

SCEC 2017 CRM Workshop
*Geologic Framework:
Scope and Mojave Example*

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Geologic Framework Scope

- **GOAL:** *Lithologic information sufficient to assign constitutive relationships at every resolved element of the lithosphere.*
- **EXTENT:** *Southern California-adjacent region sufficient for plate-boundary scale modeling.*
- **APPROACH:** *Define litho-tectonic blocks, increasing lithologic resolution over time with data assimilation and new information.*

Material Properties and Fault Geometry Affect Strain Distribution

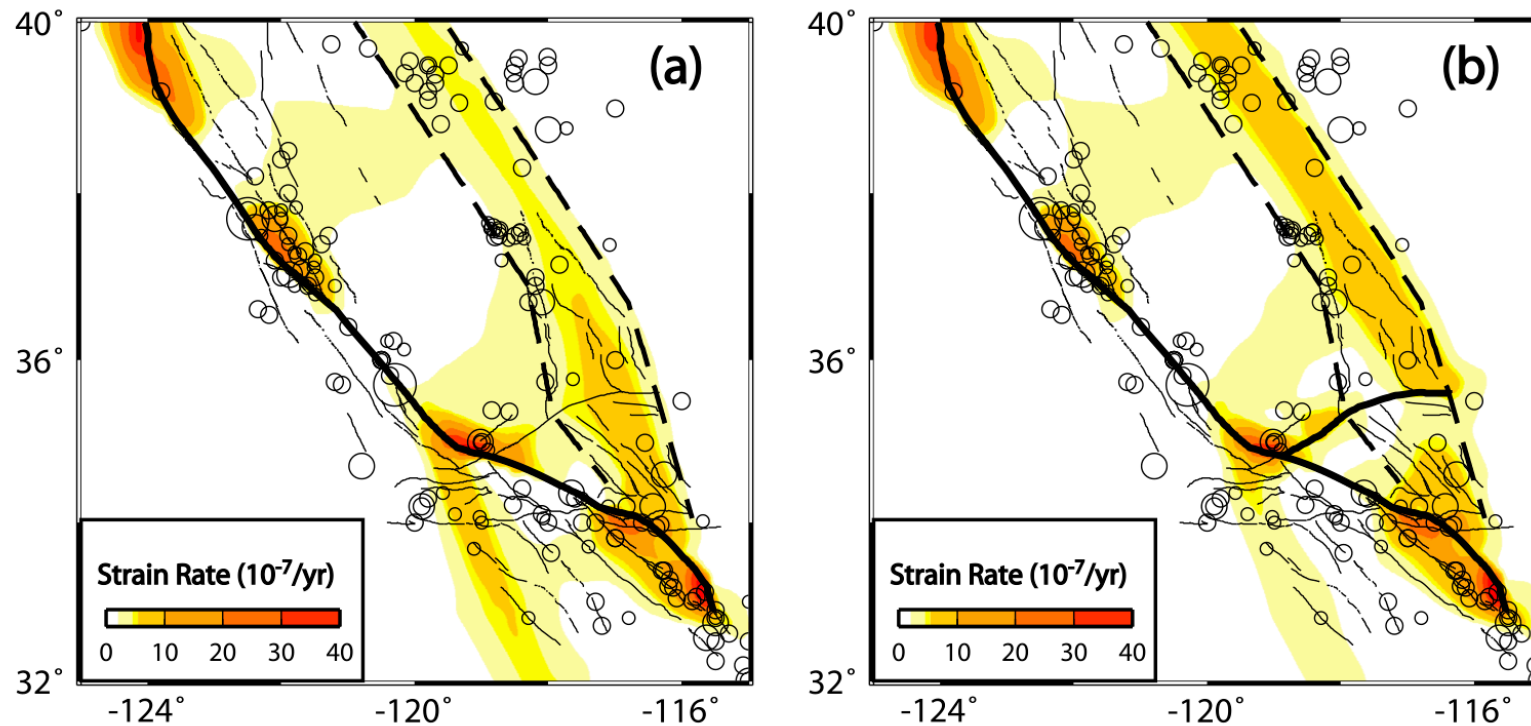
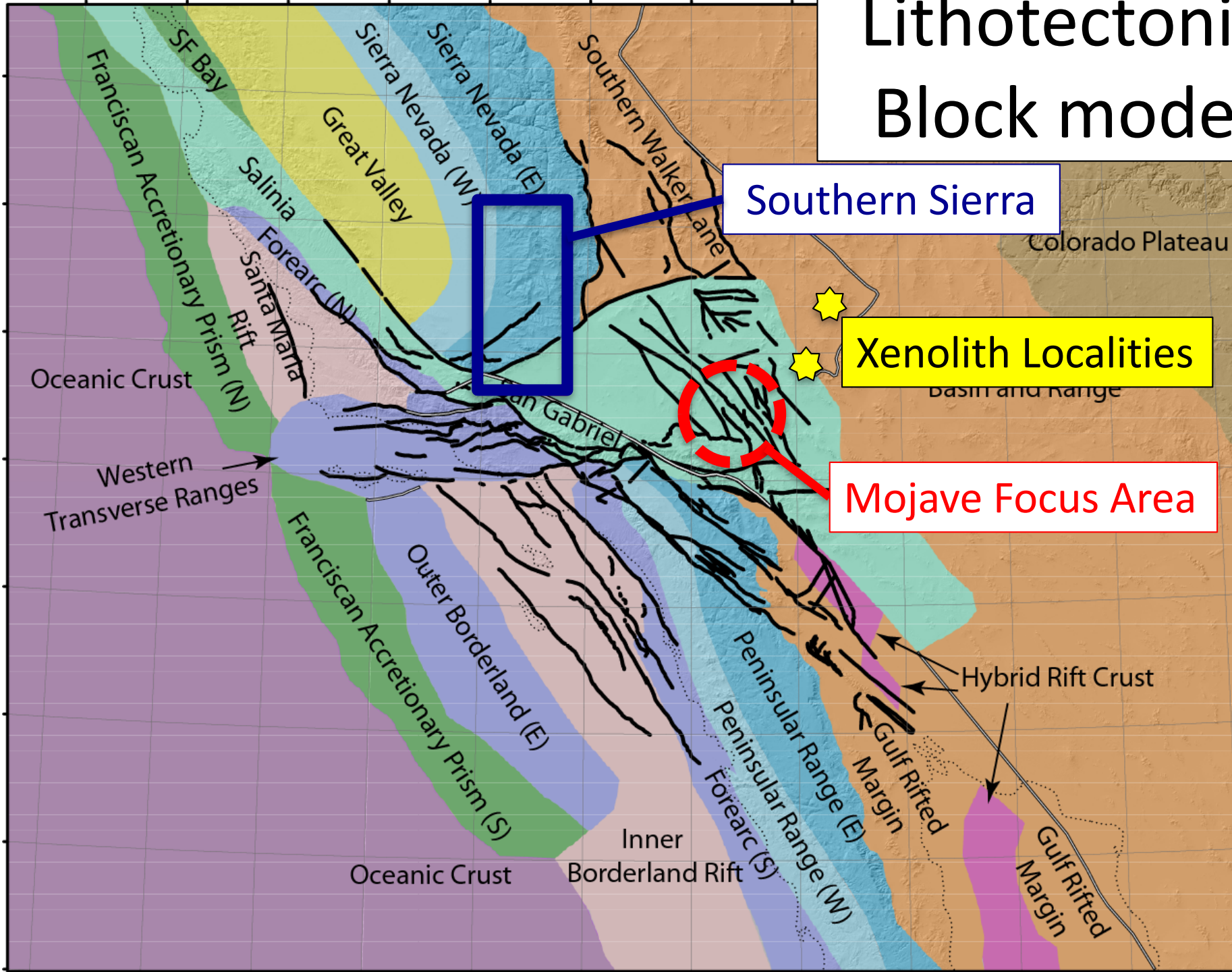


Figure 8. Results showing the impact of lithospheric weakening in the Basin and Range and the eastern California shear zone (bounded by the dashed lines). The viscosity is 2×10^{19} Pa s under the ECSZ, 1×10^{20} Pa s under the Basin and Range, 2×10^{20} Pa s for the rest area of the model domain. (a) Predicted plastic strain rates outside the faults. (b) Same as Figure 8a but with the Garlock Fault included in the model.

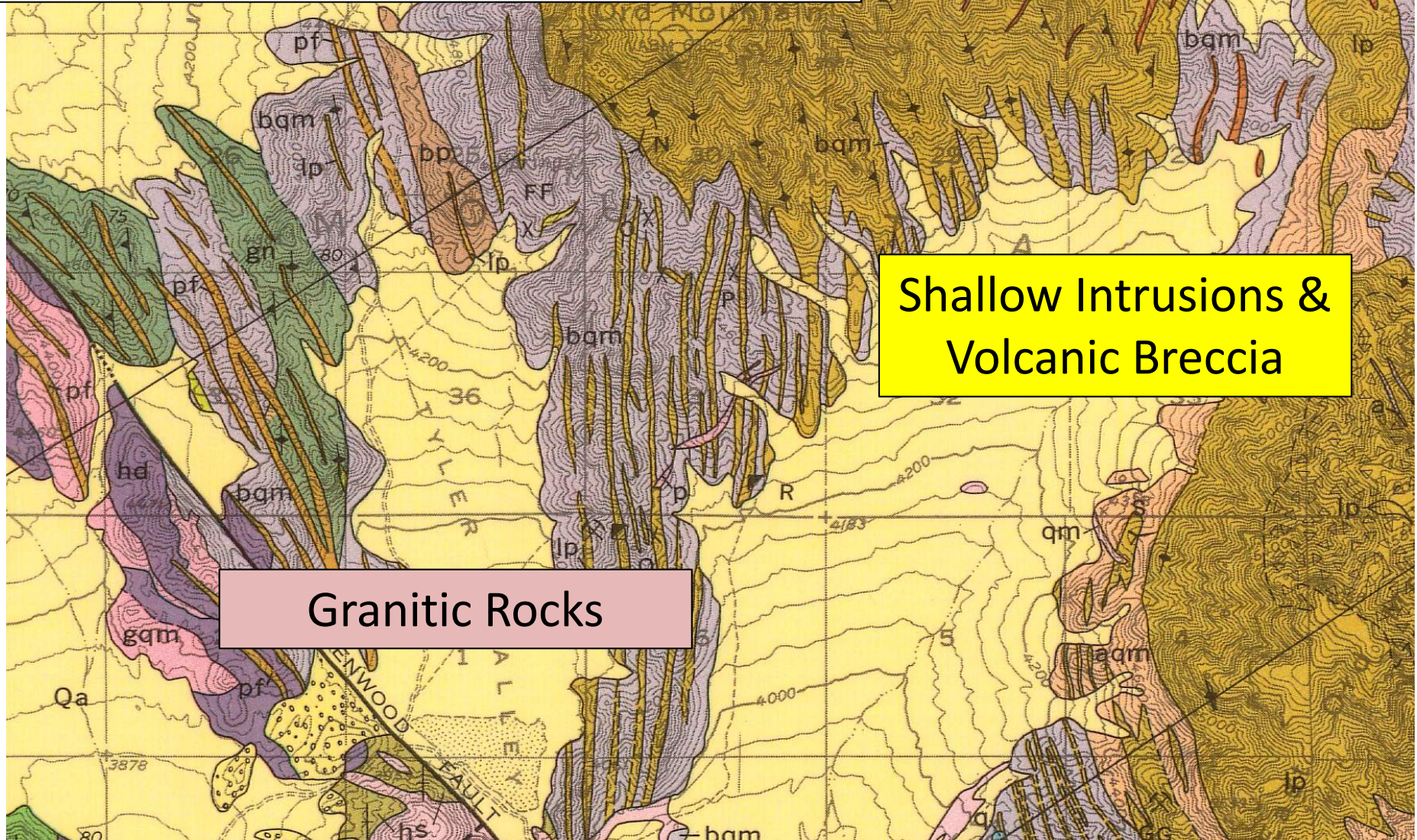
Liu et al., 2010, Inception of the Eastern California Shear Zone and evolution of Pacific-North American Plate Boundary: From kinematics to geodynamics

Lithotectonic Block model



Mojave Focus Area Surficial Geology

Dibblee (1964)

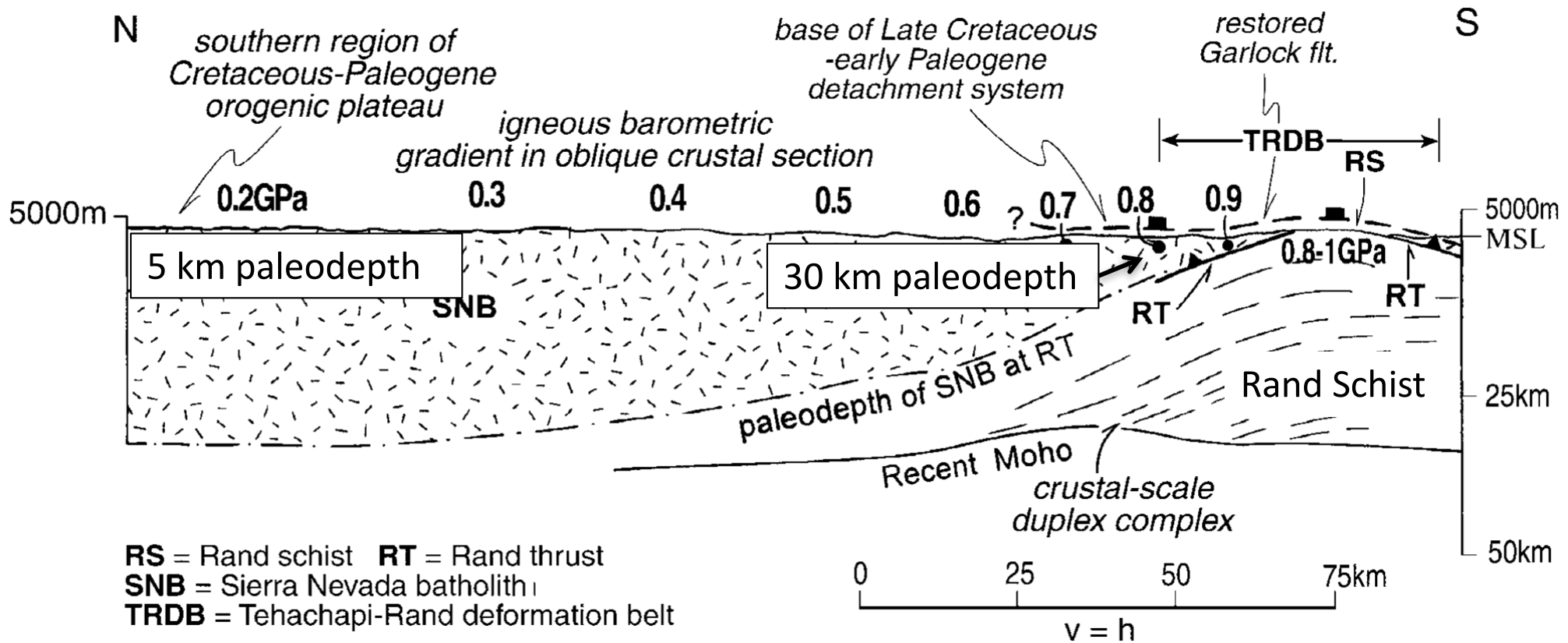


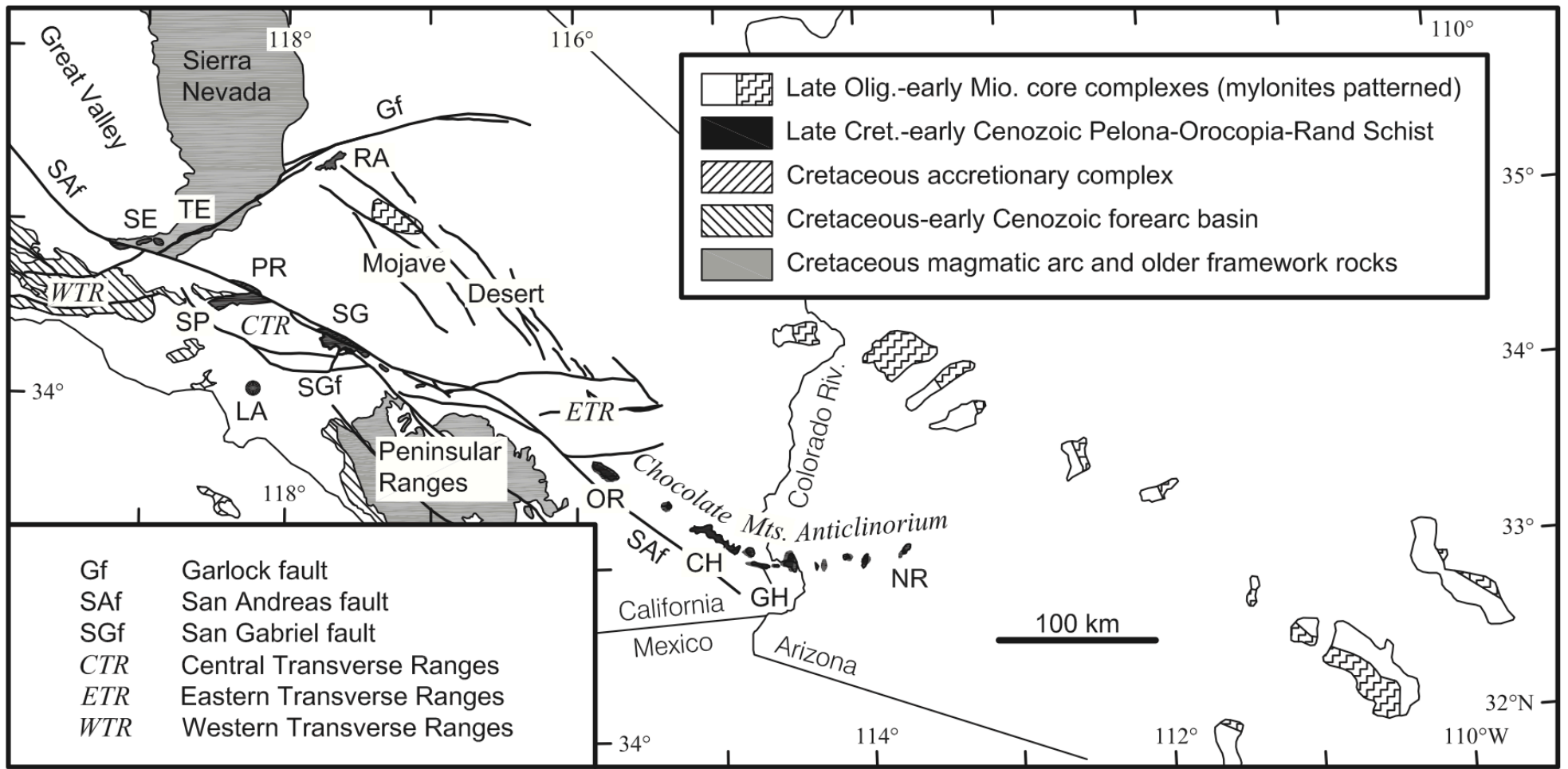
Shallow Intrusions &
Volcanic Breccia

Granitic Rocks

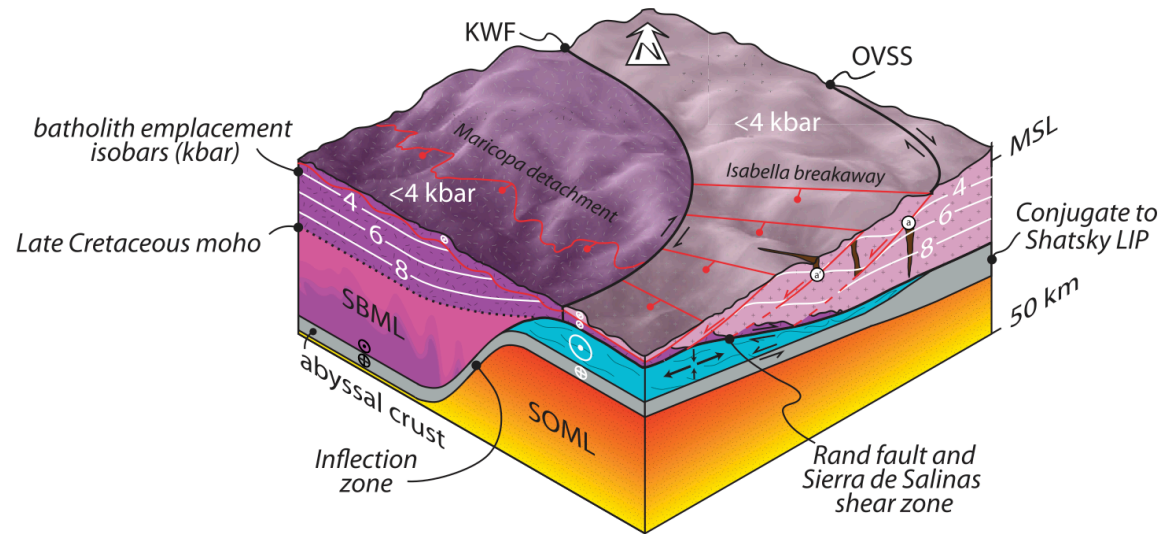
Exhumed Crustal Section of Batholith

Saleeby et al. (2003)



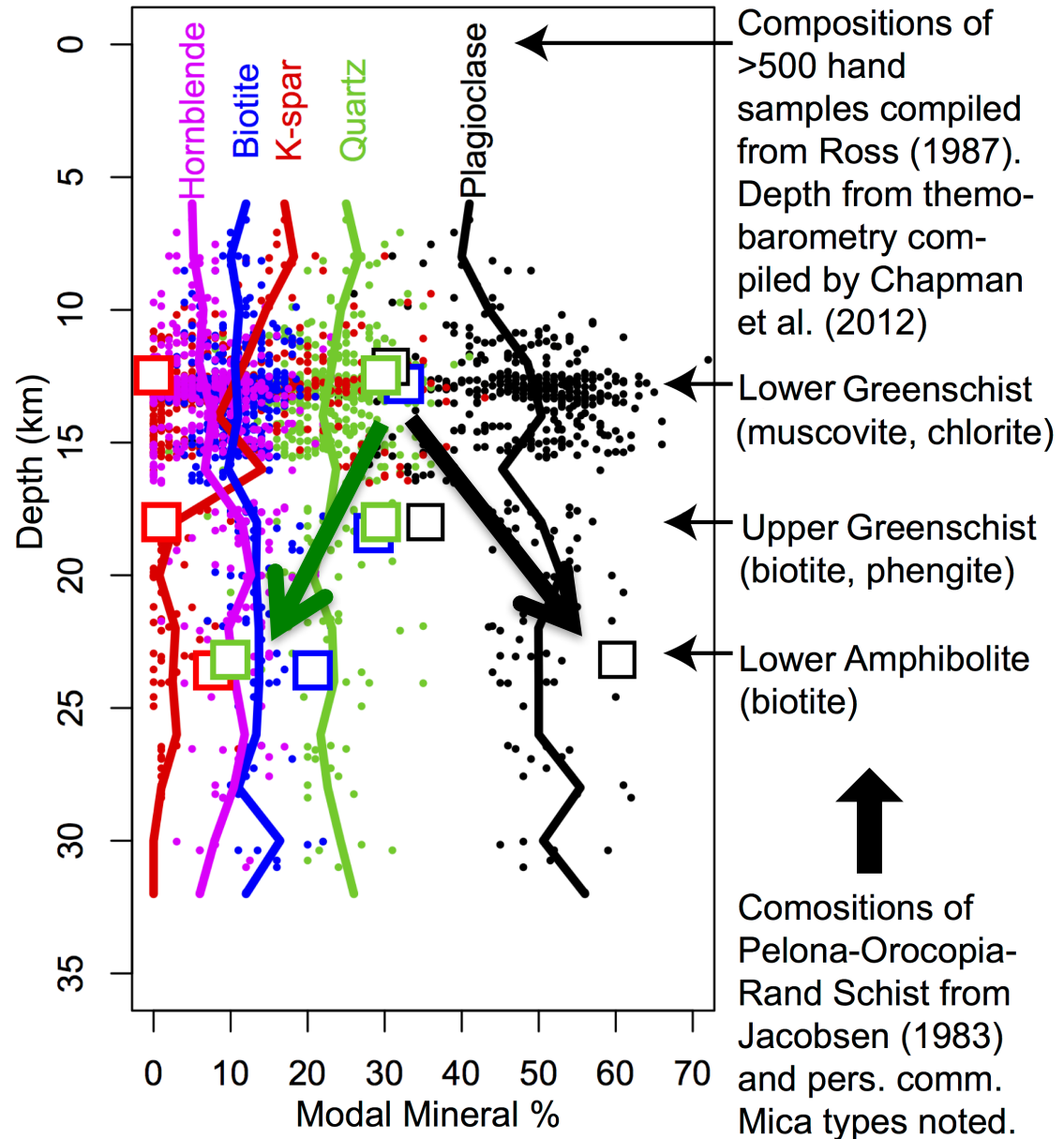
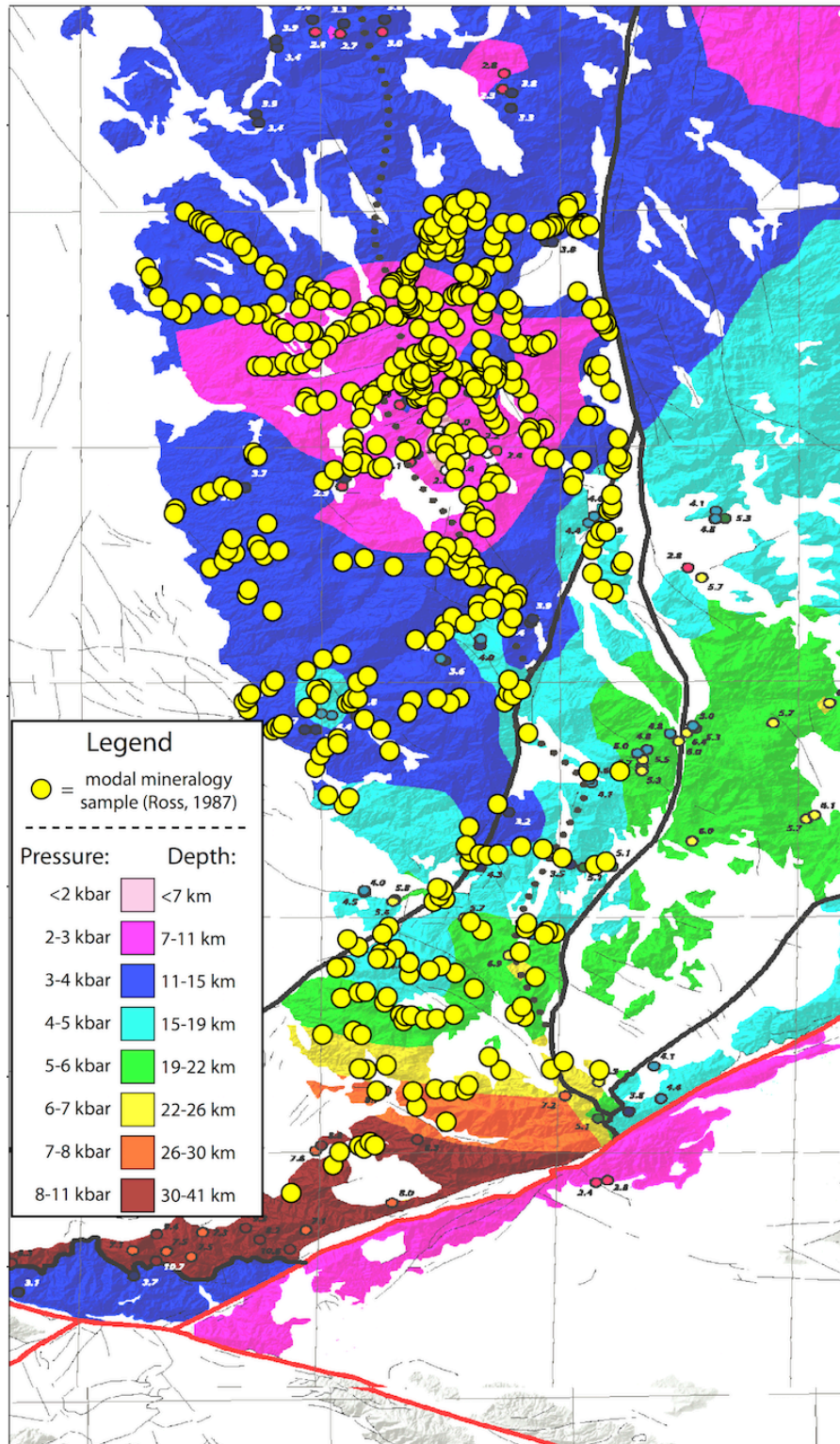


Low-Angle Subduction, Schist Underplating, & Upper Plate Extension

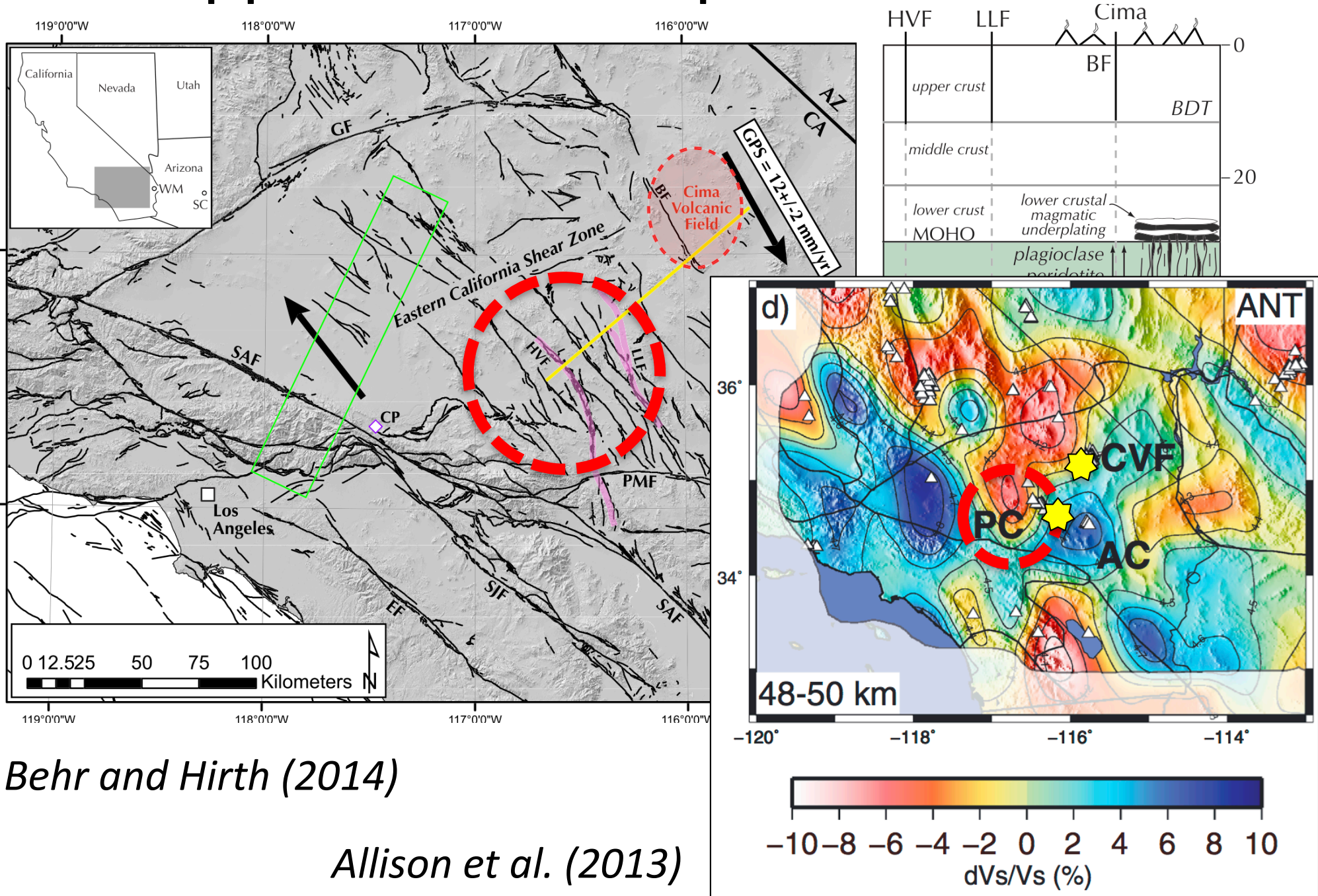


Modal Mineralogy of Southern Sierra Exhumed Crustal Section

Ross (1987, etc.) & Chapman et al. (2012)



Upper Mantle: Replaced or Not?



Behr and Hirth (2014)

Allison et al. (2013)

Mojave Focus Area Synthesis

Extended Batholith (Upper Plate)

± Underplated Schist

± Underplated Cz Mafic Rocks, Remnant Slab?

Sub-Oceanic, or Remnant North America

Mantle Lithosphere

