Paleogeothermal Gradients across an Inverted Hyperextended Rift System (Mauléon Fossil Rift, Western Pyrenees)

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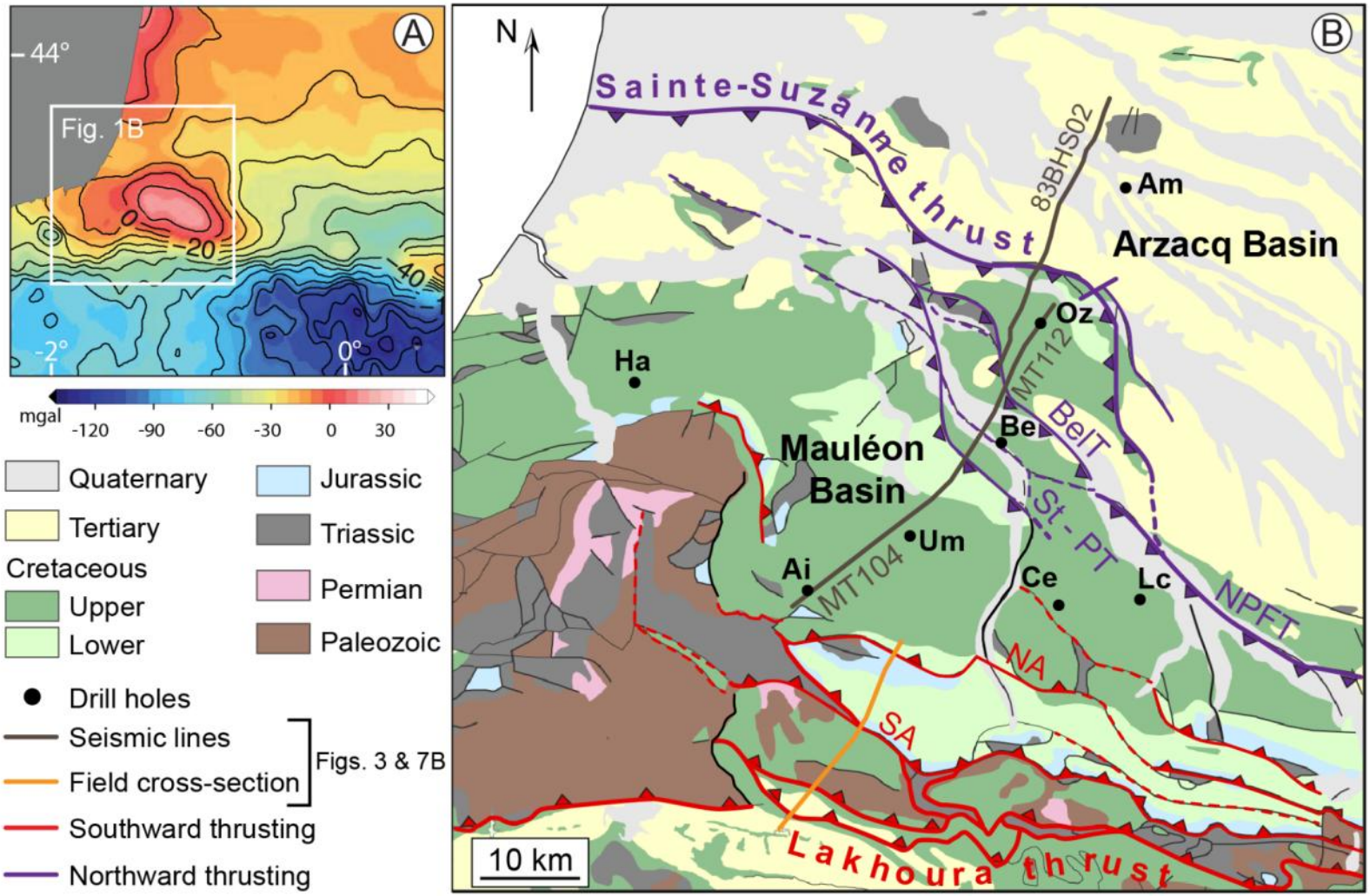
METHODOLOGY



- Positive gravity anomaly → high synrift thermal gradient?
- 3D distribution of the synrift thermal gradient?
- RSCM analysis → maximum T°C reach by the samples

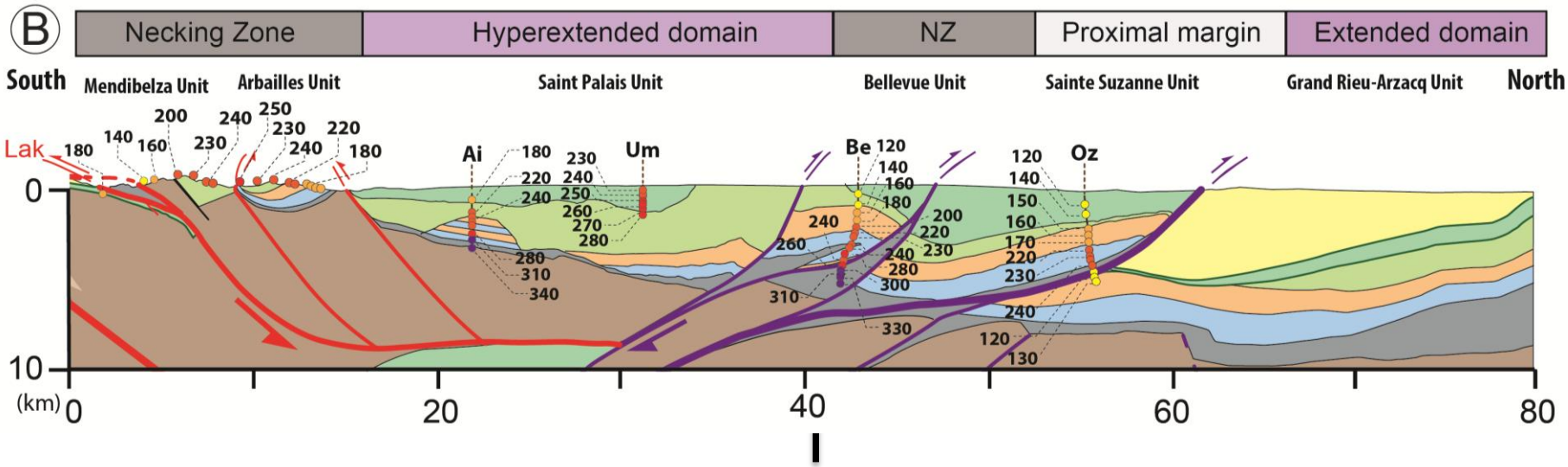
RSCM SAMPLING

Iberia

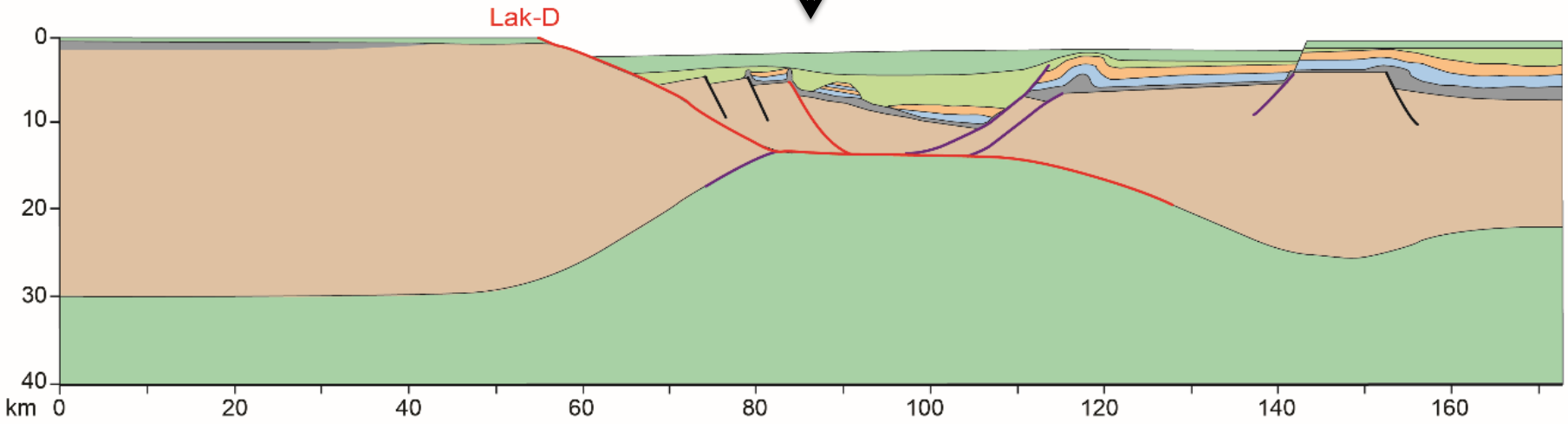
Europe

62 Field samples

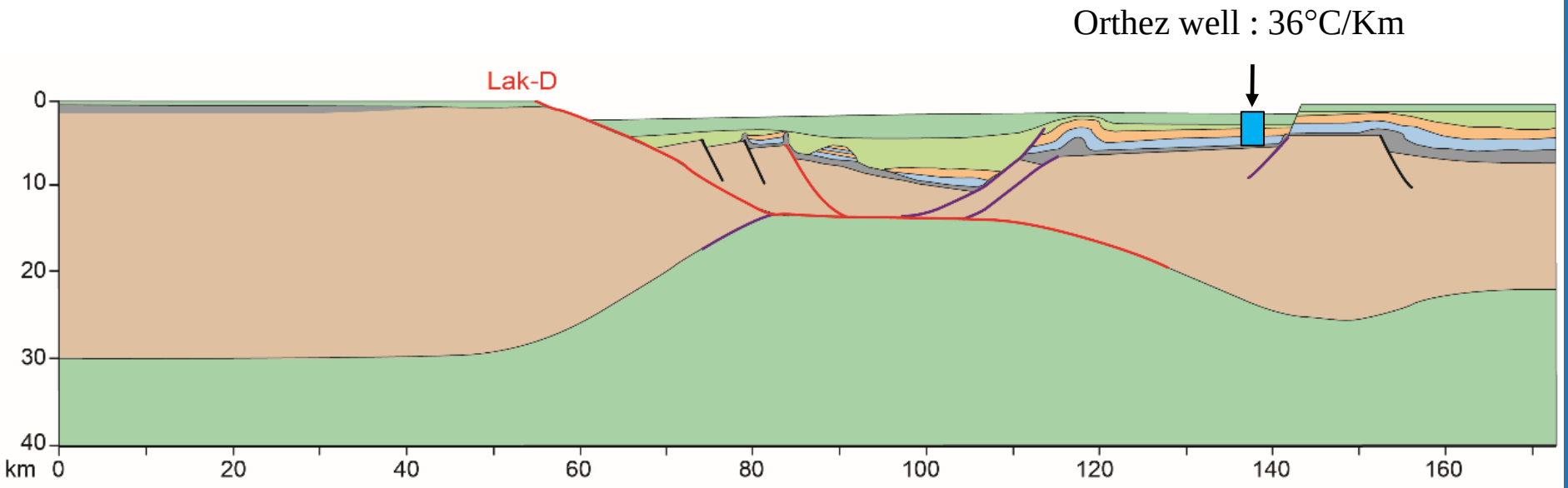
7 wells→ 102 samples

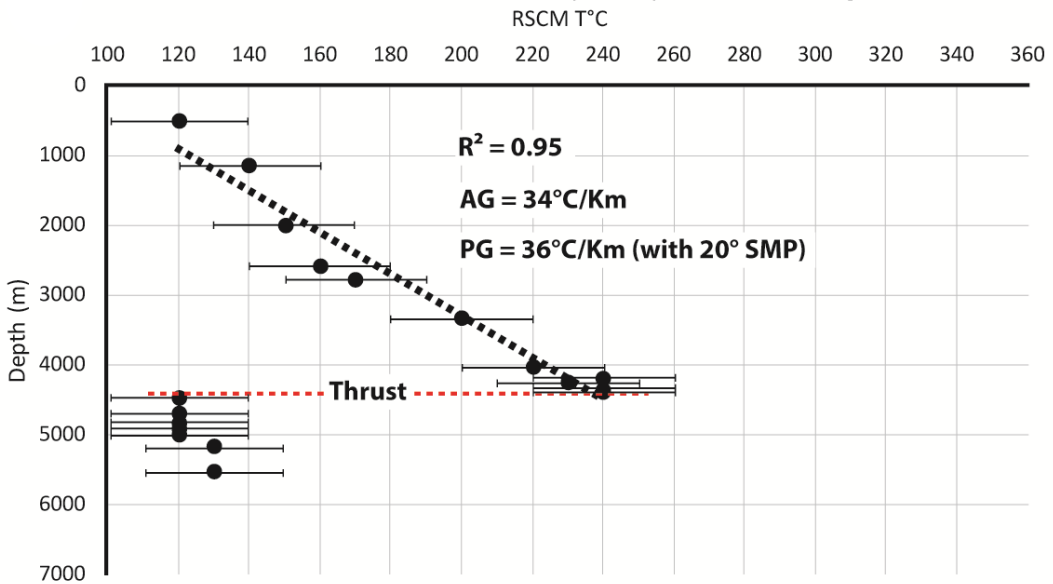


Proximal-Distal synrift thermal gradient distribution



EUROPEAN PROXIMAL MARGIN





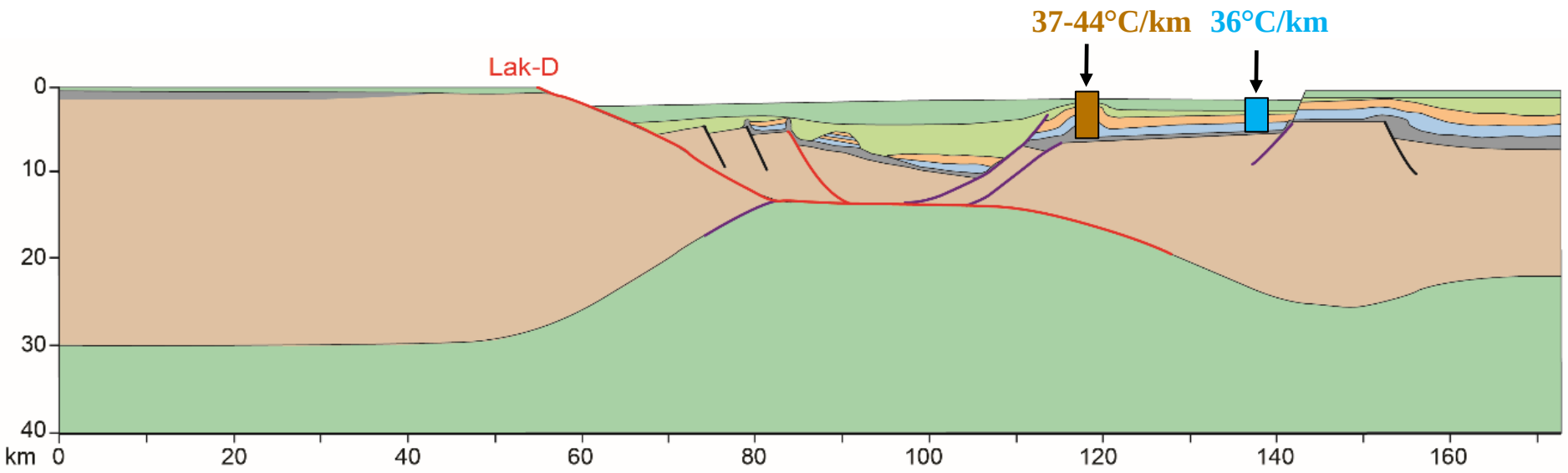
Apparent gradient (AG) → corrected from borehole deviation

Paleo gradient (PG) → Apparent gradient corrected from strata mean plunge

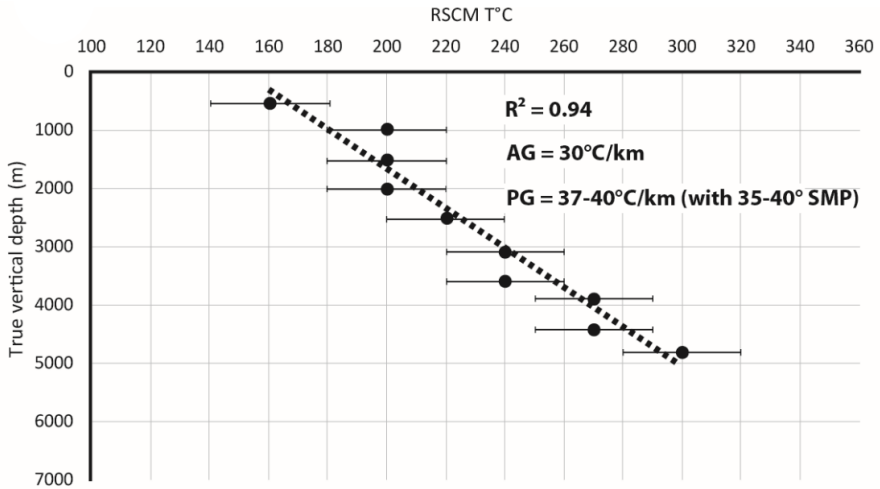
AG = PG → deformation occurs before Tmax acquisition

Classic thermal gradient **~36°C/Km**

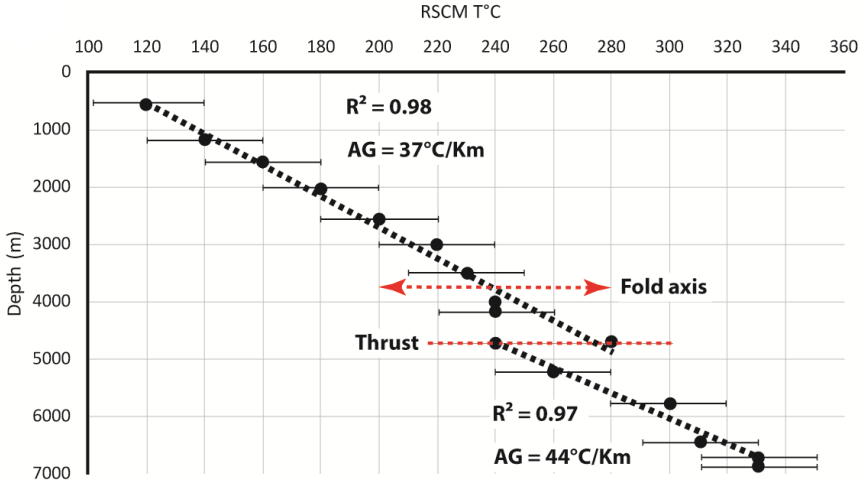
EUROPEAN NECKING ZONE



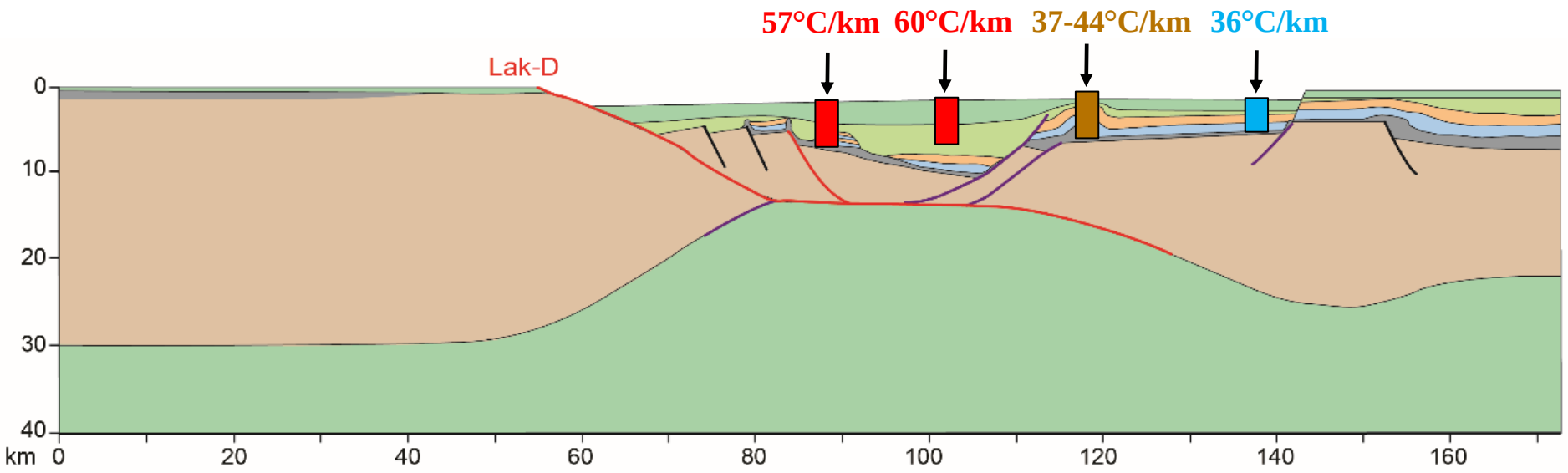
Les Cassières-2 well : PG → **~37-40°C/Km**



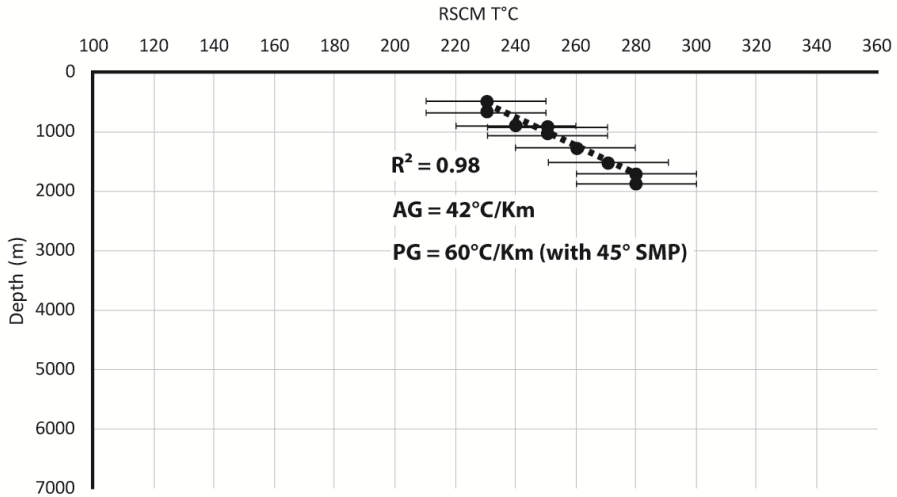
Bellevue-1 well : PG → **~37-44°C/Km**



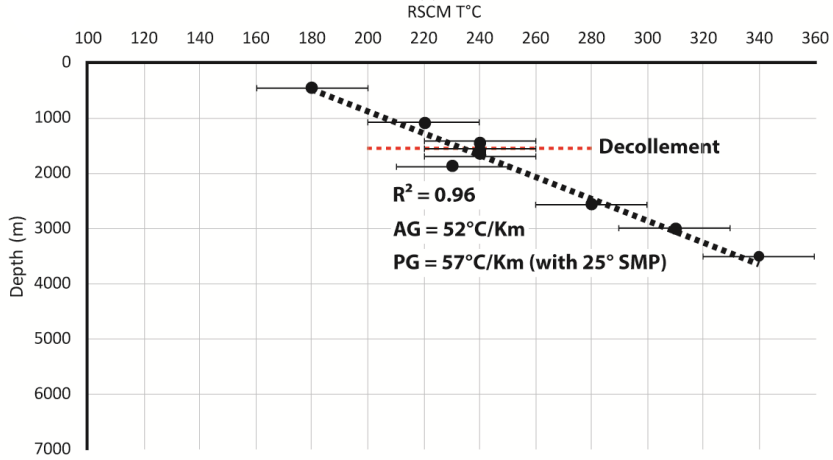
HYPER-EXTENDED DOMAIN



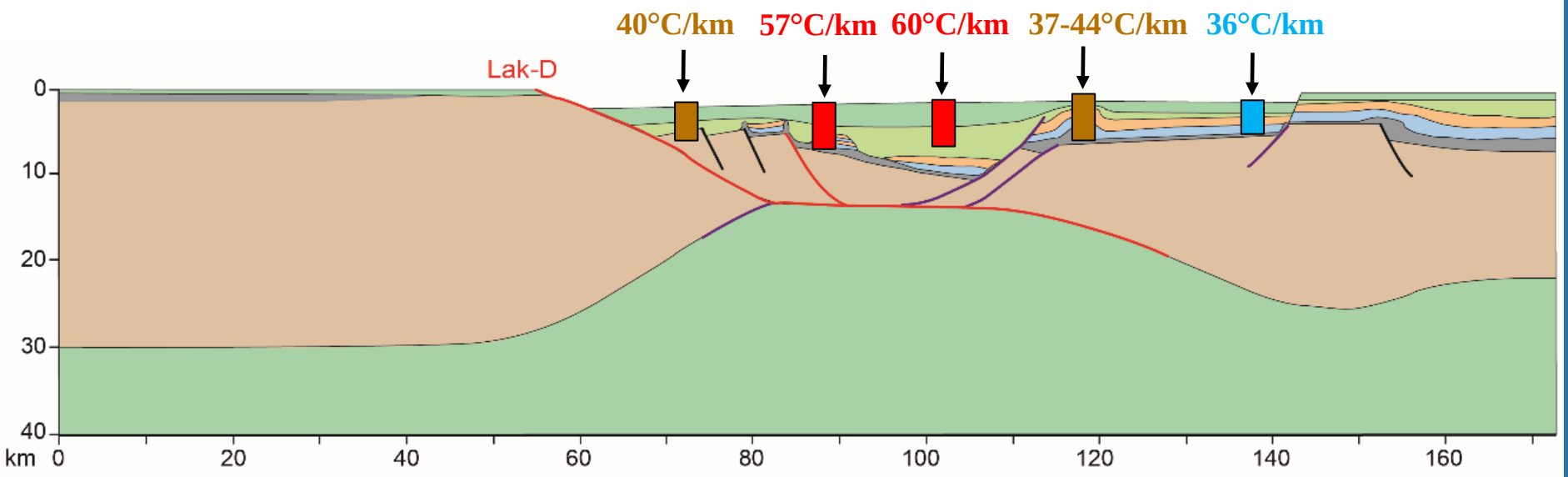
Uhart-Mixe-1 well : PG → **~60°C/Km**

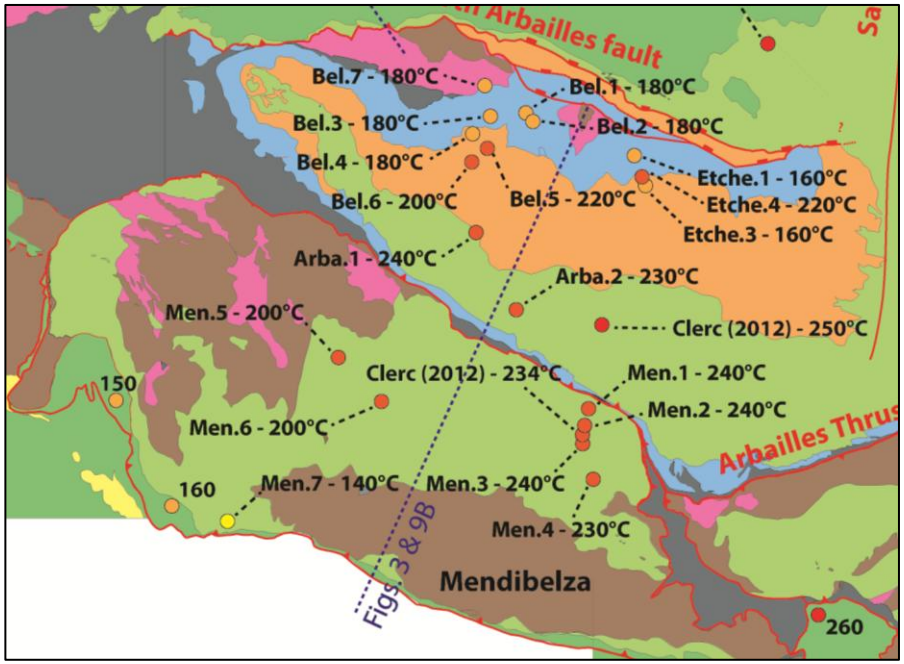


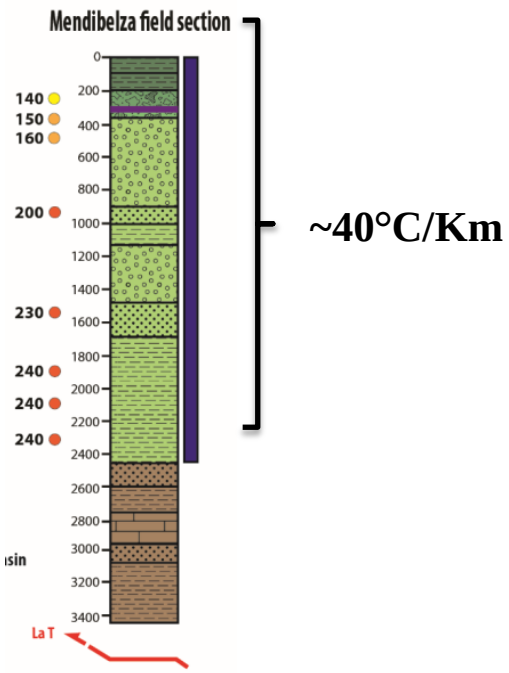
Ainhice-1 well : PG → **~57°C/Km**



IBERIAN NECKING ZONE







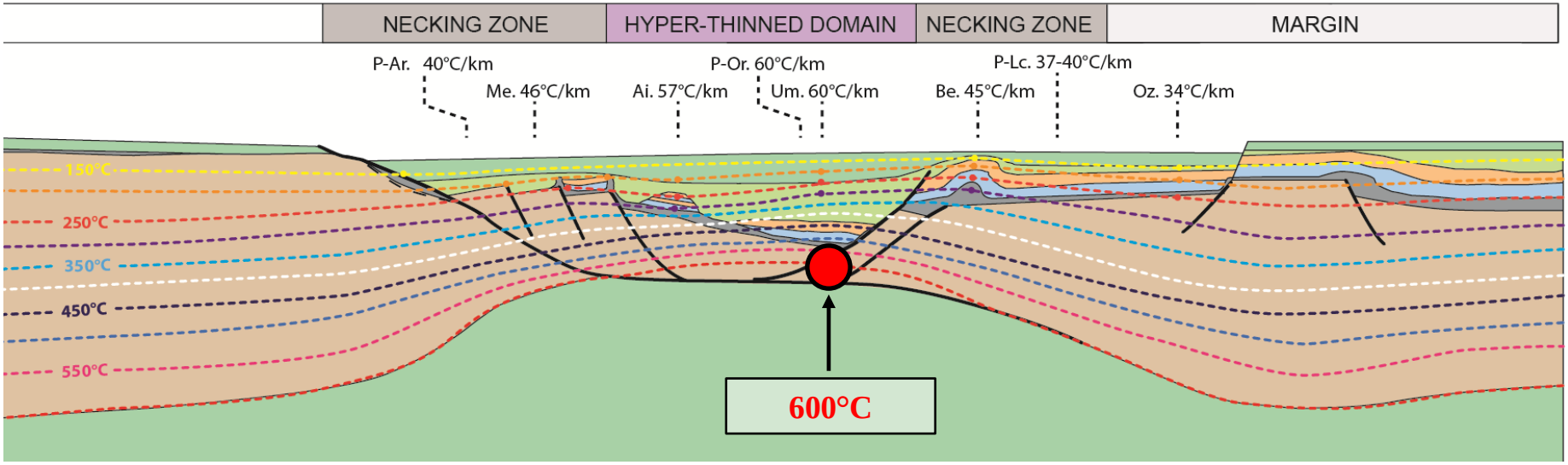
BASINWARD INCREASE OF THE THERMAL ANOMALY

~**30-36**°C/km → **Proximal Margin**

~**37-45**°C/km → **Necking Zone**

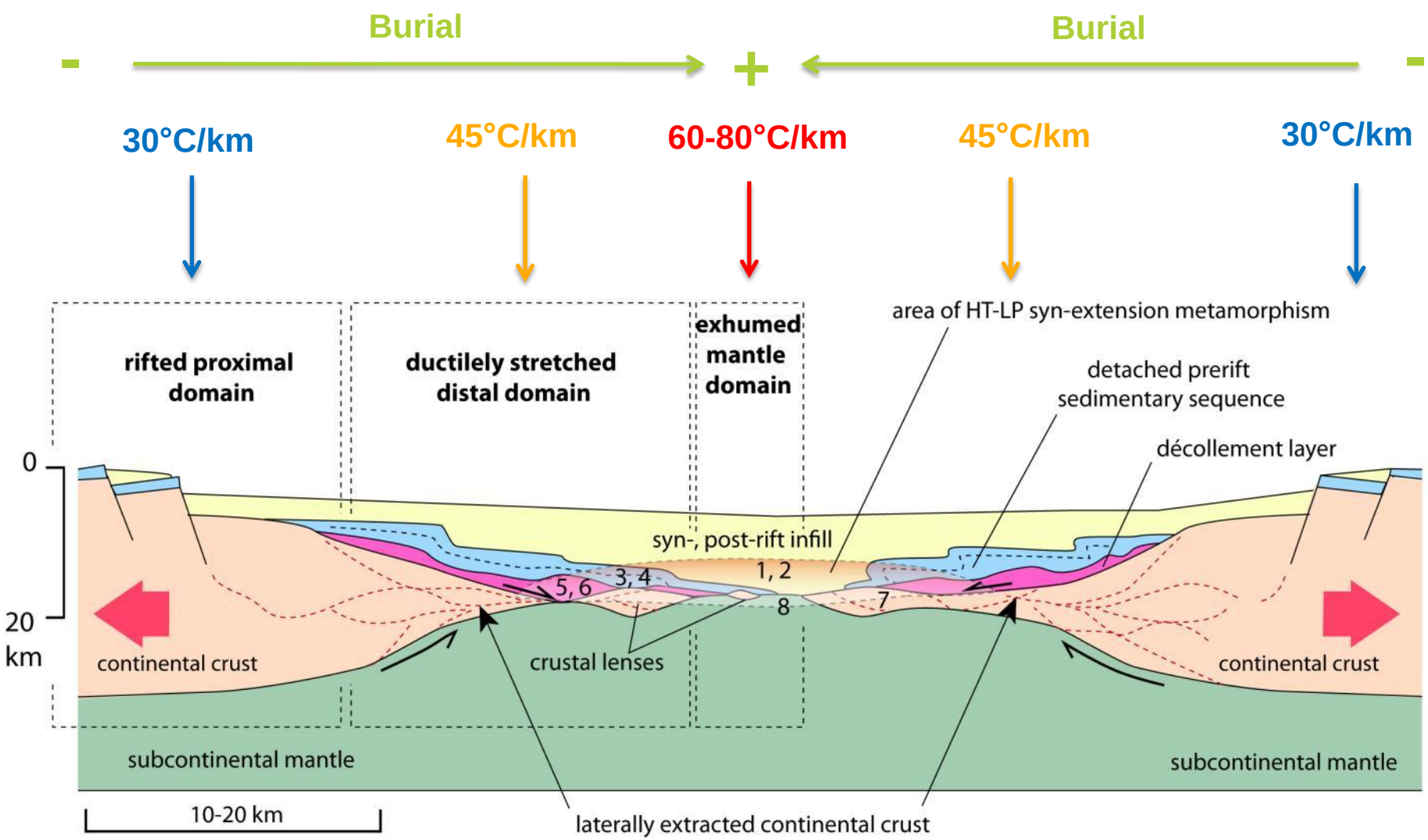
~ **57-60**°C/km → **Hyper-extended domain**

600°C at the base of the hyper-thinned domain



SMOOTH SLOPE BASIN

A COMPLEX COMPETITION BETWEEN SALT / THERMICITY / BURIAL



Lagabrielle et al (2019) / Saspiturry et al (accepted)

CURENT THERMAL GRADIENT

Puits	Paleo gradient	Curent gradient
Orthez-102	36°C/Km	22,7°C/Km
Les Cassières-2	29°C/Km	23,5°C/Km
Bellevue-1	45°C/Km	22°C/Km
Hasparren-101	Min 40°C/Km	25,1°C/Km
Uhart-Mixe-1	60°C/Km	25,6°C/Km
Ainhice-1	57°C/Km	25,2°C/Km

THERMIC EVOLUTION NUMERICAL SIMULATION