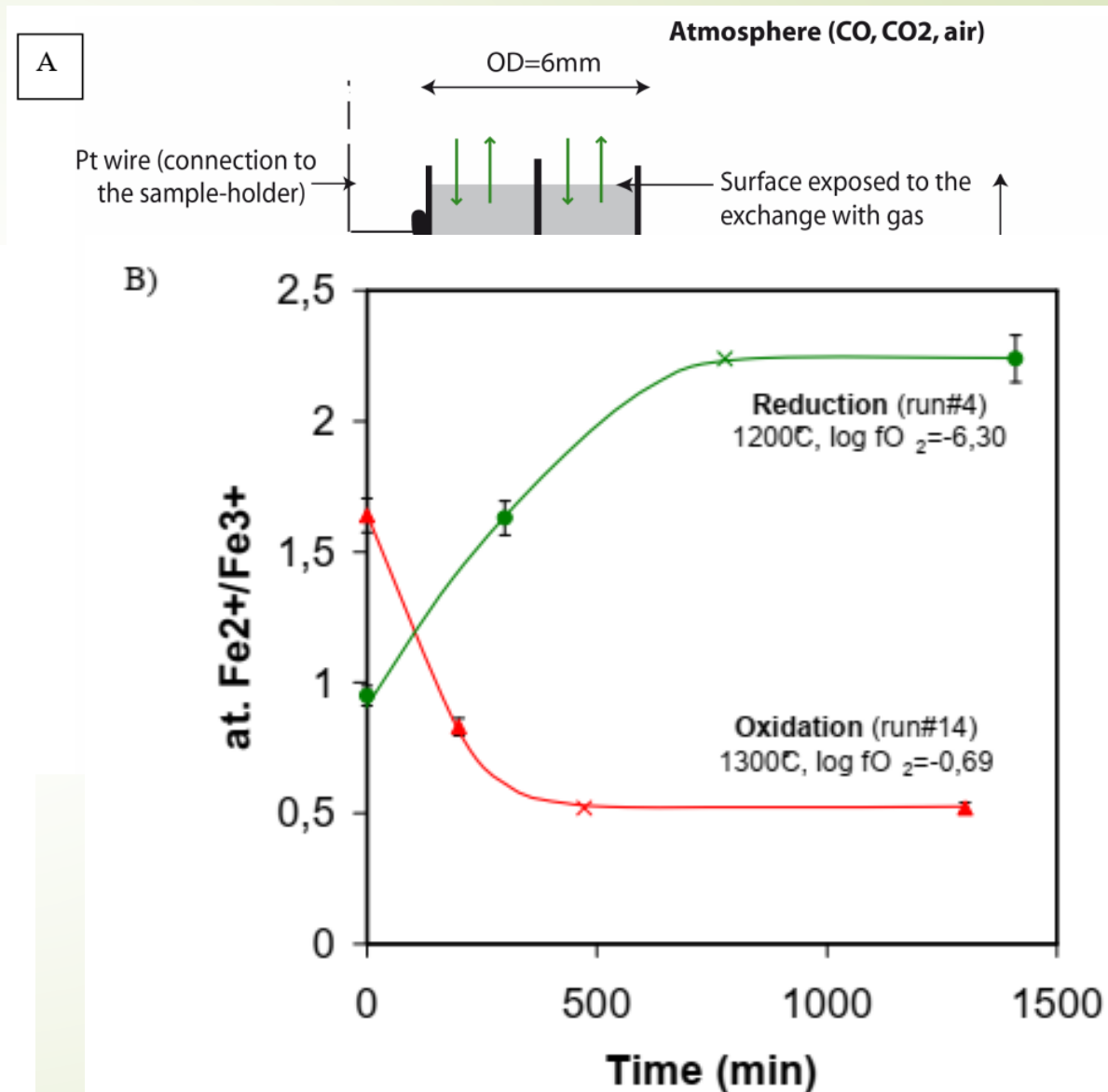
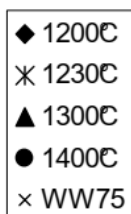
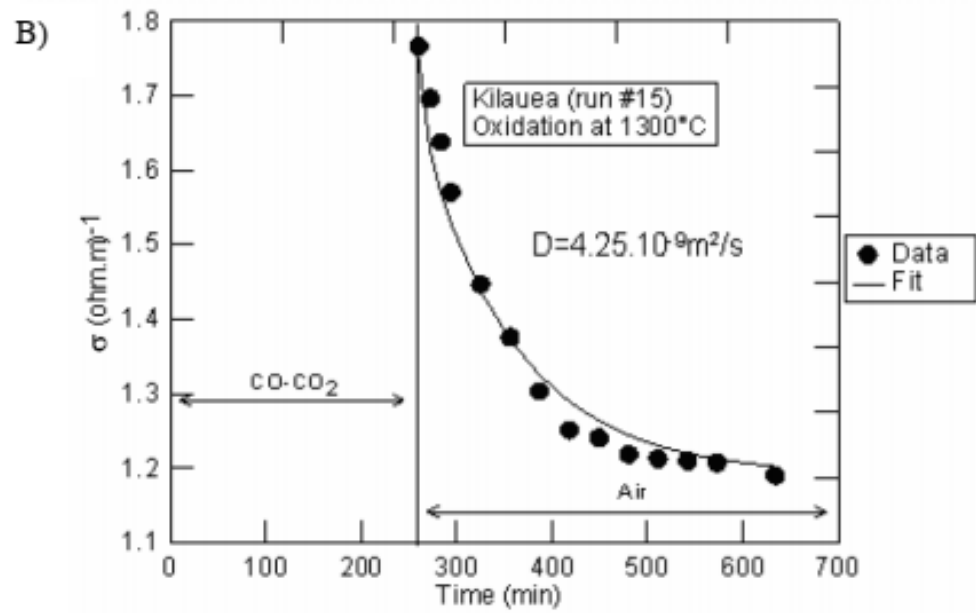
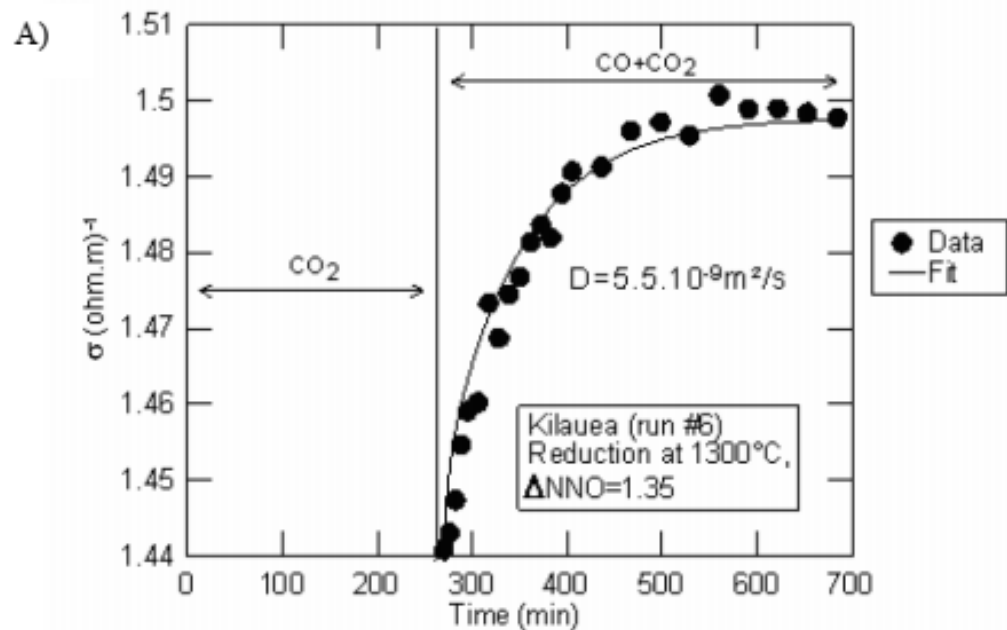
Fig. 7. Arrhenius plot of the conductivity results for hydrous obsidians in the temperature range of 1325–500°C at 200 MPa. The temperature effect can be reproduced using an Ar-

CONDUCTIVITÉ ÉLECTRIQUE DES LIQUIDES SILICATES

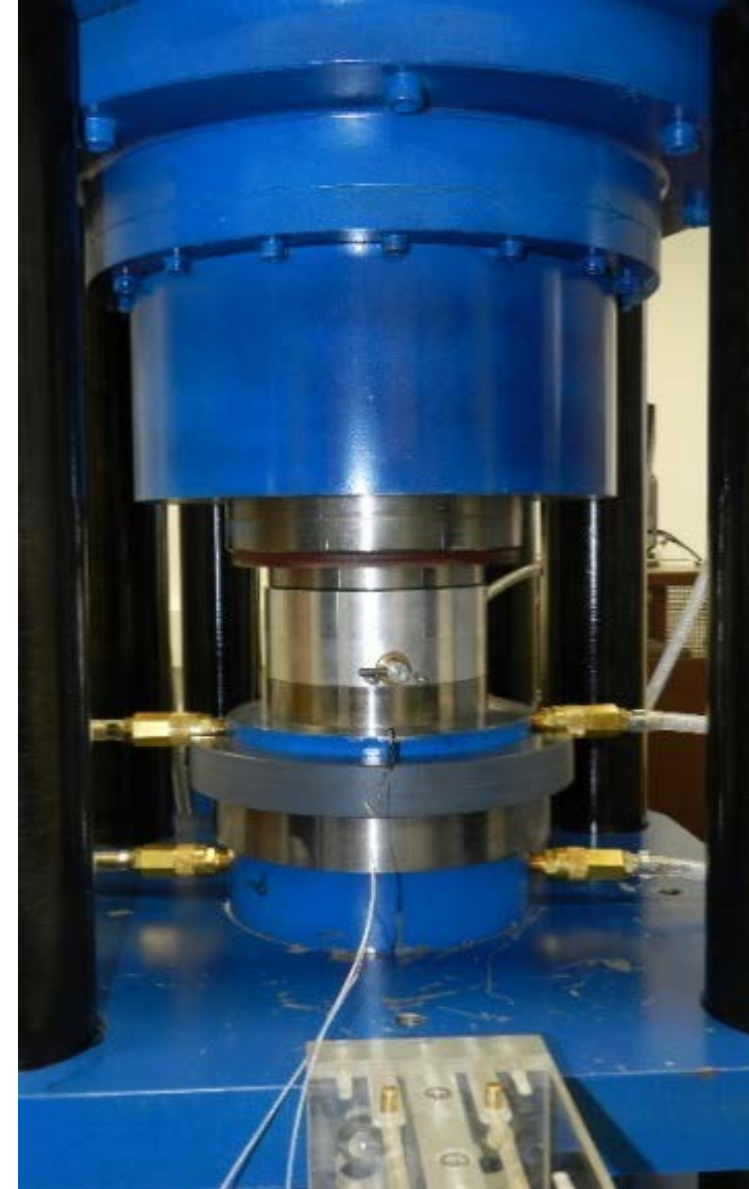
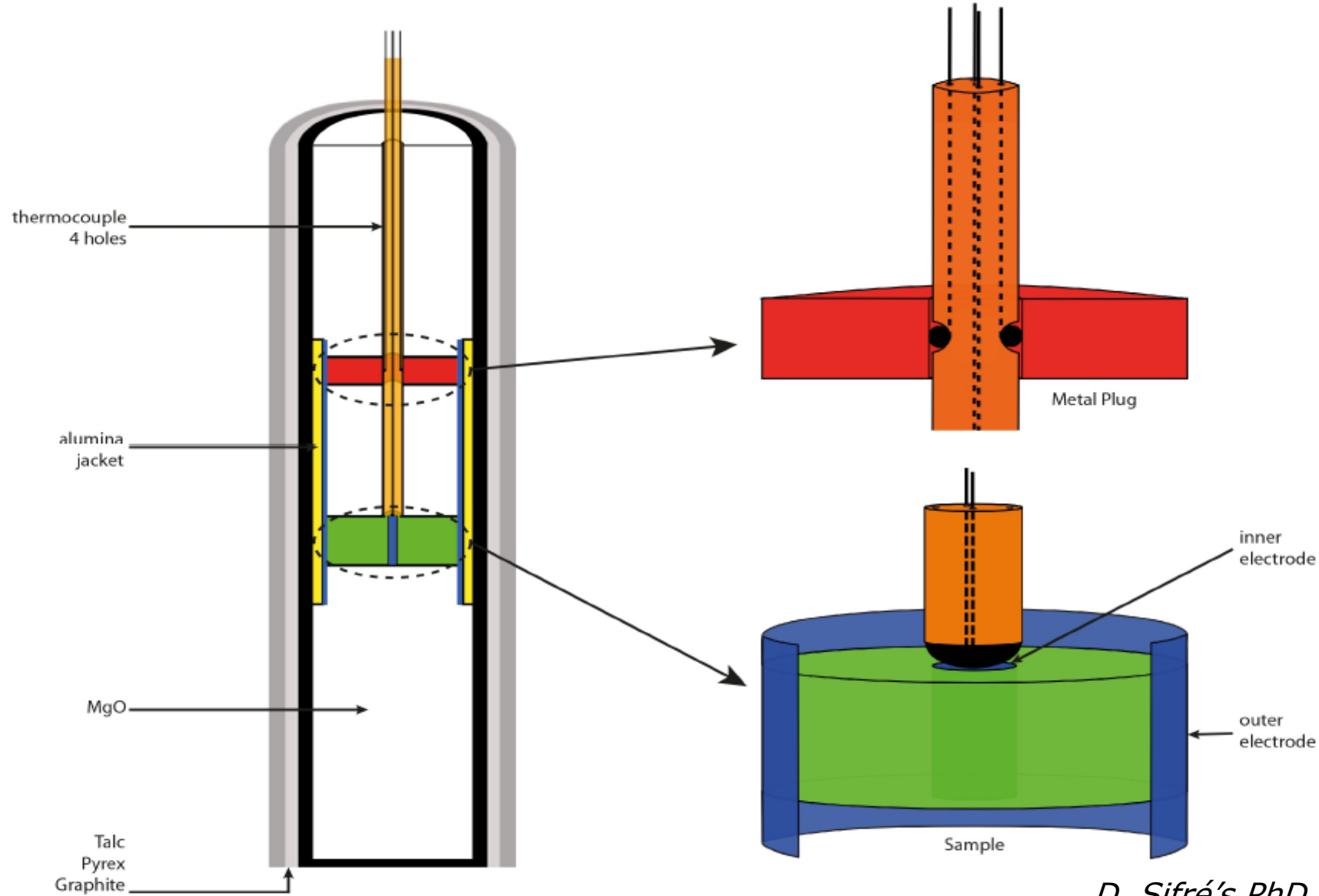
*Anne Pommier
David Sifré
Leila Hashim
Mickael Laumonier
Jinyu Chen*

- Effet de PO_2
- Effets de H_2O & CO_2
- Effet de Pression (& Température)

MESURES SOUS PO₂ CONTRÔLÉE

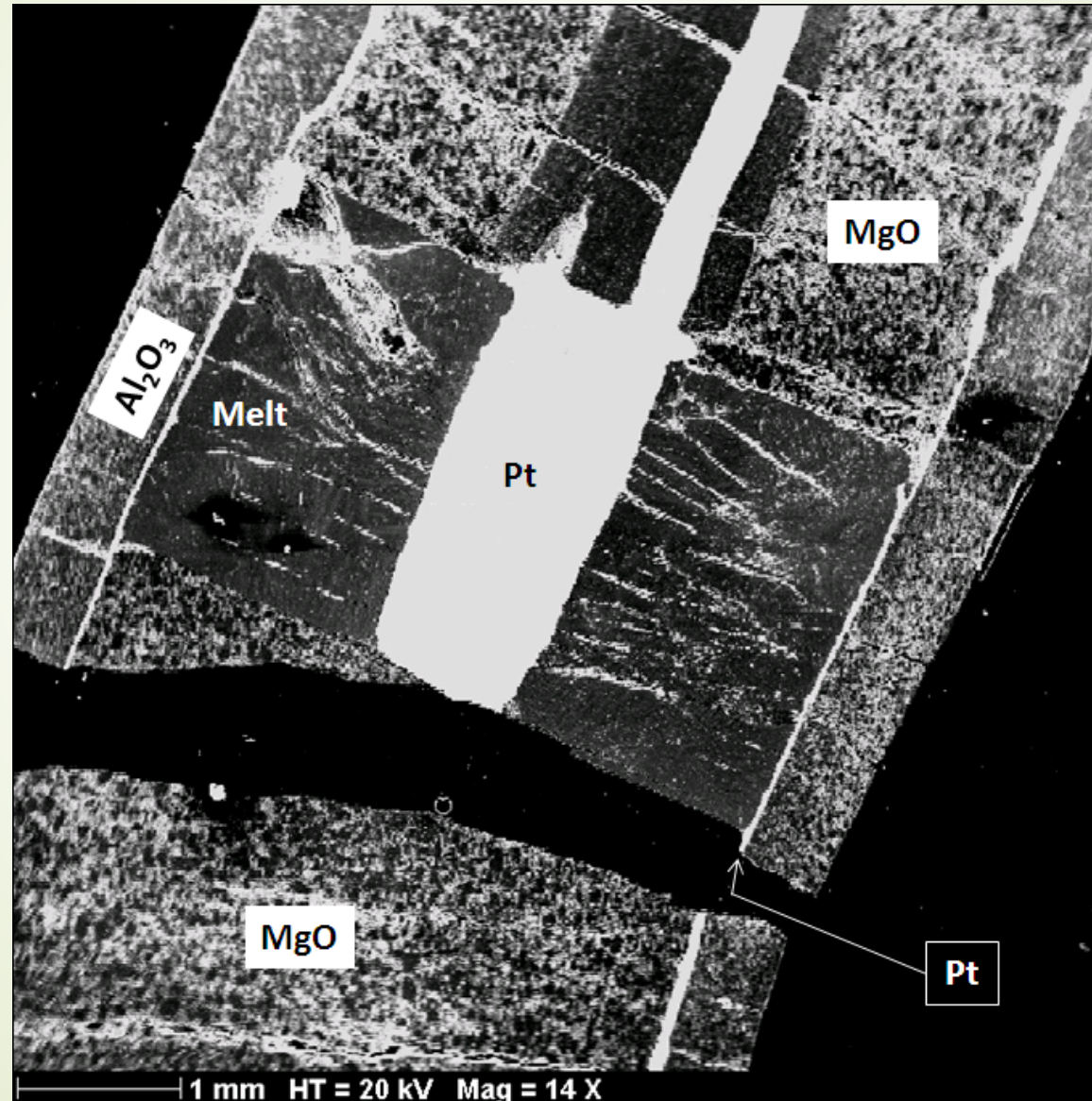


CONDUCTIVITÉ ÉLECTRIQUE EN HAUTE PRESSION

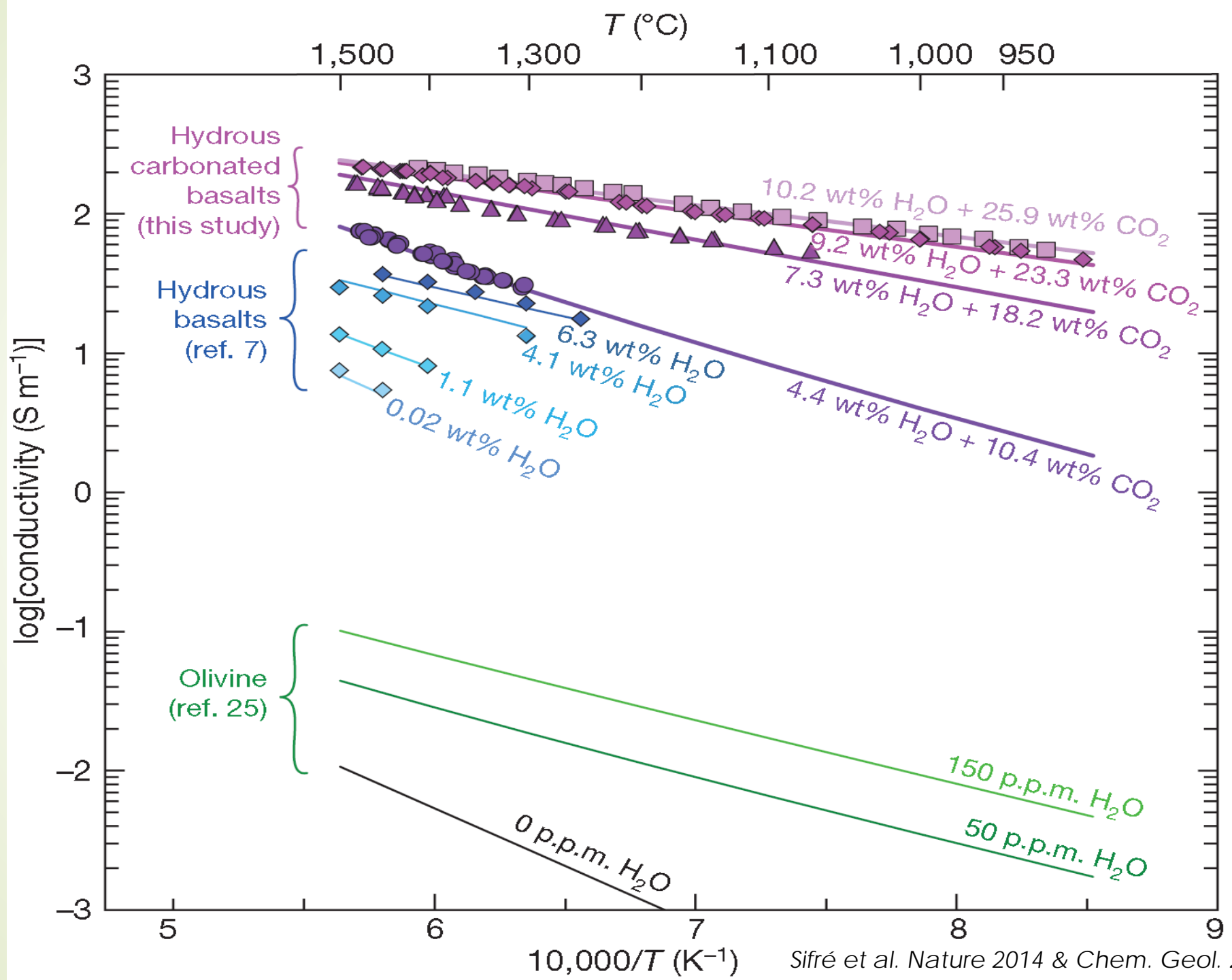


D. Sifré's PhD

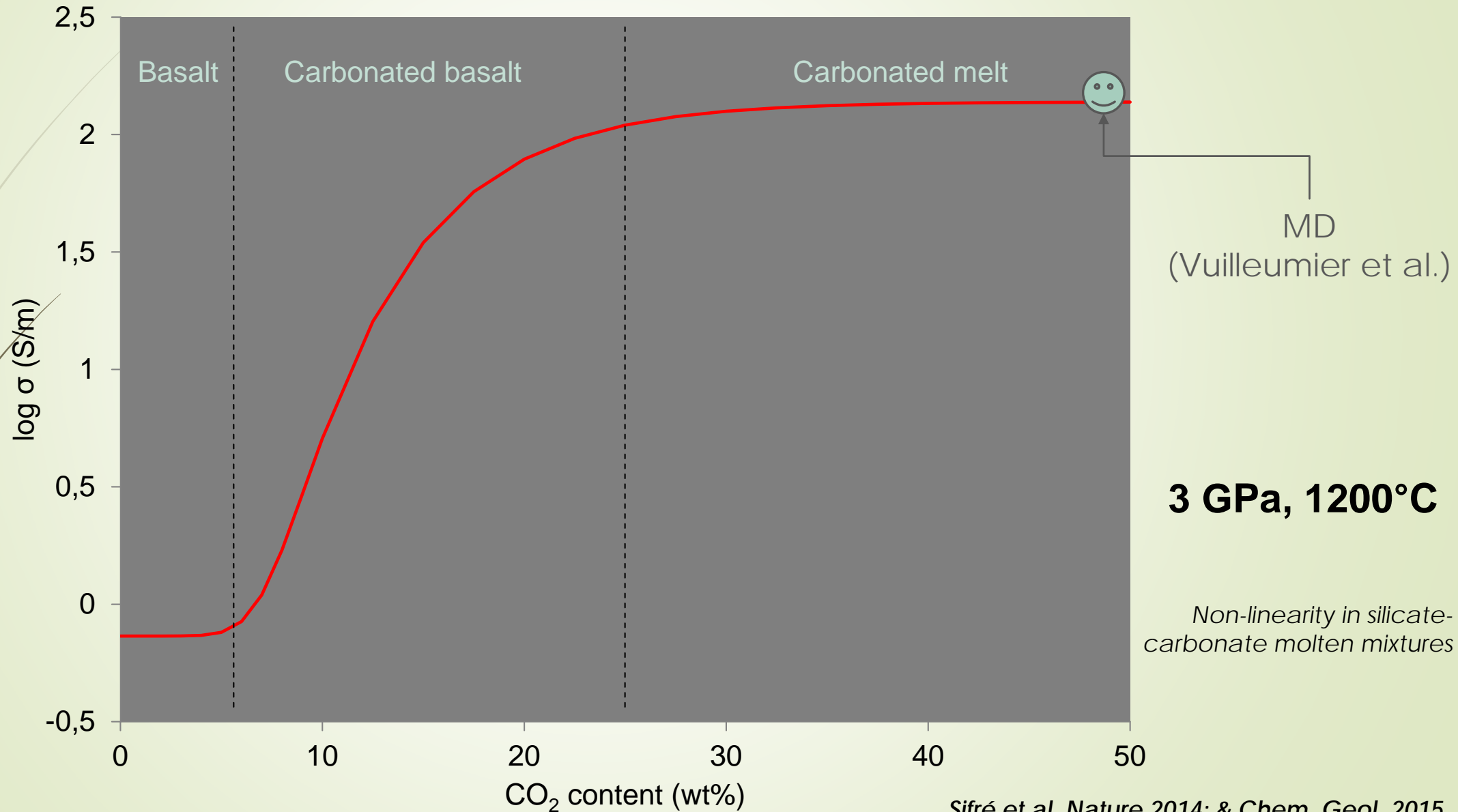
AFTER a RUN @ 1550°C & 3 GPa



EFFET DU CO₂



CONDUCTIVITÉ ÉLECTRIQUE DES LIQUIDES: SILICATE → CARBONATE



EFFET DE PRESSION

$$\sigma = \sigma_0 \cdot \exp [(-Ea + P\Delta V) / R T]$$

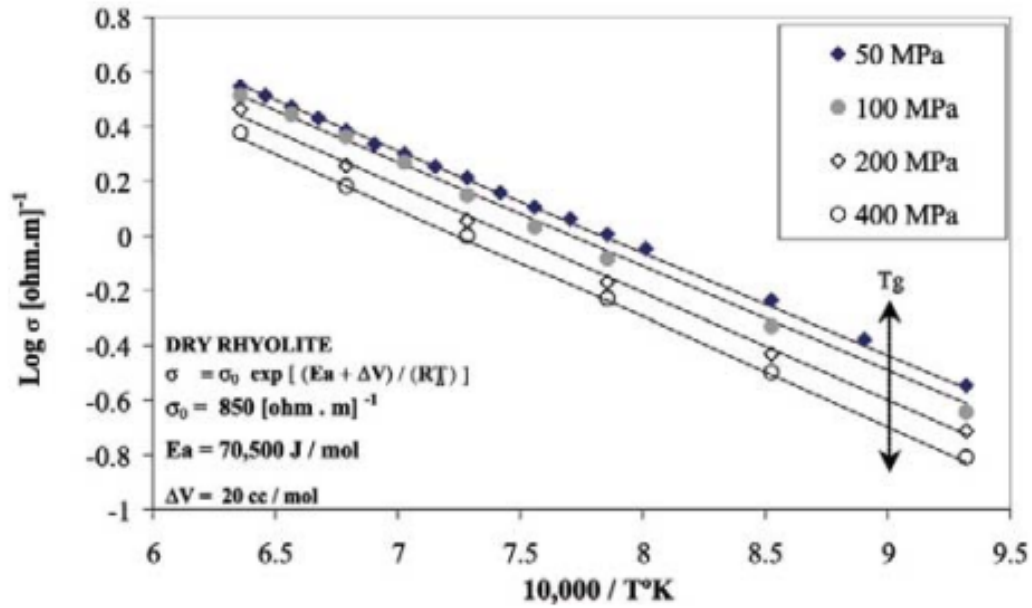
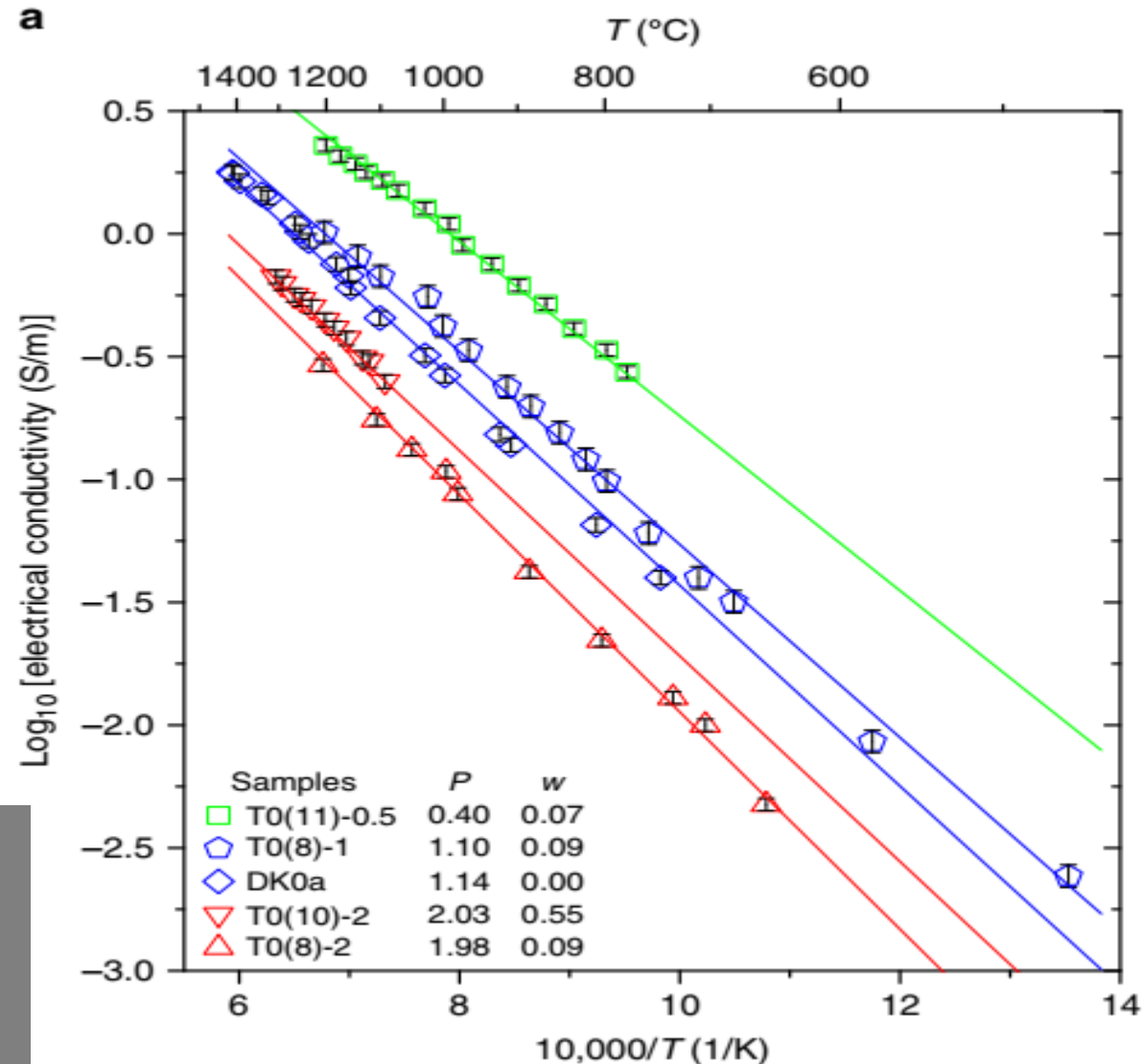


Fig. 5. Arrhenius plot of the conductivity results for the dry obsidian in the temperature range of 1300–800°C. Both tem-



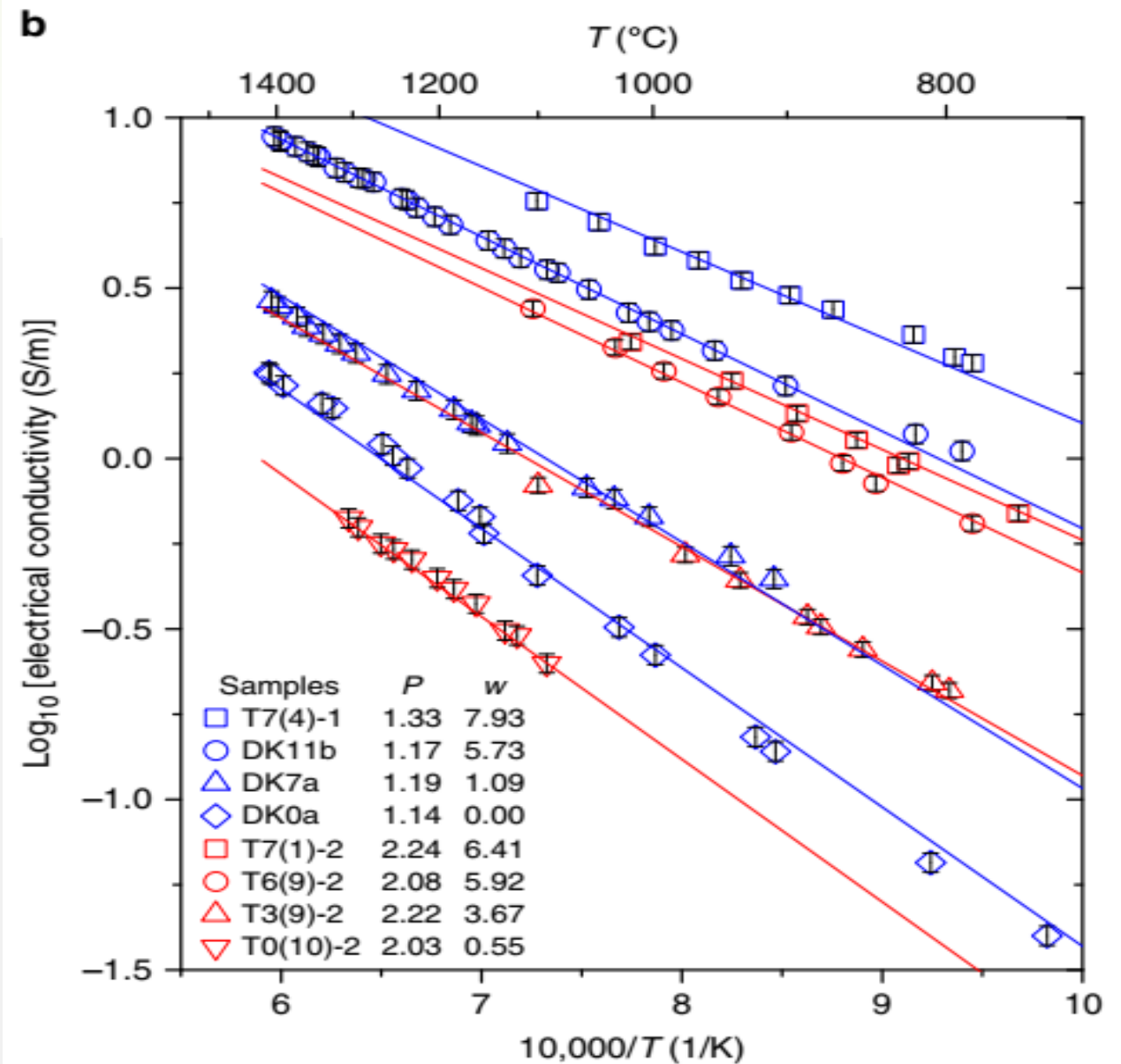
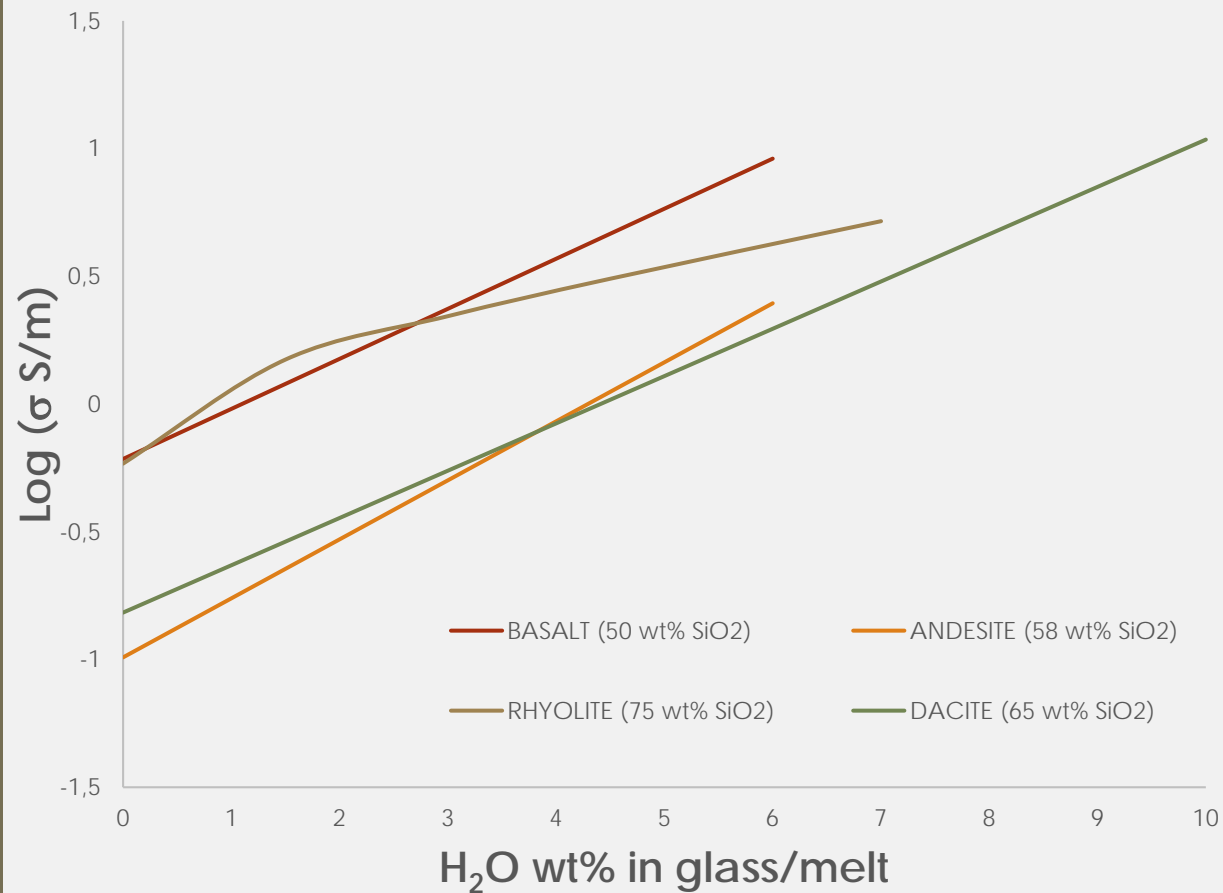
Linéaire; Volume d'activation cst.

Dépend de composition chimique du silicate:

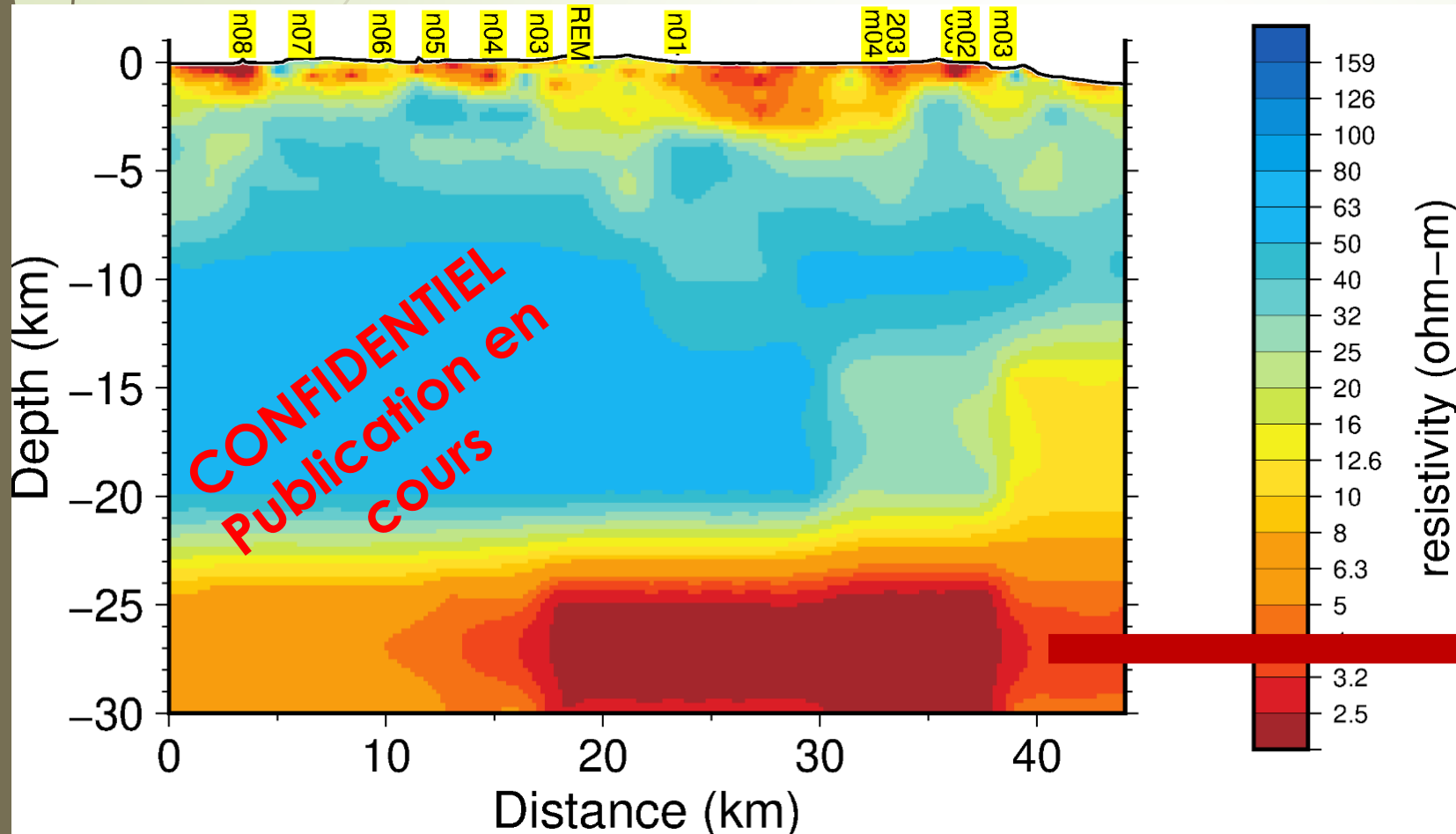
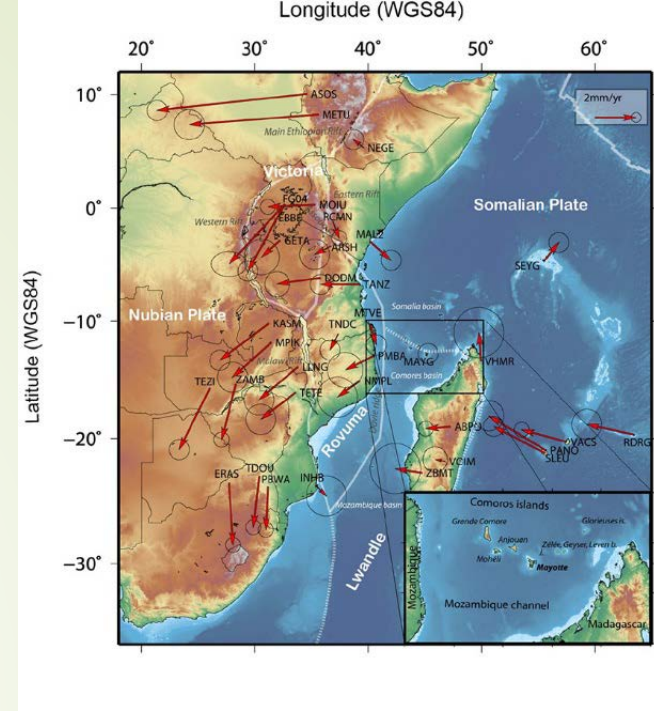
Fort pour liquide polymérisé; faible pour liq. dépolymérisé

EFFET DE H₂O

T=1100°C; P=1 GPa



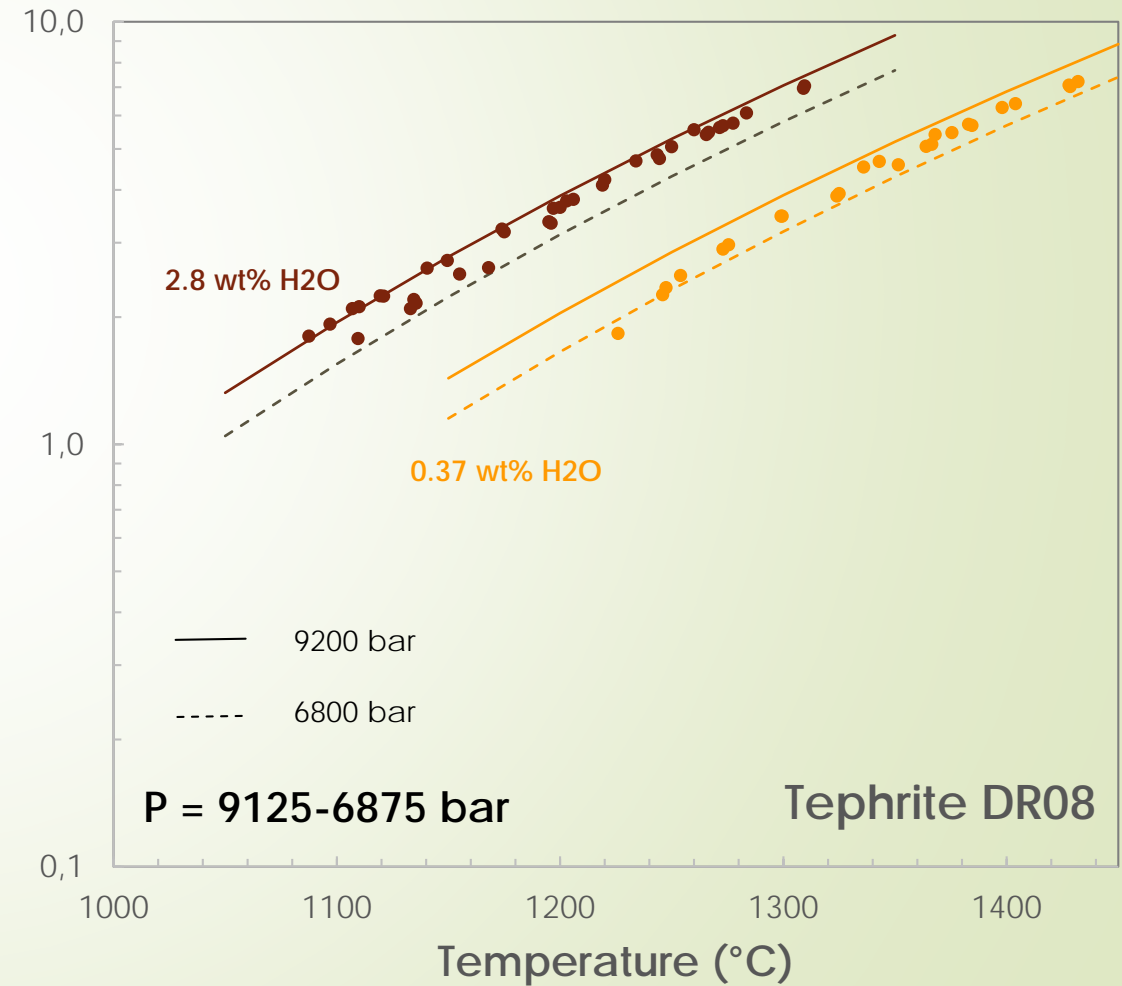
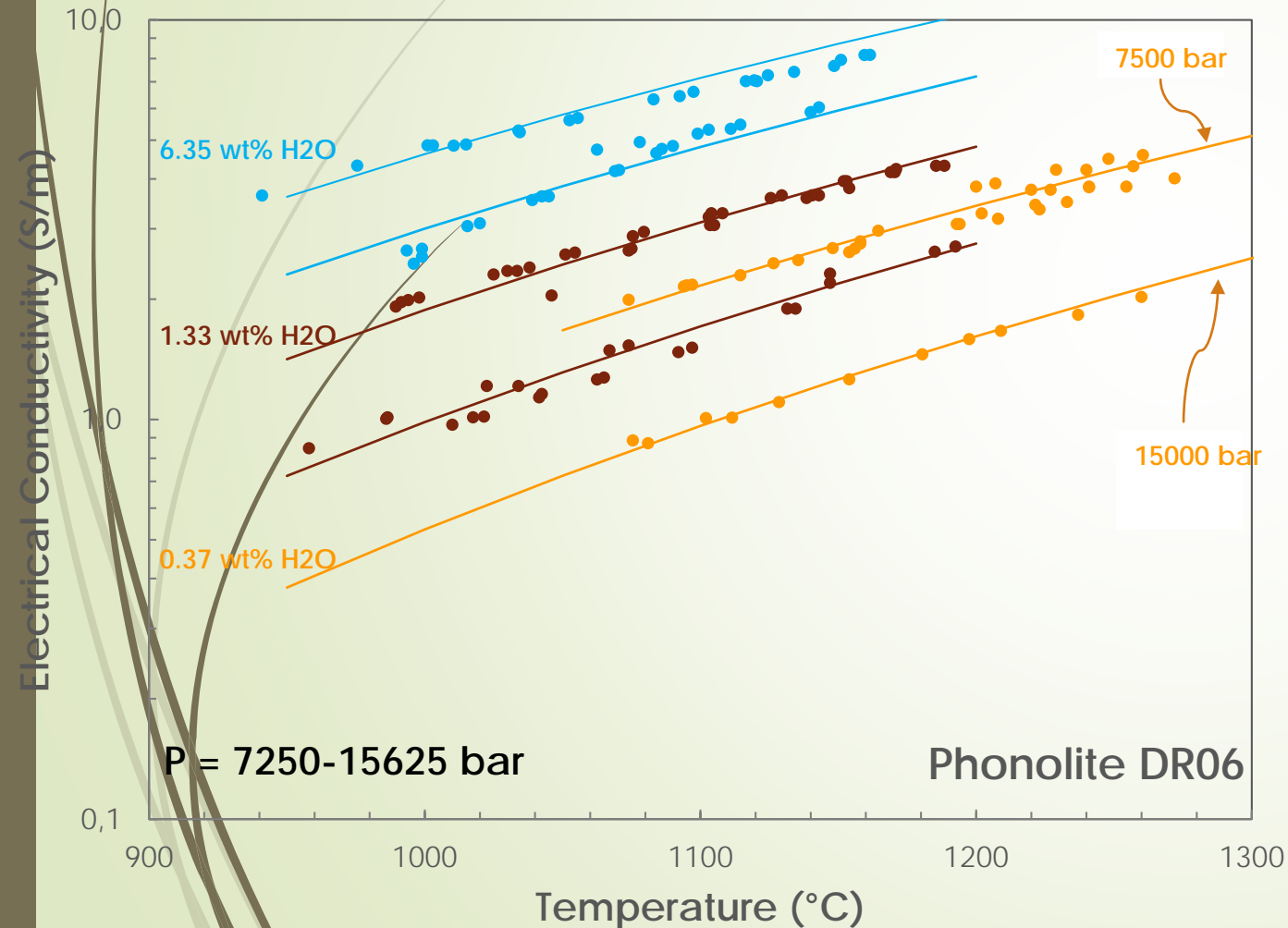
IL Y A QUOI SOUS MAYOTTE?



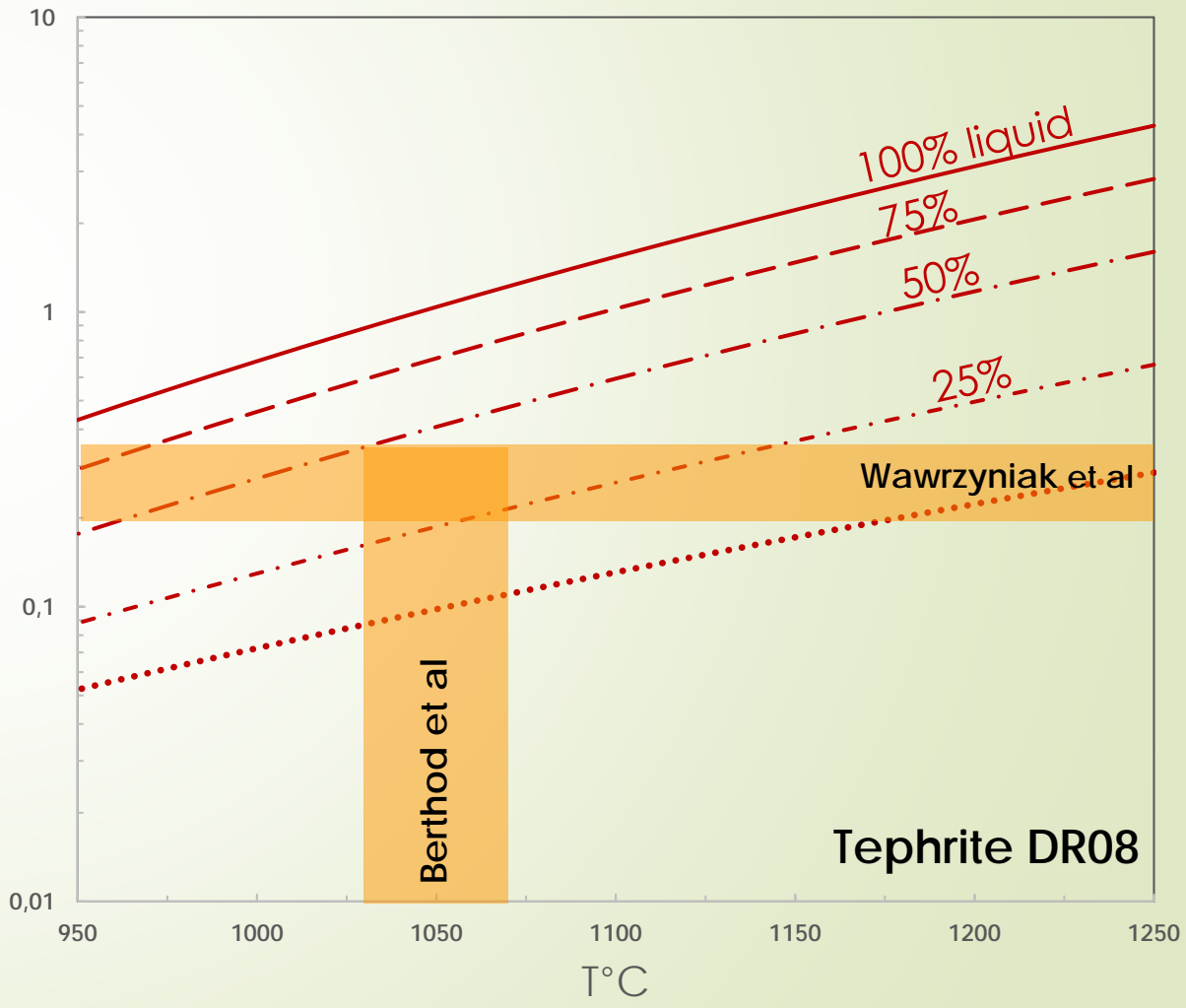
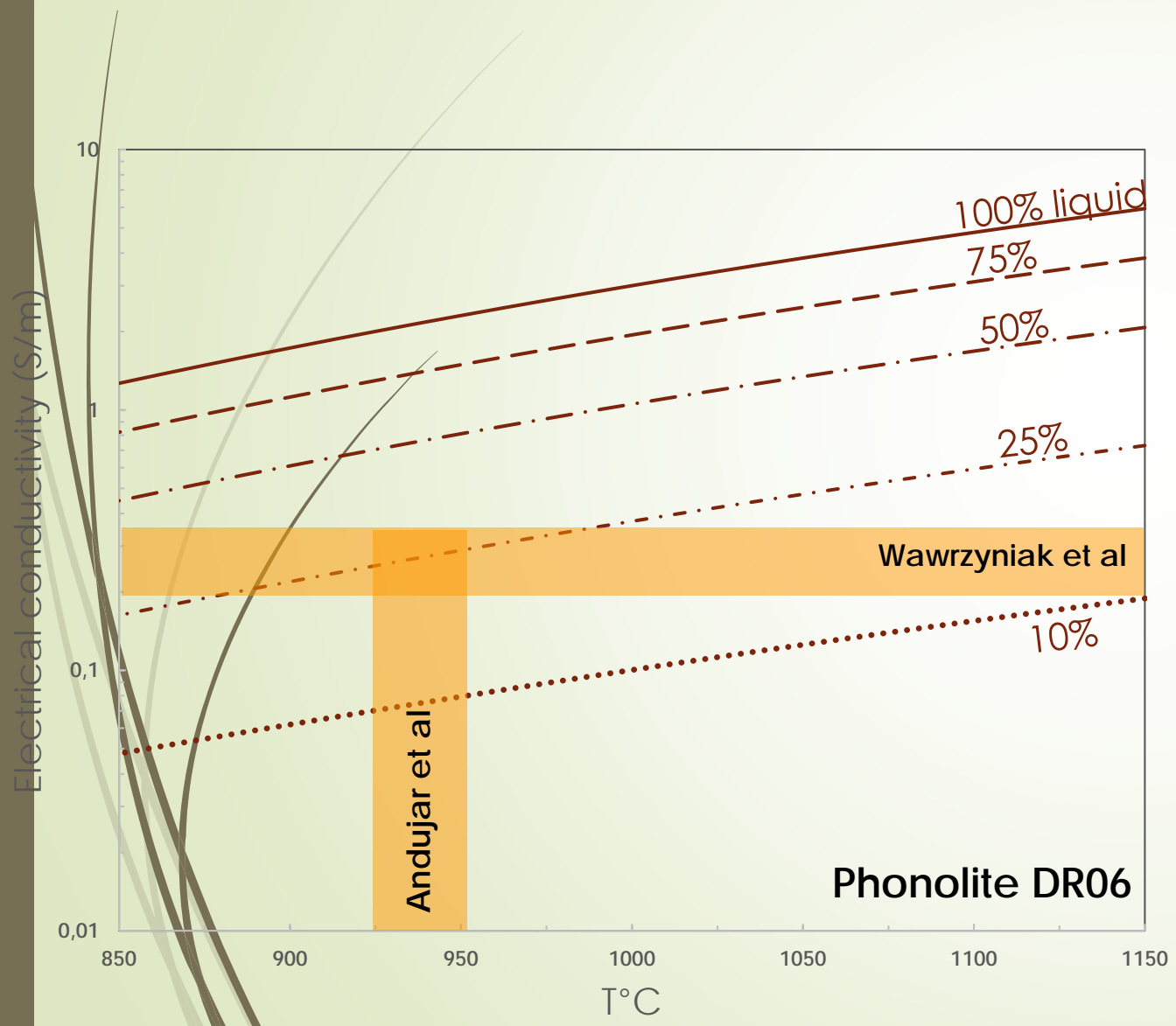
?????

Phonolite vs Tephrite Melts

$$\ln \sigma = 7.56 + (-65184 + \ln(\text{H}_2\text{O}) * 3367.2) / 8.314 * (1/T) + (0.0976 * \text{H}_2\text{O} - 1.2688) / 8.314 * P/T$$



DÉFINITION DES SIGNATURES ELECTRIQUE D'UN RÉSERVOIR MAGMATIQUE



CONDUCTIVITÉ ÉLECTRIQUE DES LIQUIDES SILICATES

- Effet de PO_2 => *To be continued : Leire Del Campo*
- Effets de H_2O & CO_2
- Effet de Pression (& Température)
- *Effet de composition chimique (alcalinité)*

Anne Pommier
David Sifré
Leila Hashim
Mickael Laumonier
Jinyu Chen