

TSG/VMSG/BGA

***Seamount - Subduction Zone
Interactions:***

***Impact of ocean floor relief on subduction
accretion/erosion & subduction
channel heterogeneity***

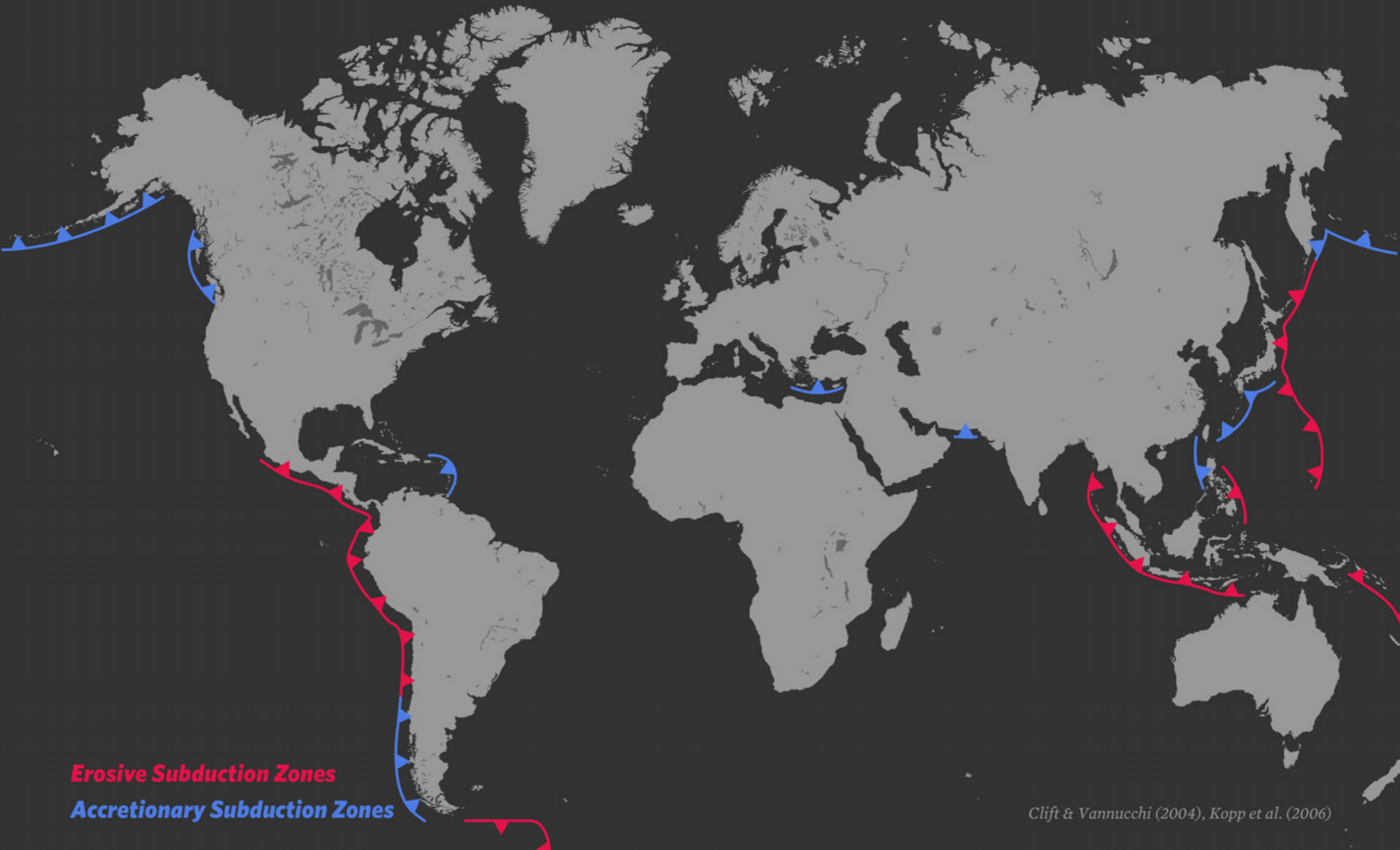
Alexander P. Clarke

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Paola Vannucchi, Jason Morgan



Erosive & Accretionary Subduction Zones



Erosive Subduction Zones

Accretionary Subduction Zones

Erosive & Accretionary Subduction Zones

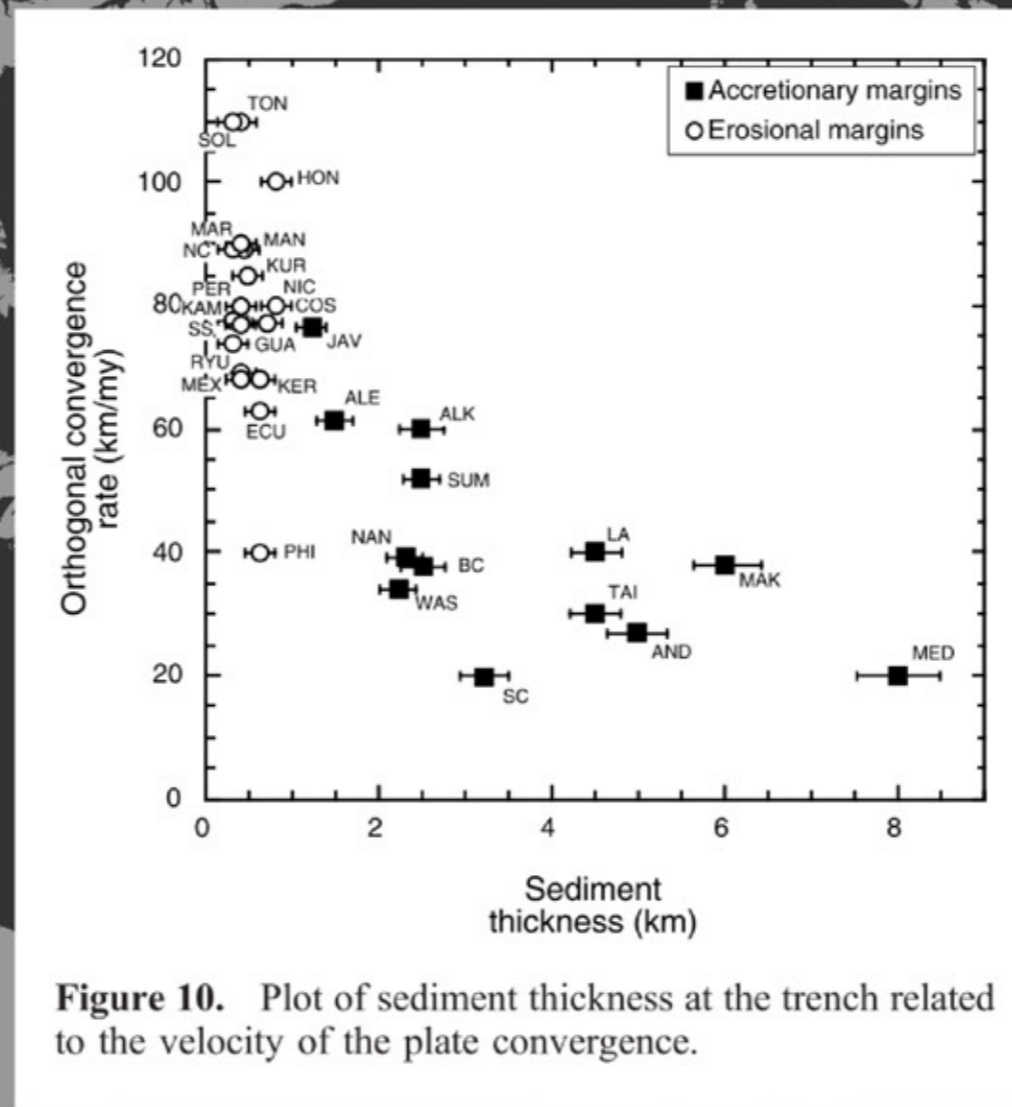


Figure 10. Plot of sediment thickness at the trench related to the velocity of the plate convergence.

Erosive Subduction Zones
Accretionary Subduction Zones

NICOYA PENINSULA

Seamount Re-Entrants in Forearcs

Costa Rica

Partially healed
seamount re-entrant

Healed
seamount re-entrant

Partially healed
seamount re-entrant

Seamount re-entrant

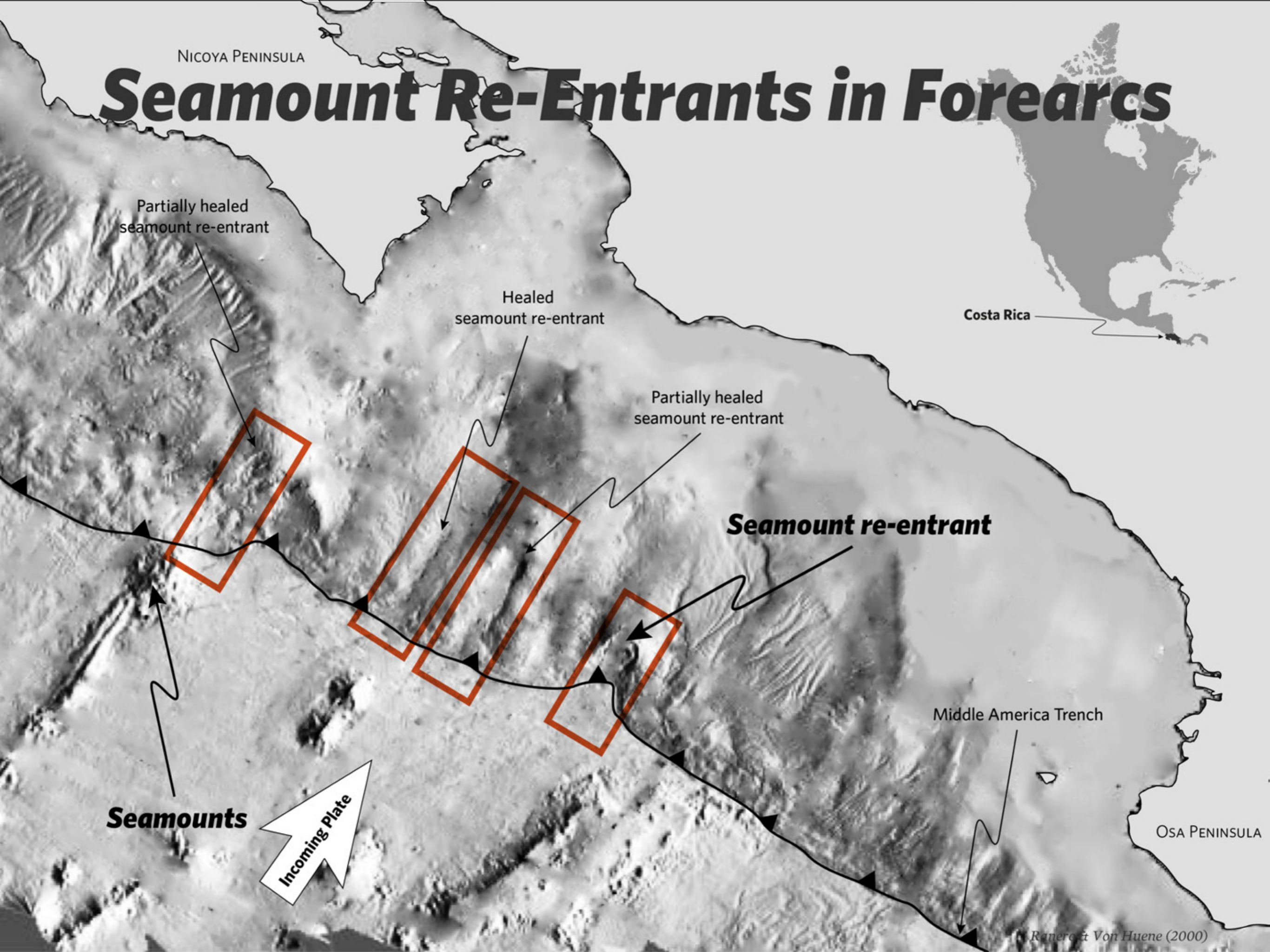
Middle America Trench

OSA PENINSULA

Seamounts



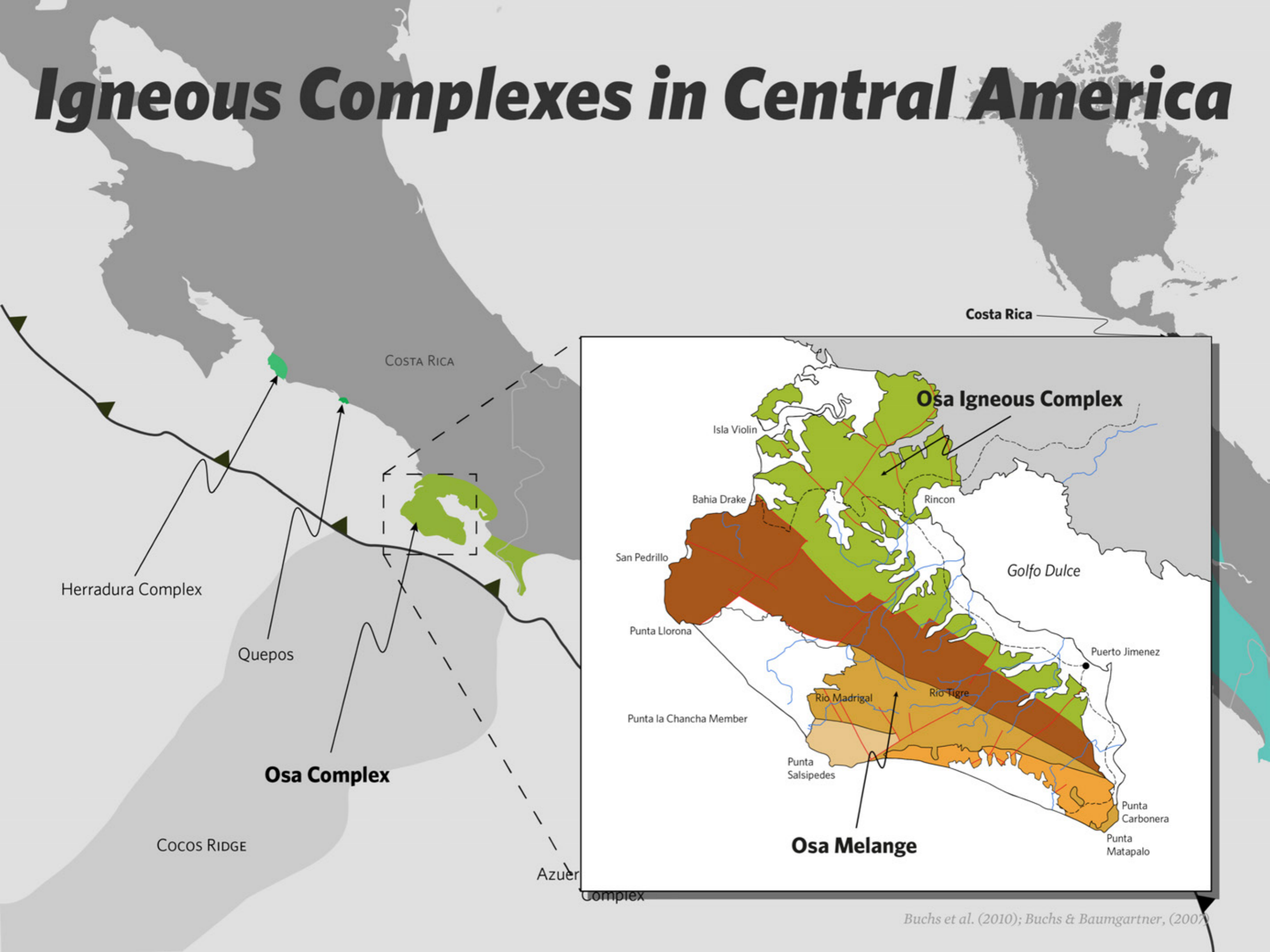
Incoming Plate



Igneous Complexes in Central America



Igneous Complexes in Central America



Costa Rica

COSTA RICA

Herradura Complex

Quepos

Osa Complex

COCOS RIDGE

Azuero

Complex

Osa Igneous Complex

Isla Violin

Bahia Drake

Rincon

Golfo Dulce

San Pedrillo

Punta Llorona

Puerto Jimenez

Punta la Chancha Member

Rio Madrigal

Rio Tigre

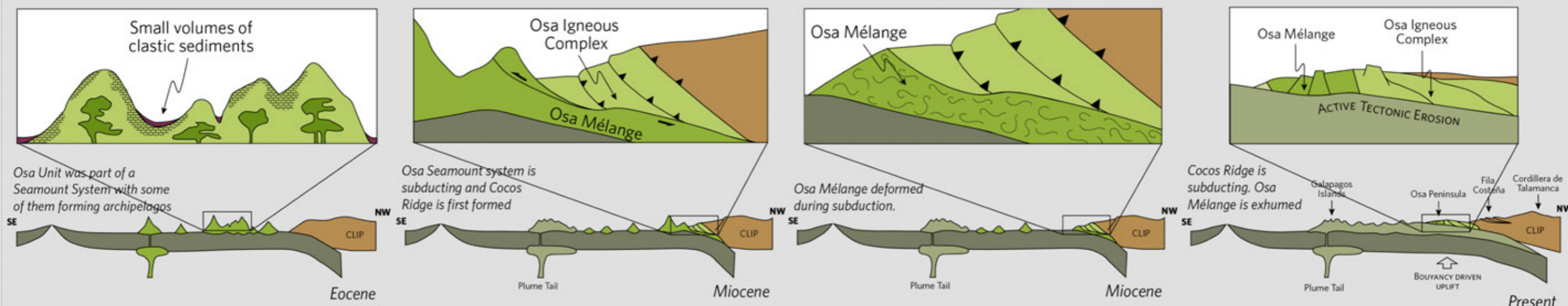
Punta Salsipedes

Punta Carbonera

Punta Matapalo

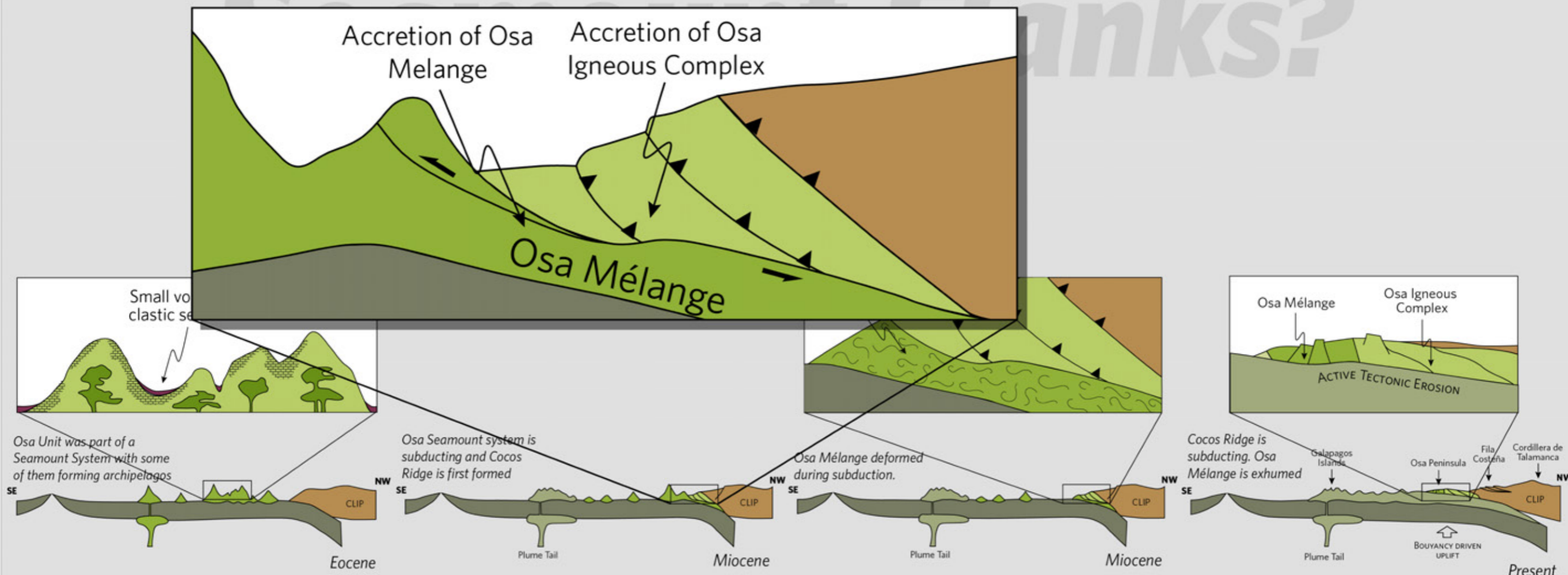
Osa Melange

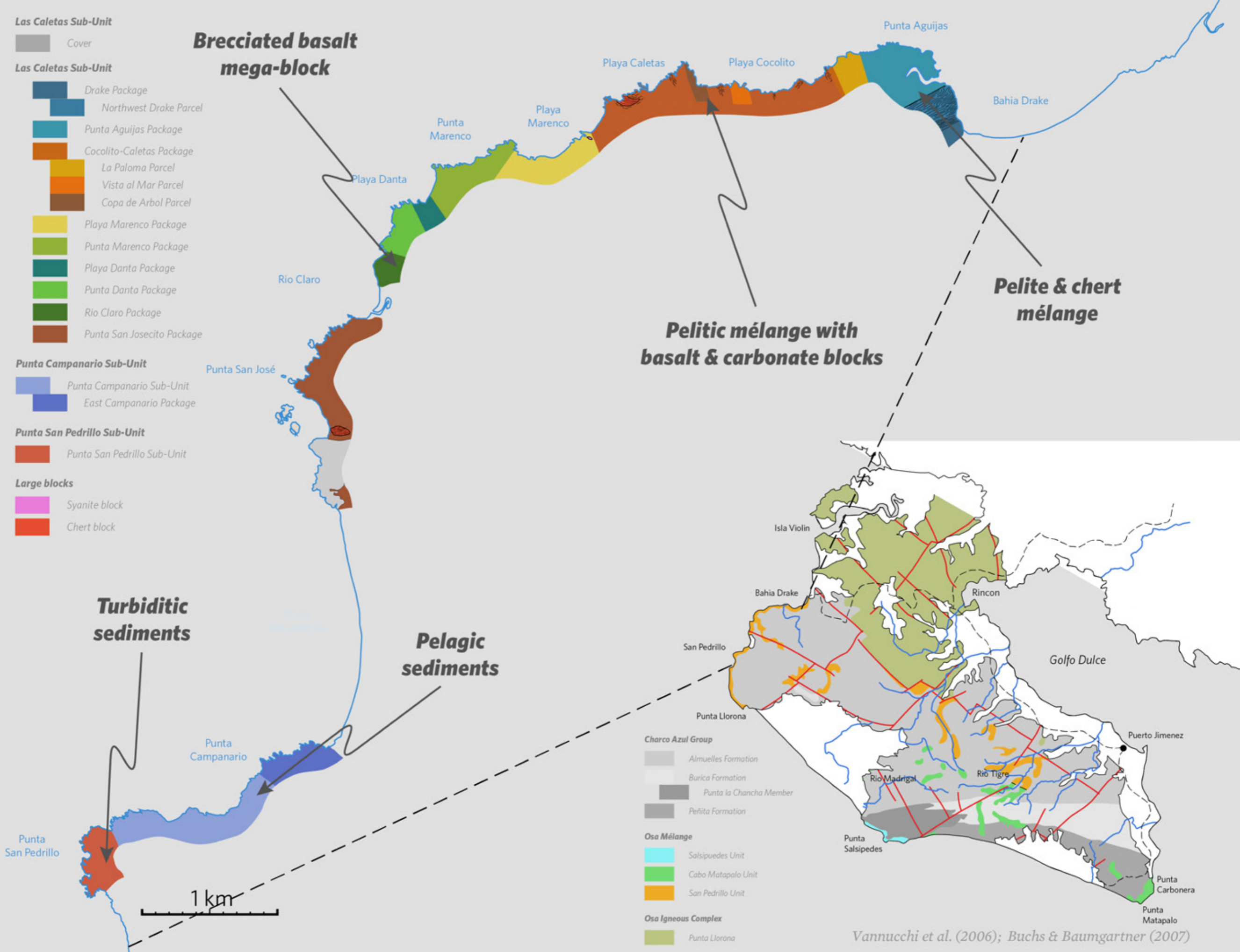
Mélange as Tectonised Seamount Flanks?



Mélange as Tectonised

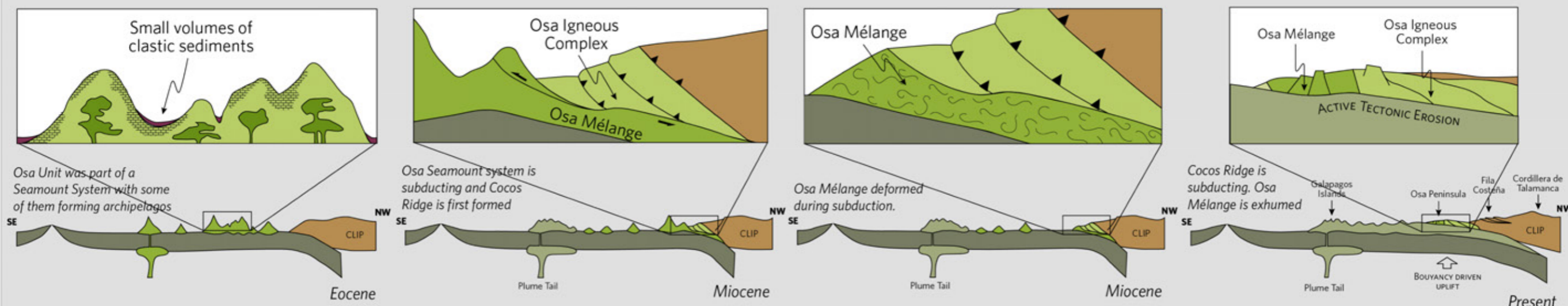
Direct seamount accretion



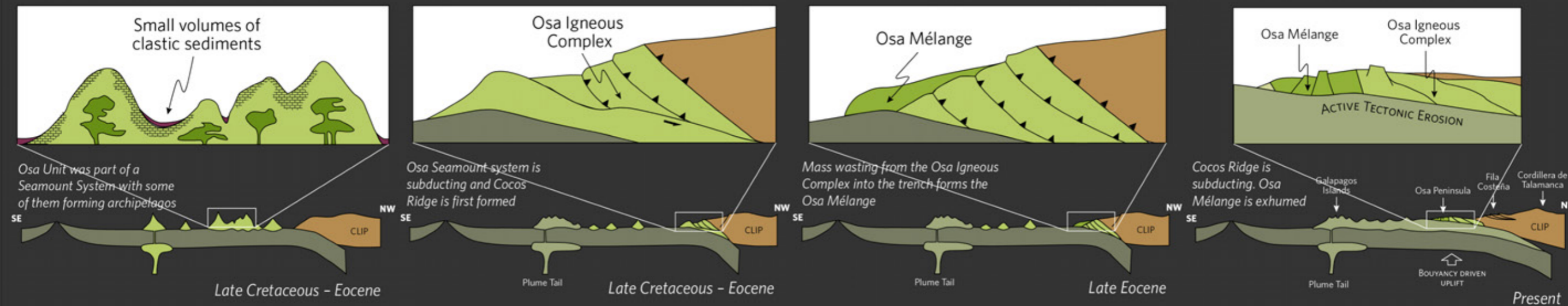


Mélange as Tectonised Seamount Flanks?

Problem: Too many sediments

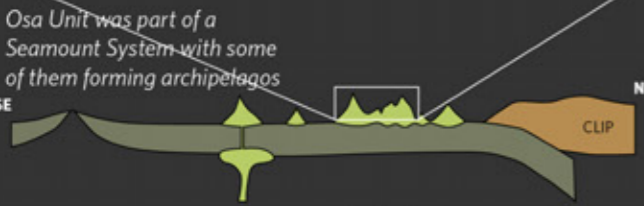
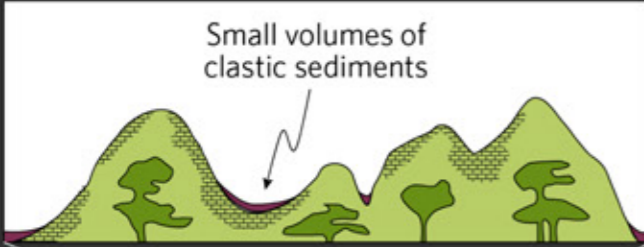
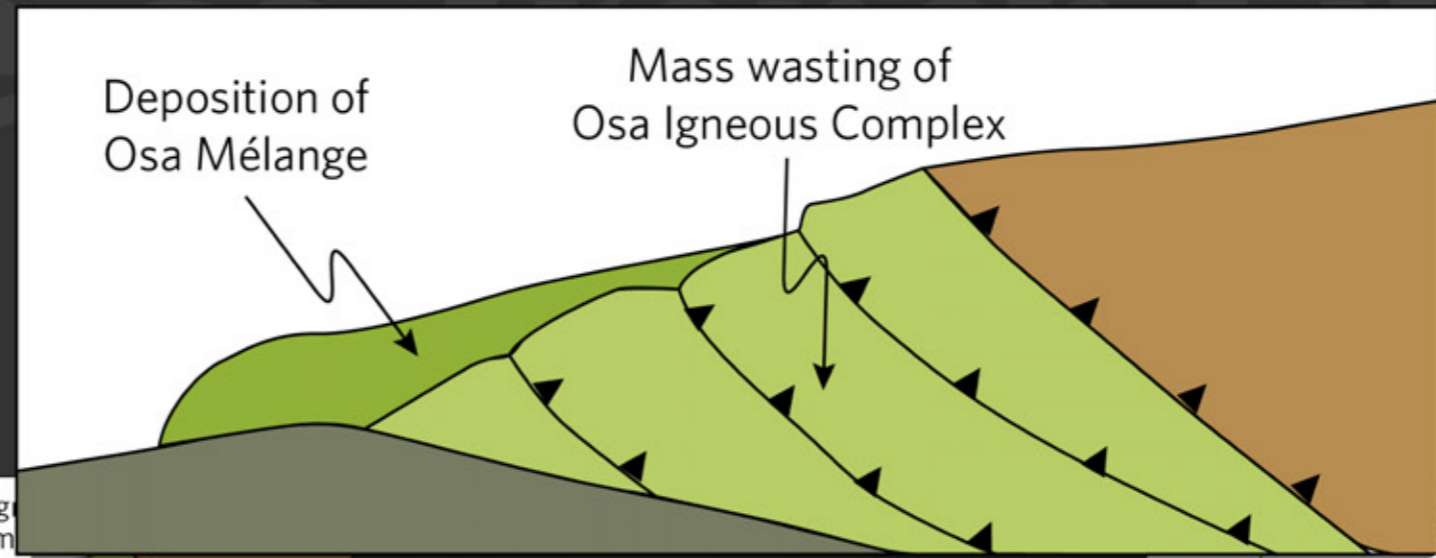


Mélange as Trench Fill?

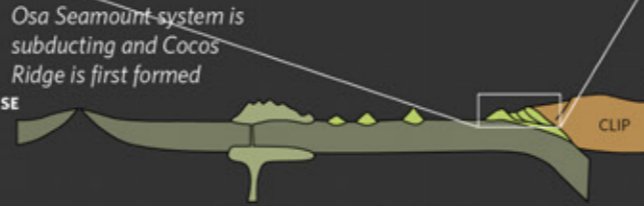
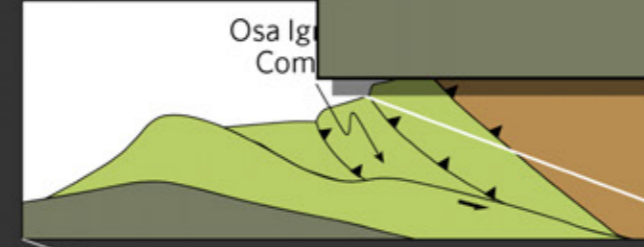


Mass Wasting into Trench & Subsequent Re-Accretion

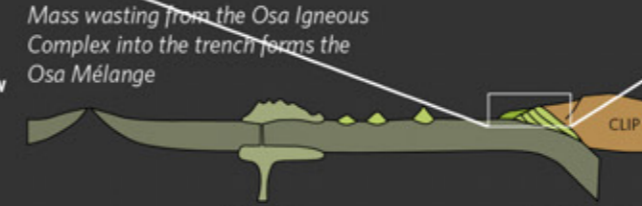
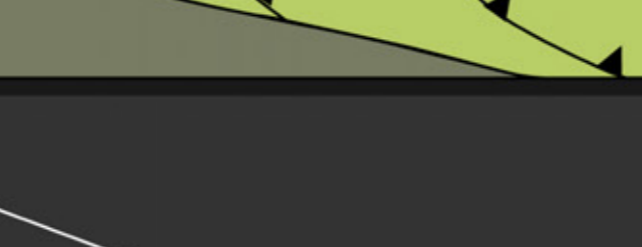
Mélange



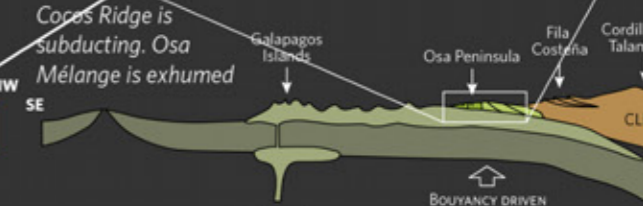
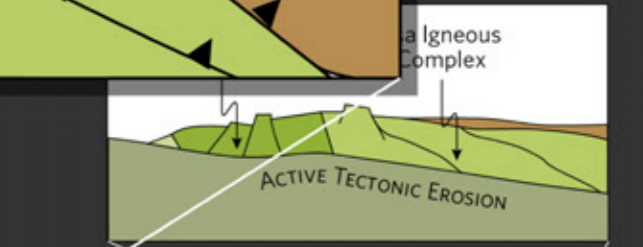
Late Cretaceous - Eocene



Late Cretaceous - Eocene



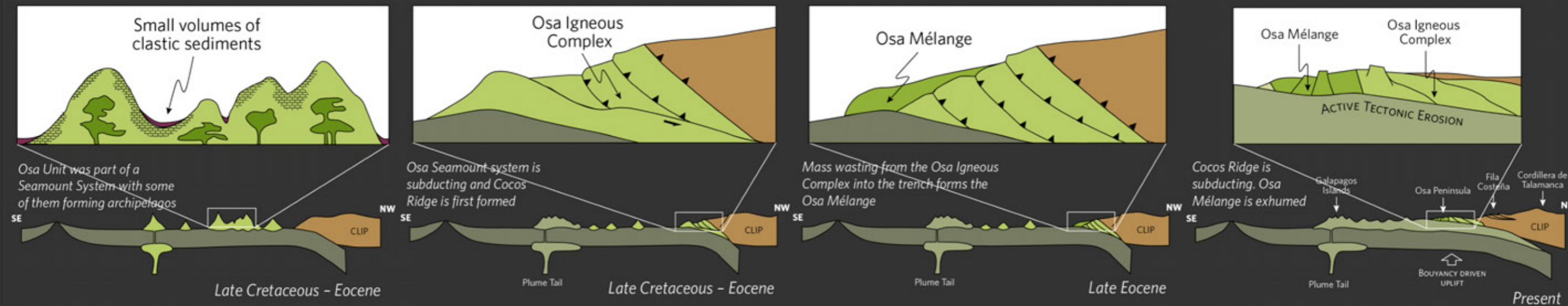
Late Eocene



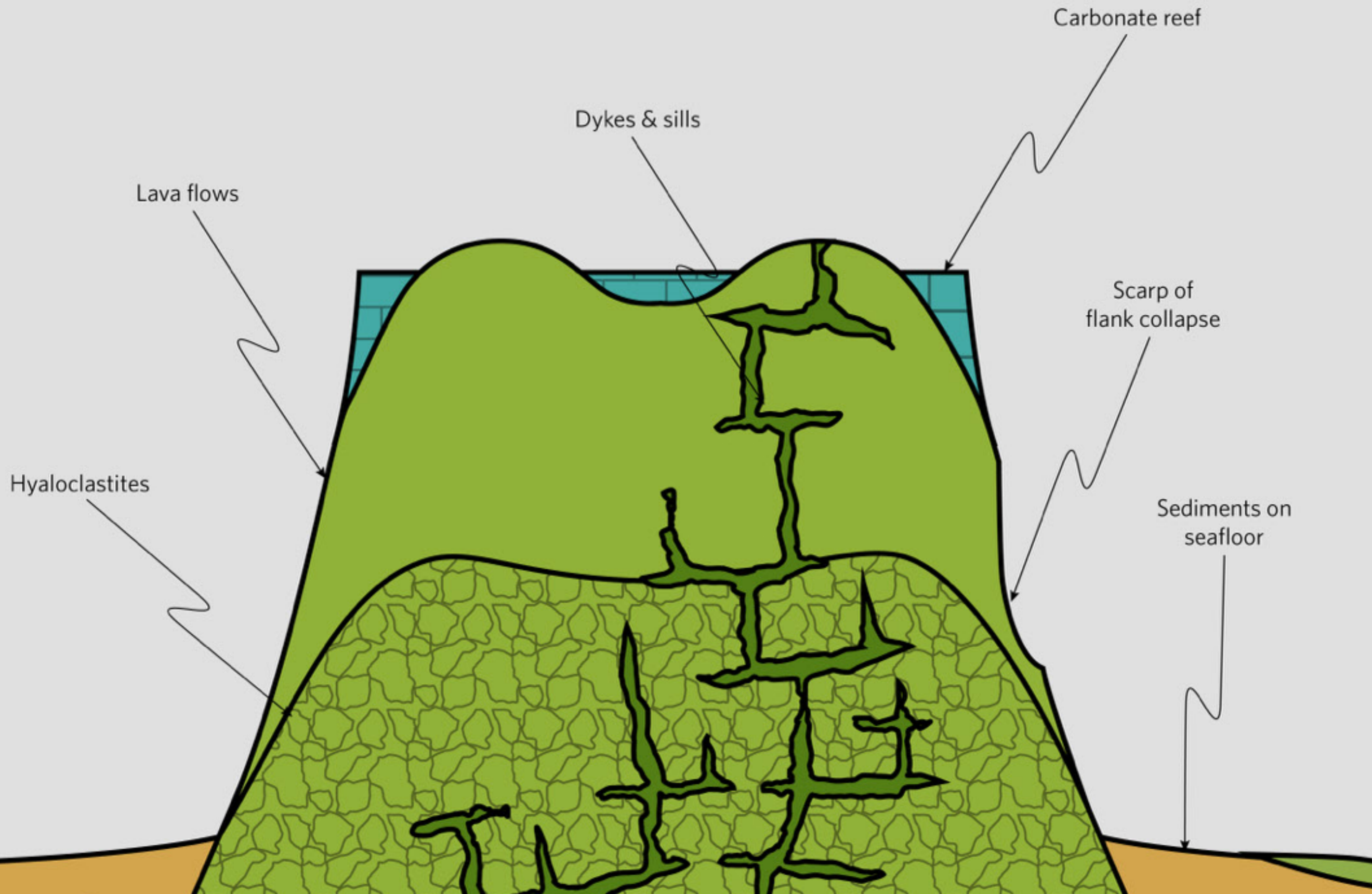
Present

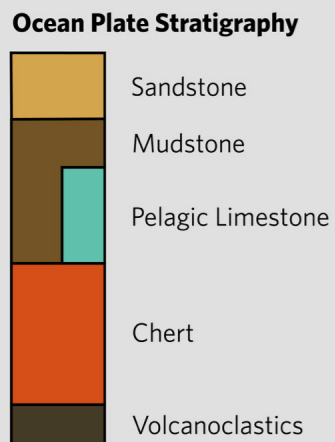
Mélange as Trench Fill?

Problem: Sediment inconsistent with trench fill

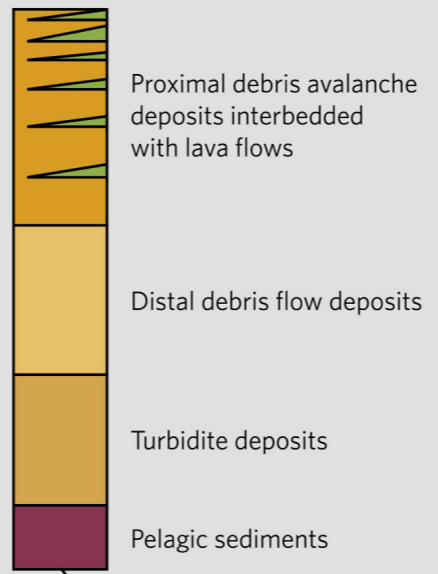


A Closer Look at Seamounts



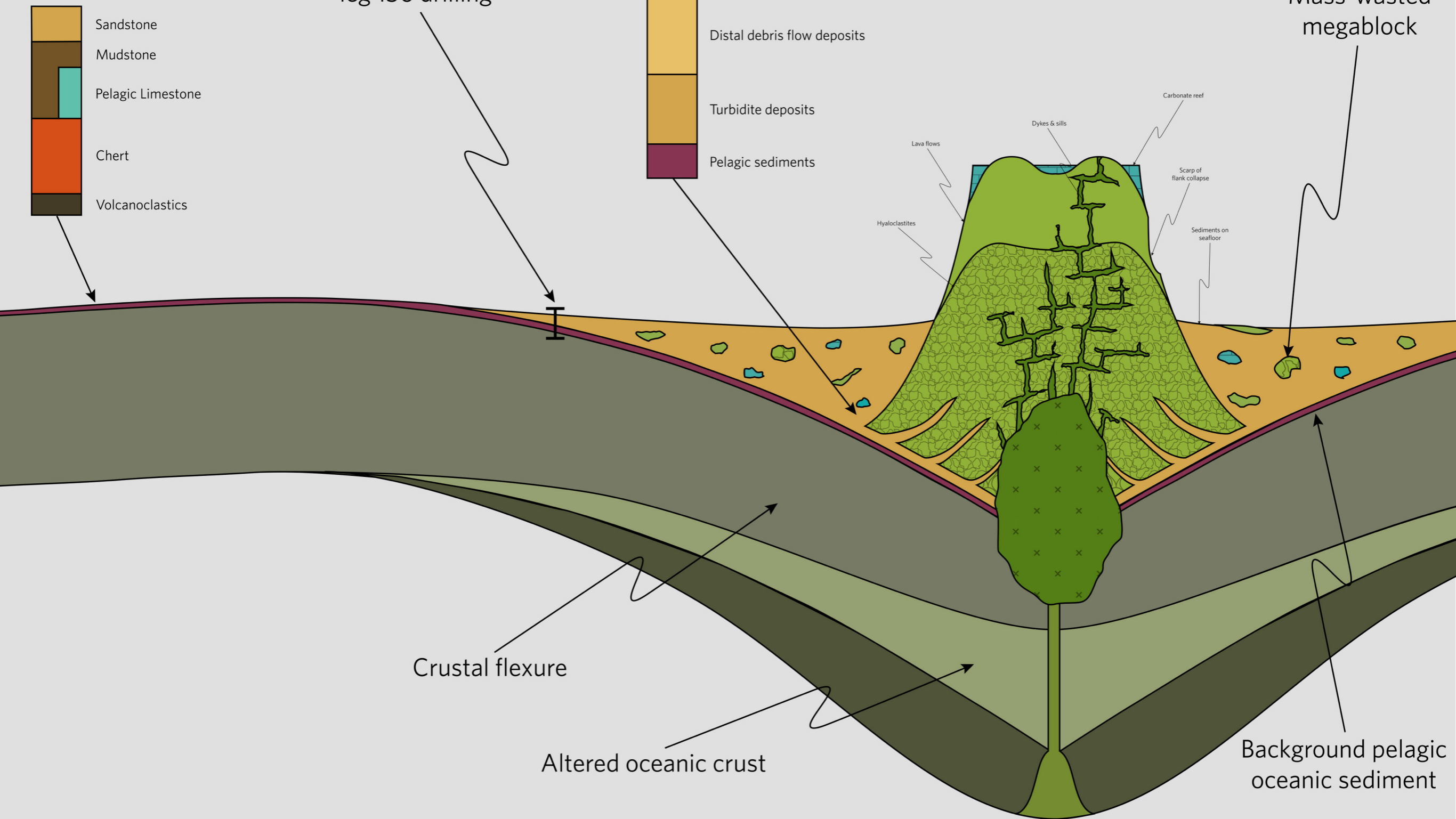


Flexural Moat Sediments

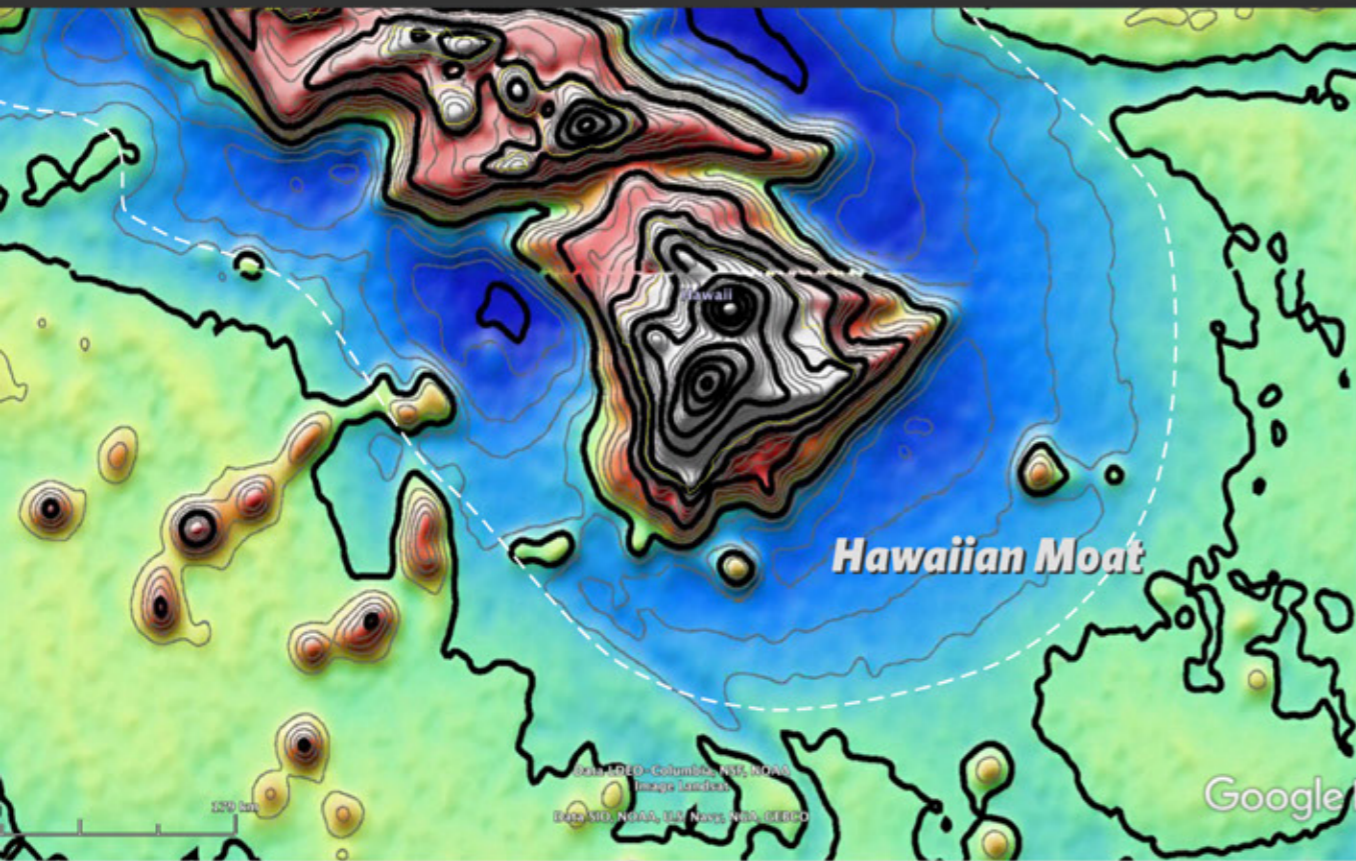


Site of ODP leg 136 drilling

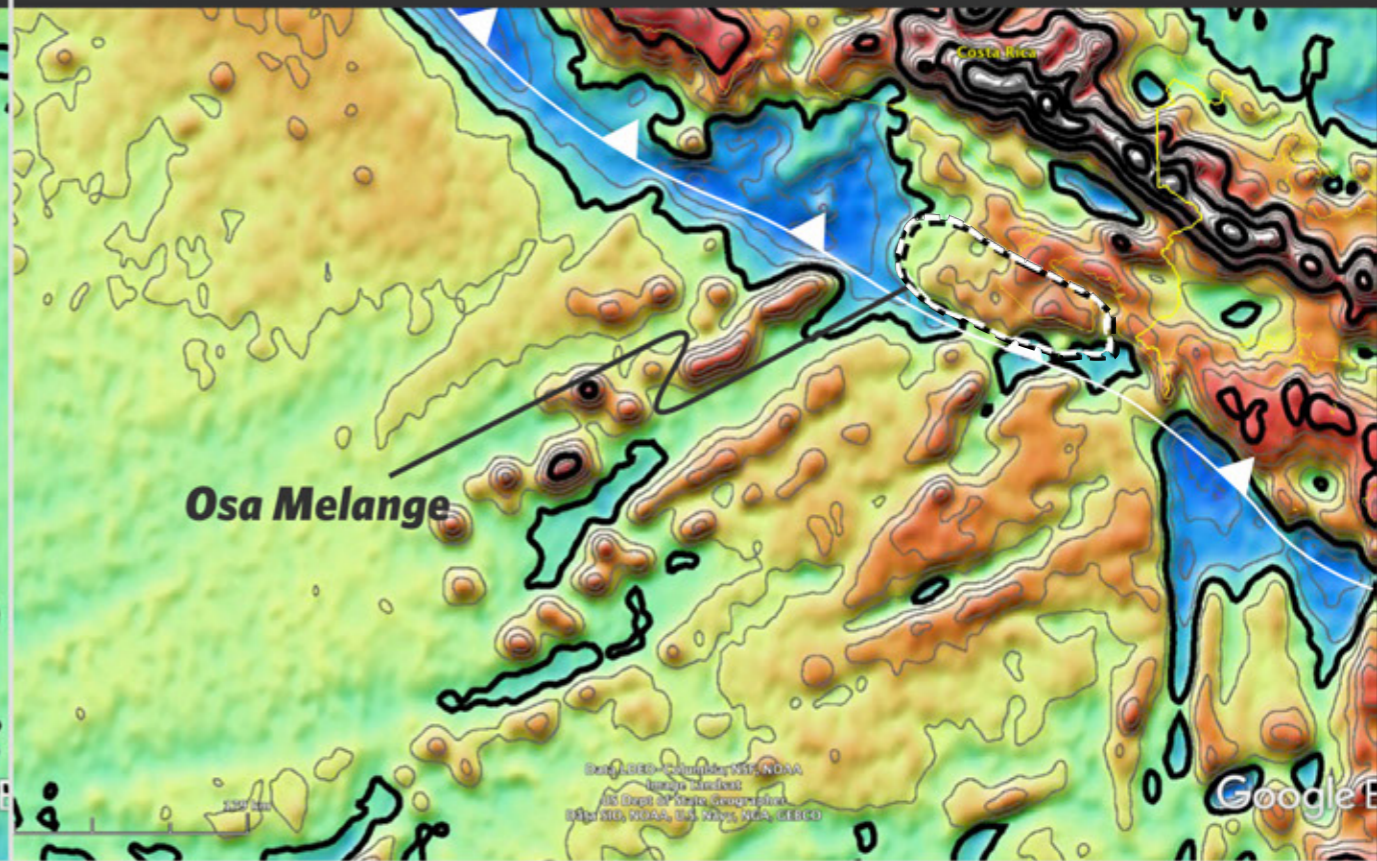
Mass-wasted megablock



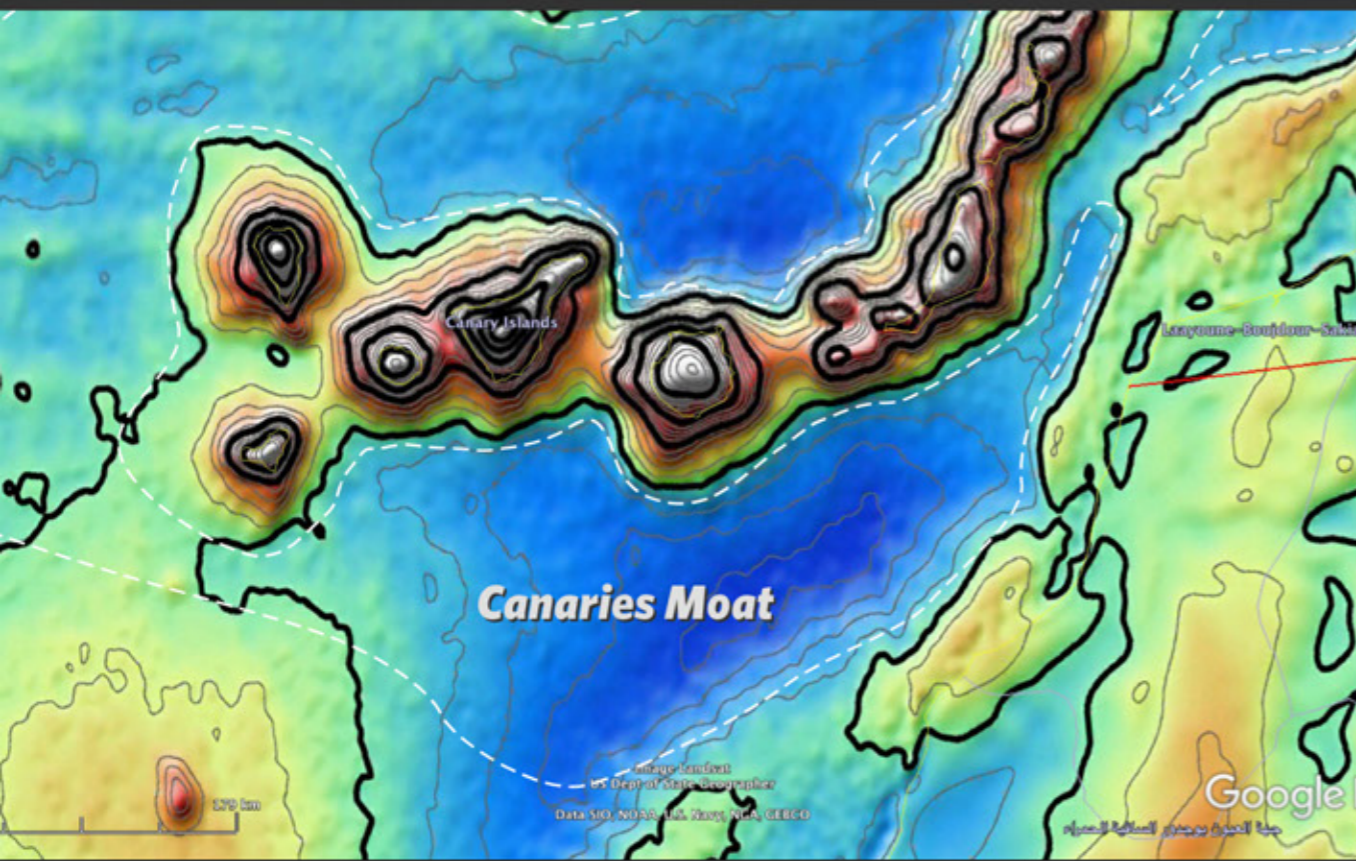
Hawaii



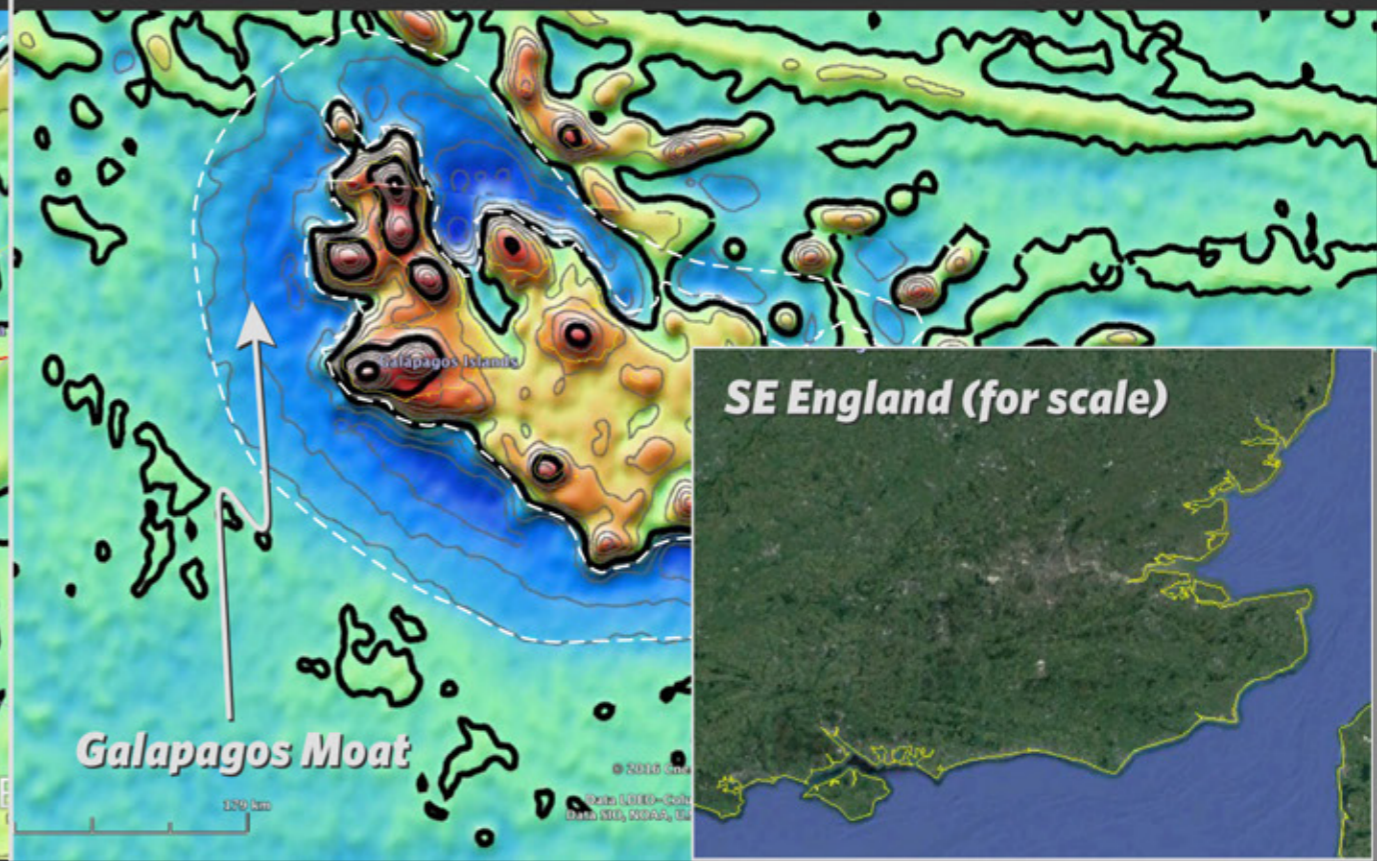
Costa Rica



Canaries



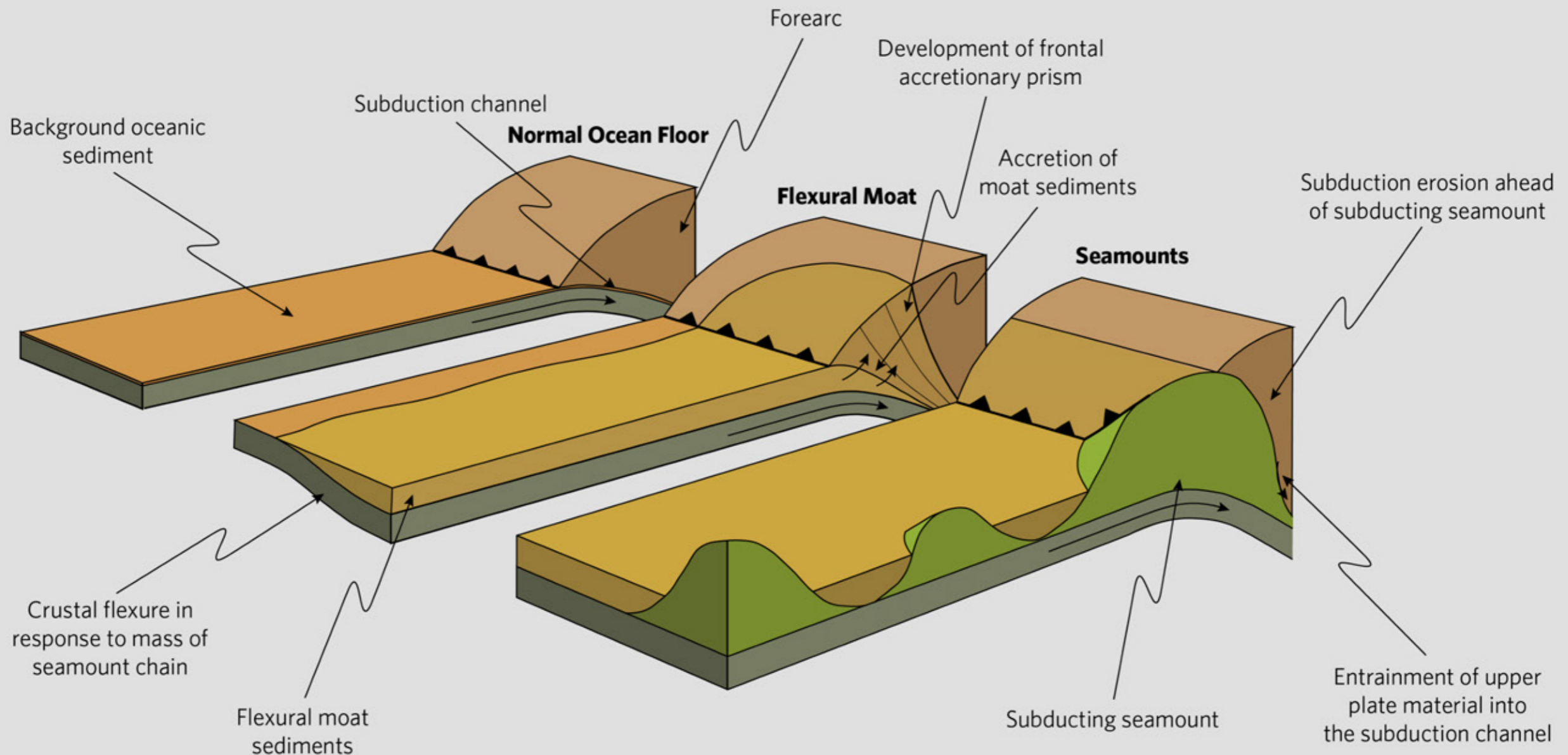
Galapagos



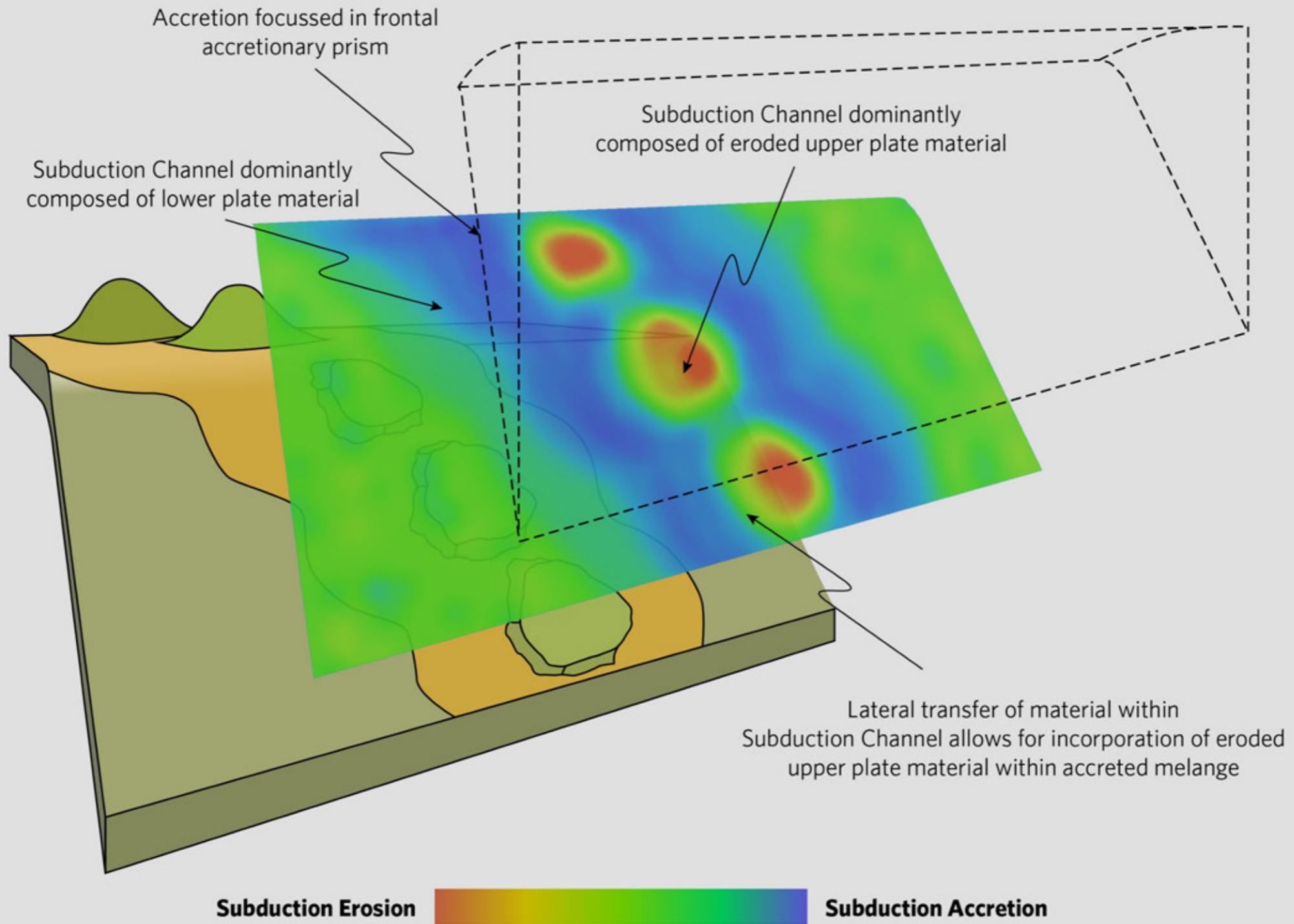
SE England (for scale)



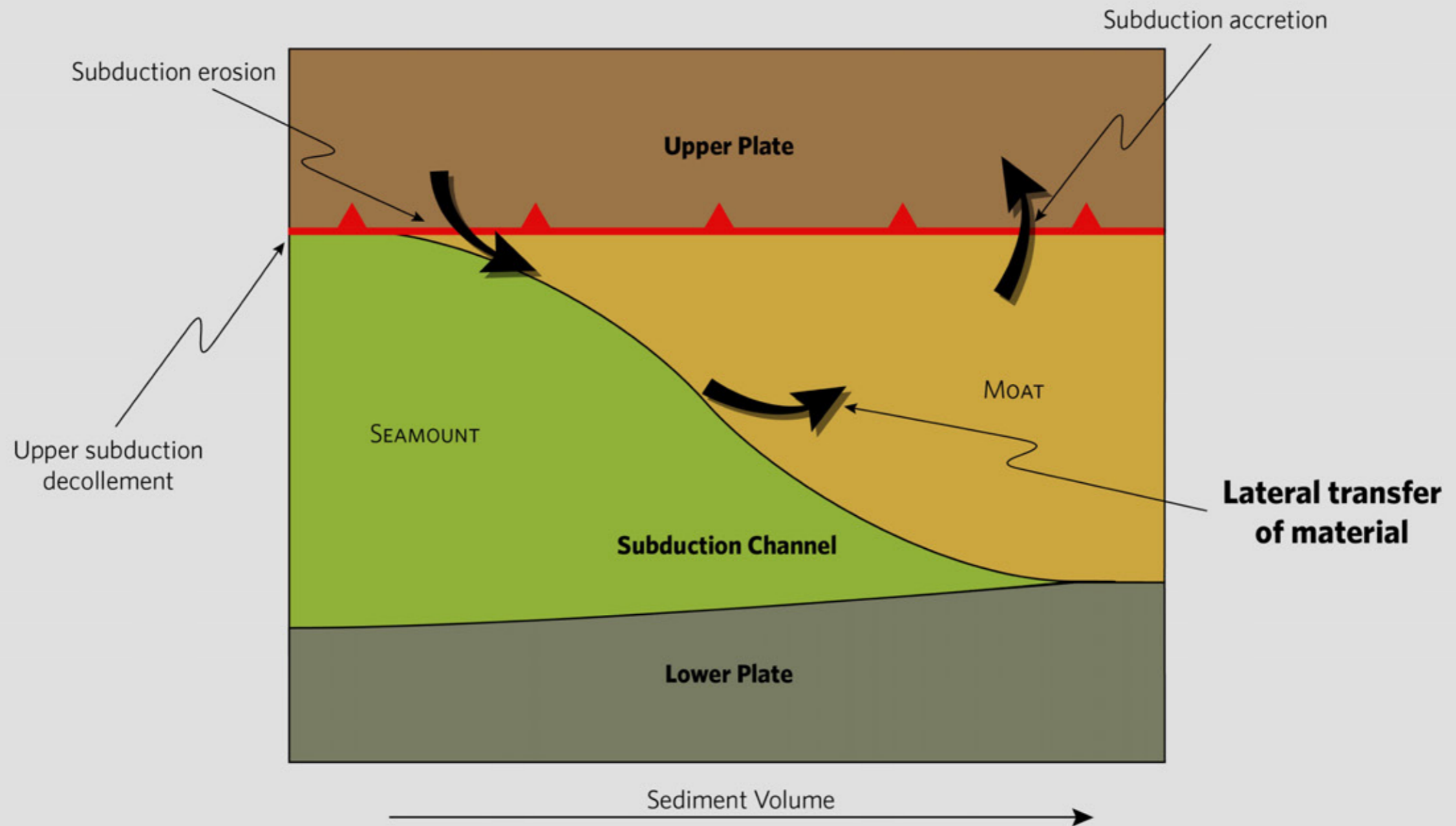
Seamount Subduction Driving Concurrent Accretion & Erosion



Heterogenous Subduction Channel Behaviour



Lateral Transfer & Re-Accretion of Tectonically Eroded Material



Conclusions

Osa Mélange has **too much sediment** to be from seamount flanks

Also **lacks arc or forearc material** expected in trench-fill

Seamount chains are surrounded by moat basins

High sediments volumes make these likely to be preferentially accreted

Subduction zone processes vary along strike

Any Questions?

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