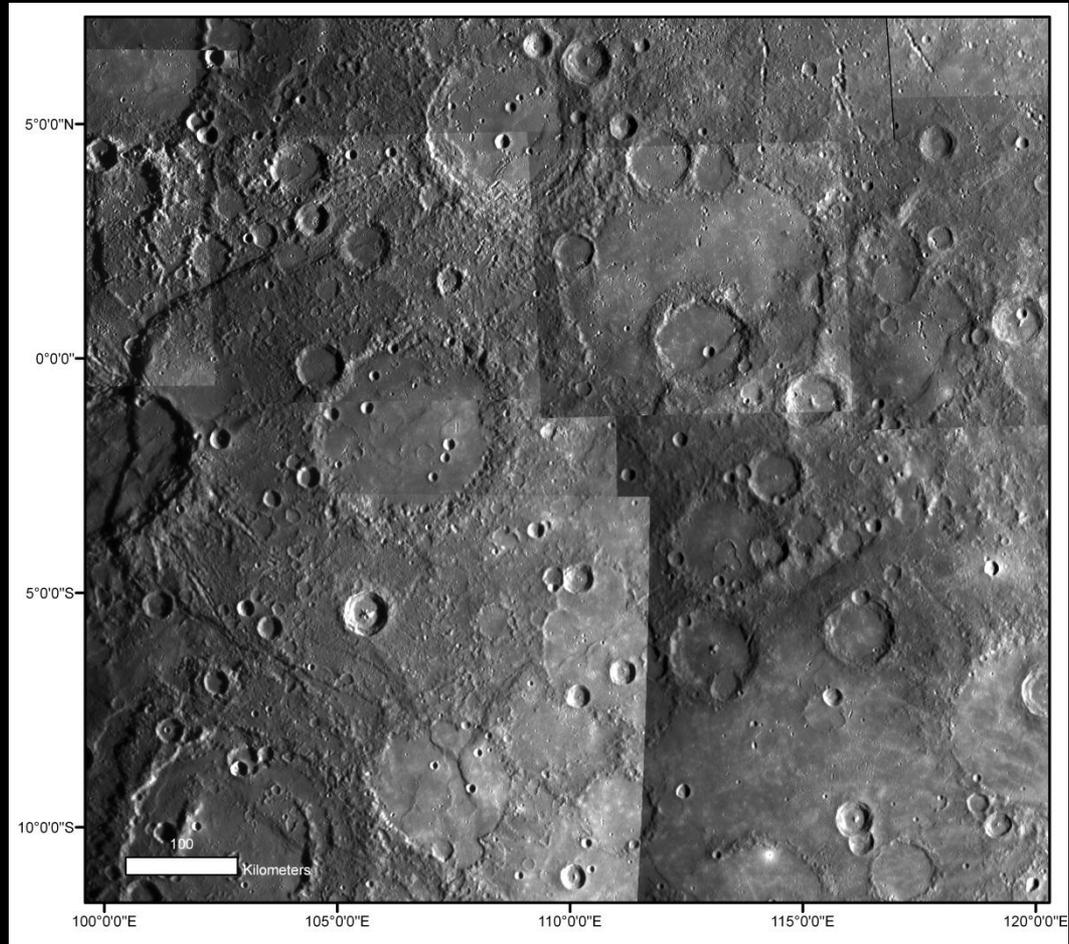




Profundidad de falla y flujo térmico en Mercurio

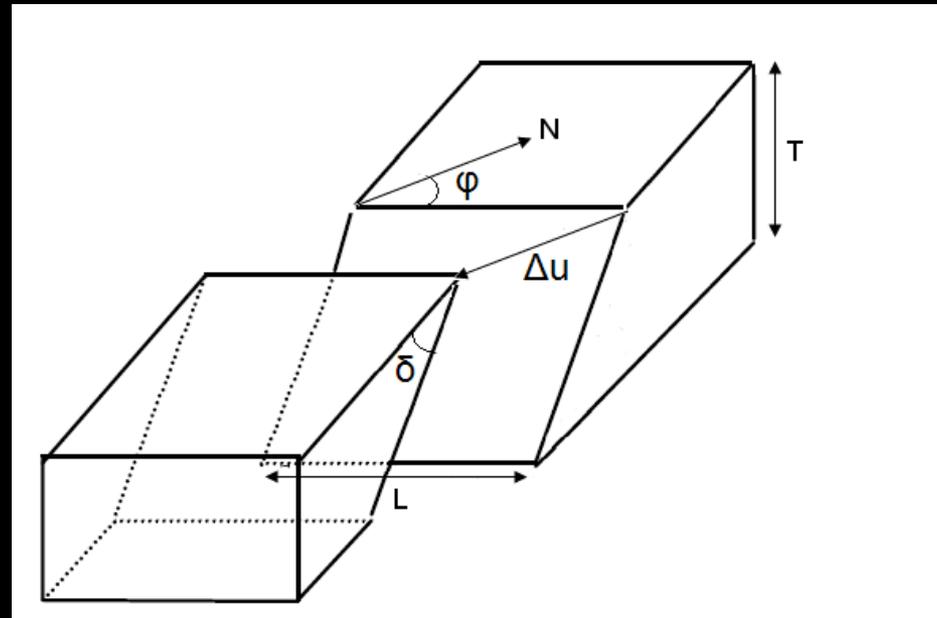
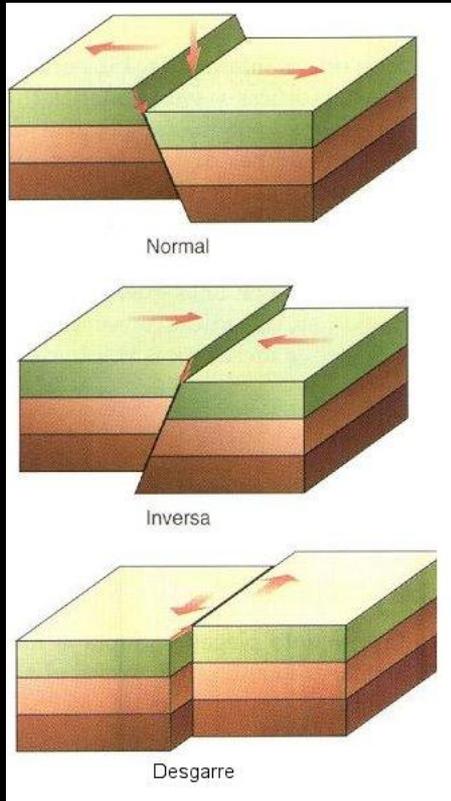
Isabel Egea

Escarpes lobulados



Escarpes = fallas inversas

Fallas

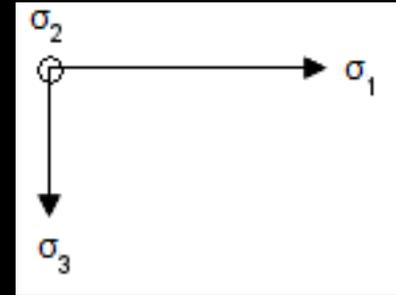
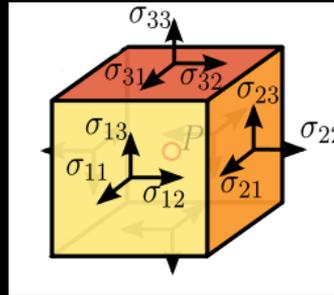


L = longitud
 ϕ = dirección
 δ = buzamiento
 Δu = desplazamiento
 T = profundidad de falla

En escarpes
 T = Profundidad de
transición dúctil-frágil

Transición dúctil-frágil

$$\begin{bmatrix} \sigma_{11} & \sigma_{12} & \sigma_{13} \\ \sigma_{21} & \sigma_{22} & \sigma_{23} \\ \sigma_{31} & \sigma_{32} & \sigma_{33} \end{bmatrix}$$



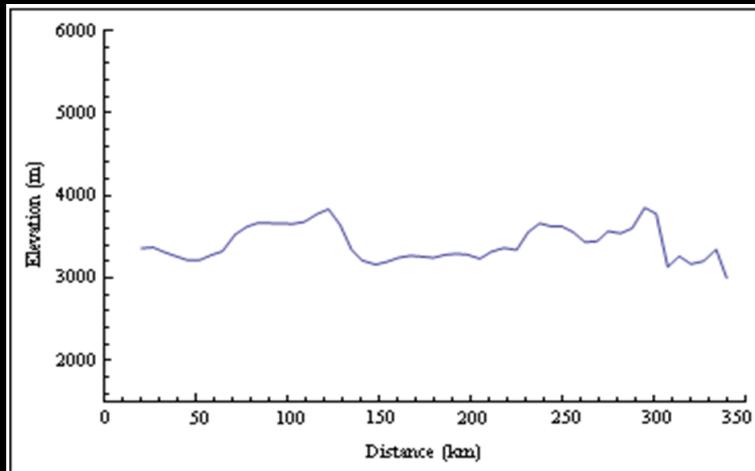
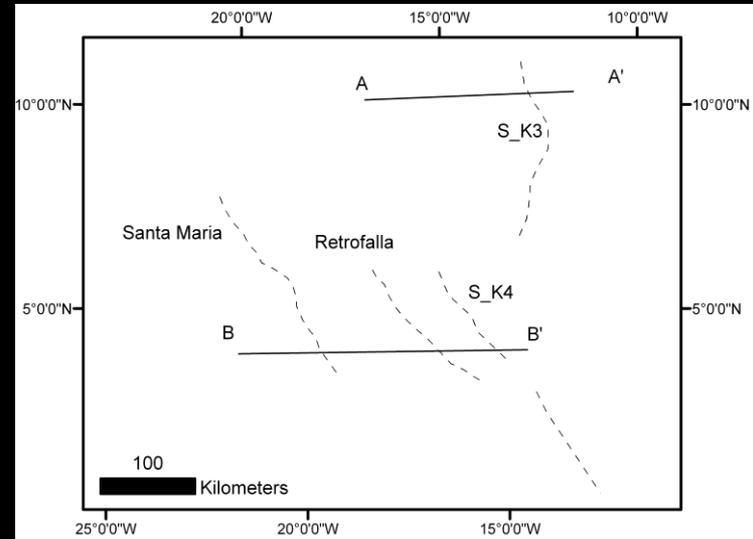
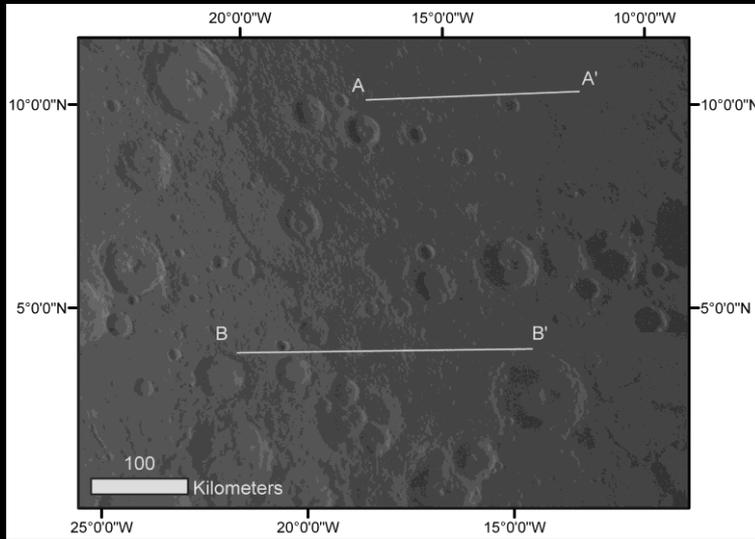
- Ley de Byerlee en la parte frágil:

$$\sigma_1 - \sigma_3 = 3\rho gz$$

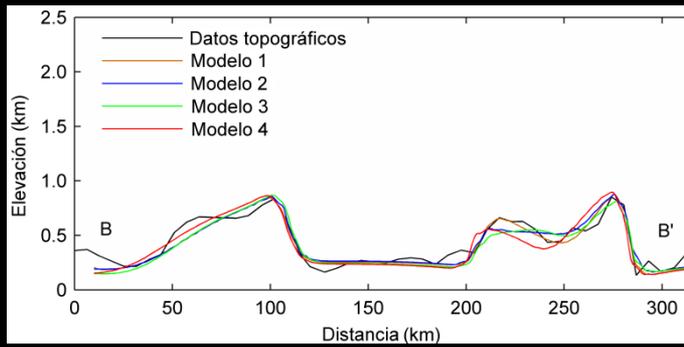
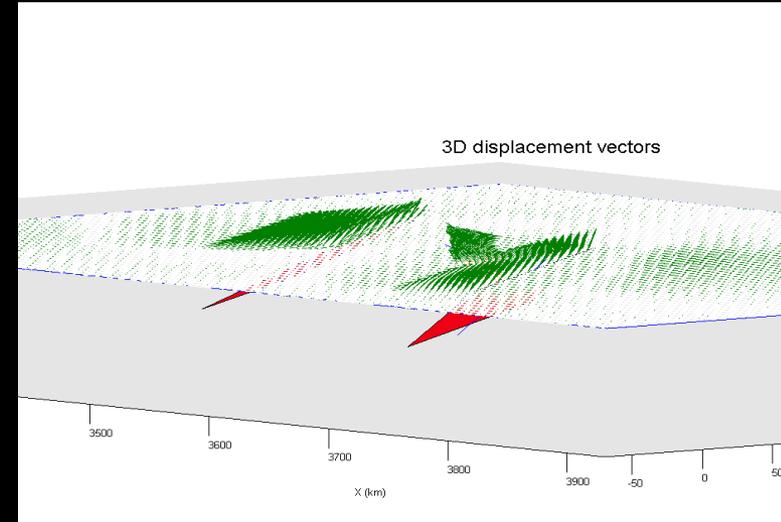
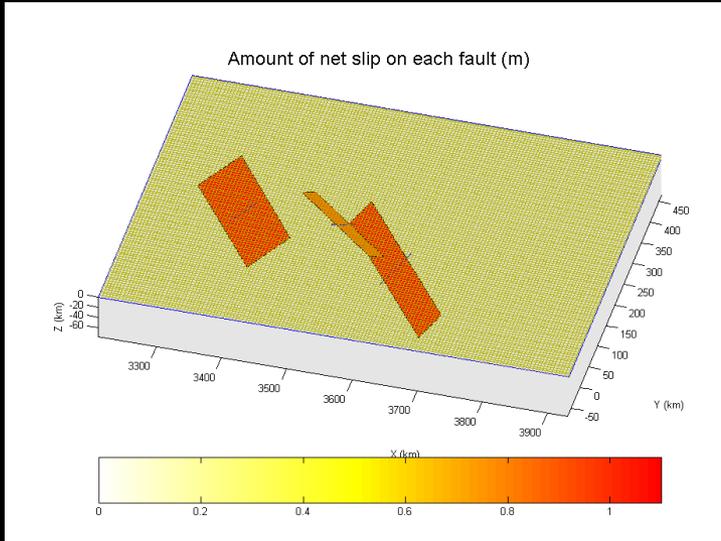
- En la parte dúctil:

$$\sigma_1 - \sigma_3 = \left(\frac{\dot{\epsilon}}{A} \right)^{\frac{1}{n}} \exp\left(\frac{E}{nRT} \right)$$

Región Kuiper



Geometría de la falla



Estructura	Desplazamiento (km)	Ángulo de buzamiento	Profundidad extremo superior (km)	Profundidad de falla (km)
Santa María Rupes	1.0-1.1	28°-32°	0.0	36-39
Escarpe S_K4	1.0-1.1	40°-44°	0.0	30-36
Retrofalla	0.9-1.0	18°-25°	0-0.5	10-15

Flujo térmico

$$T_{BDT} = \frac{E}{nRLn \left(3\rho g z_{BDT} \left(\frac{\dot{\varepsilon}}{A} \right)^{-\frac{1}{n}} \right)}$$

$$T_{BDT} \approx 735-820 \text{ K}$$

$$E = 485 \text{ kJmol}^{-1}$$

$$n = 4.7$$

$$A = 8 \text{ Mpa}^n \text{s}^{-1}$$

$$g = 3.7 \text{ ms}^{-2}$$

$$R = 8.3 \text{ Jmol}^{-1} \text{K}^{-1}$$

$$\dot{\varepsilon} = 10^{-16} - 10^{-19} \text{ s}^{-1}$$

$$\rho = 2900 \text{ kgm}^{-3}$$

$$\frac{\partial}{\partial z} \left(k \frac{\partial T}{\partial z} \right) + H = 0$$

$$F_s = \frac{k(T_{BDT} - T_s)}{z_{BDT}} + \frac{z_{BDT} H}{2}$$

$$k = 2 \text{ Wm}^{-1} \text{K}^{-1}$$

$$H = 1.2 \times 10^{-4} - 2.7 \times 10^{-4} \text{ mWm}^{-3}$$

$$T_s = 435 \text{ K}$$

$$F_s \approx 19-30 \text{ mW/m}^2$$