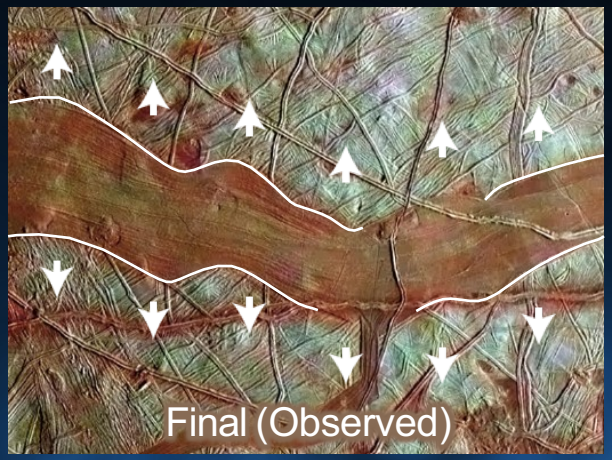
Possible Ocean Material Exposed on Europa's Surface

Smooth band on Europa

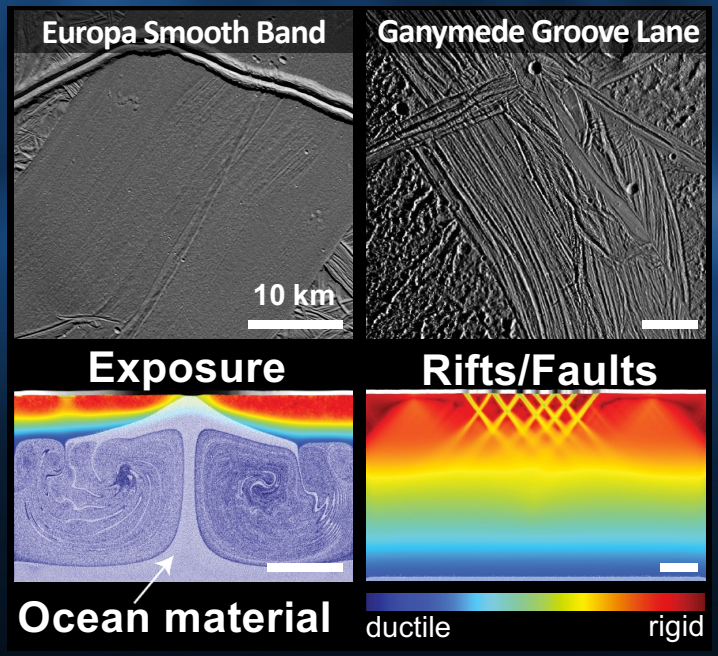
Initial (Reconstructed)



Final (Observed)

On Europa, extensional bands, where the cold, brittle ice shell pulls apart exposes warmer, ductile material from the subsurface oceans, and freezes it into the surface.

- Extensional bands form on both Europa and Ganymede with two different forms: smooth and knobby (hummocky) or grooved and tectonically dominated.
- Recent modeling work of ice stretching, flow and faulting to understand the character of these two forms indicates that the differences are governed by ice shell strength.
- The smooth bands are formed in weak ice shells, where the tectonic bands are formed by faults in strong ice.
- The model results (right) indicate that only the smooth bands are likely to expose subsurface ocean material, whereas the tectonically dominated bands are unlikely to expose ocean material.



Howell & Pappalardo (2018) *Geophysical Research Letters*