

Advanced Structural Geology, Fall 2022

# Anatomy of orogenic belts

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Mostly derived from

Moore and Twiss, 1995



# Major elements of orogens

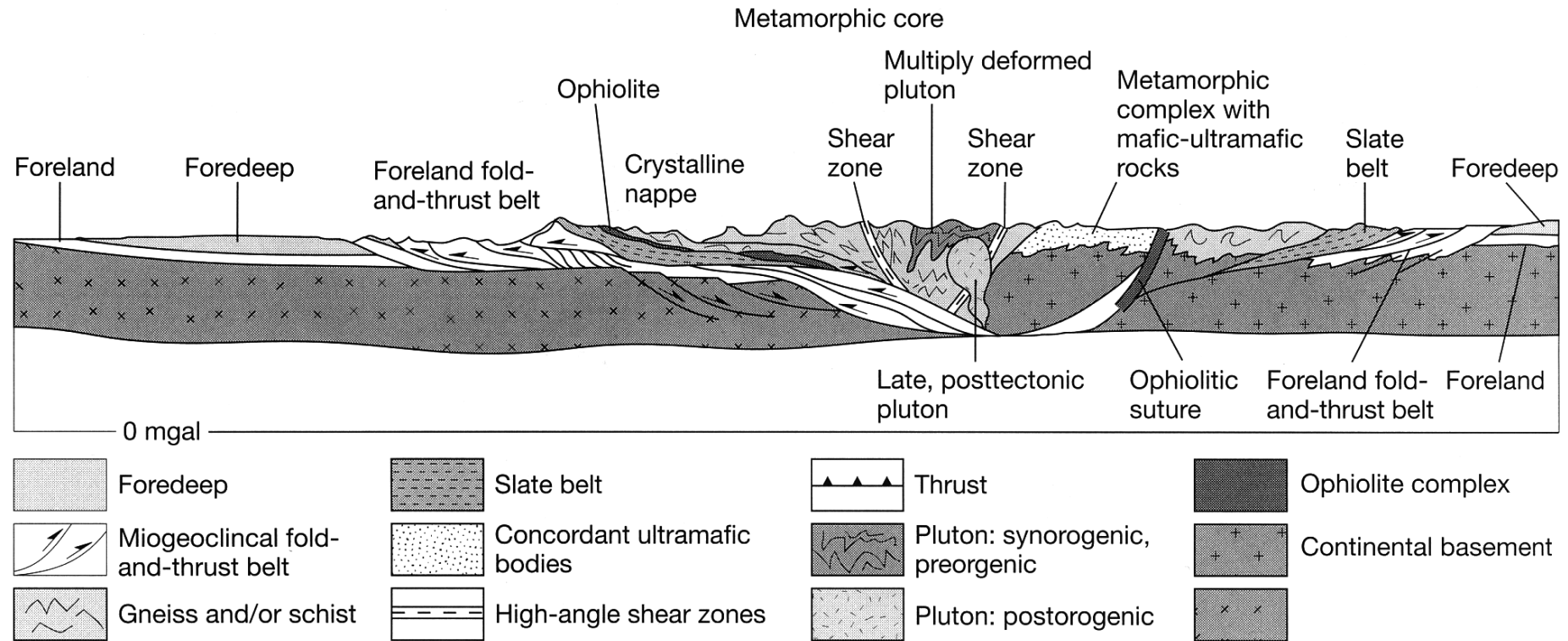
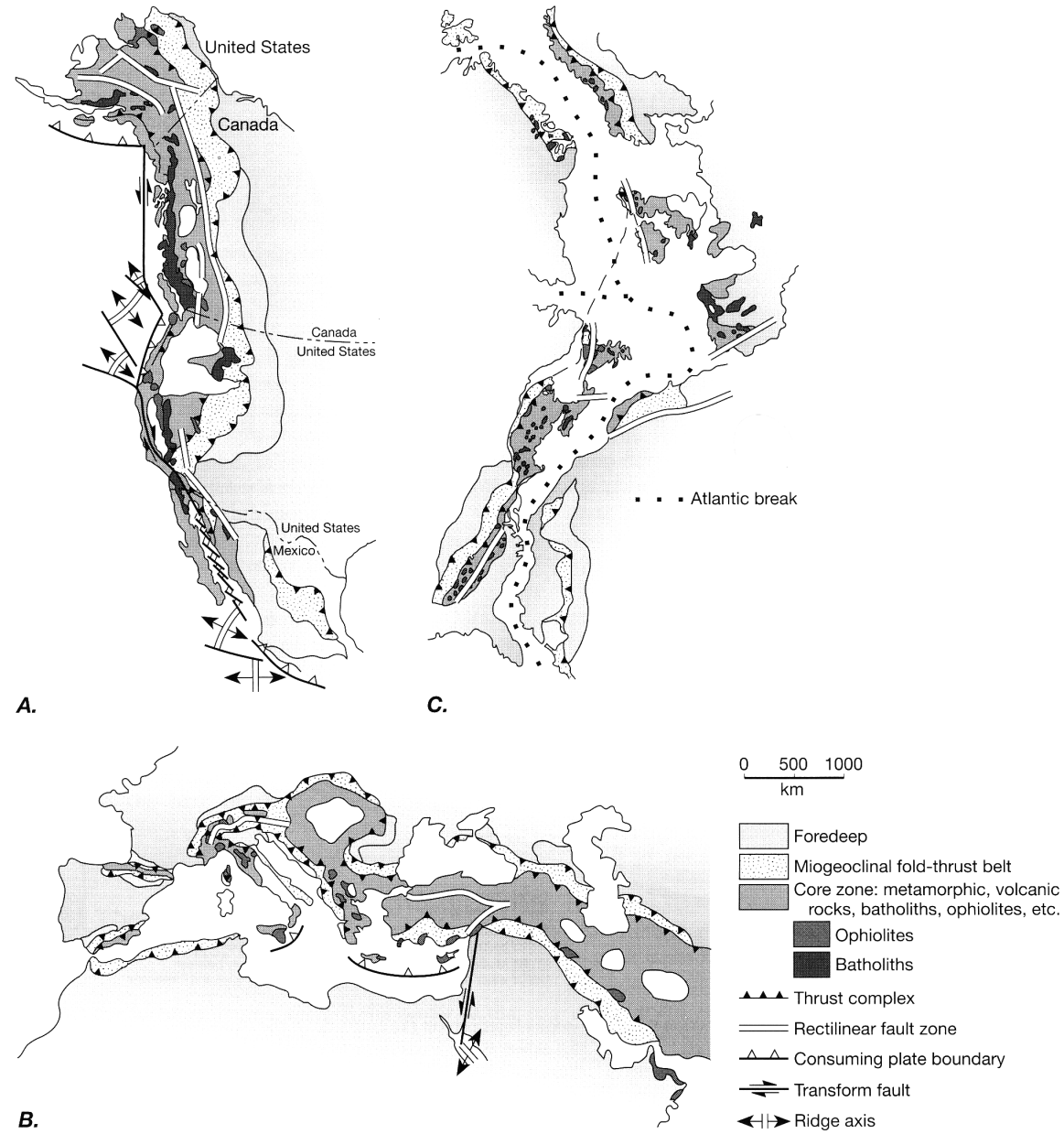
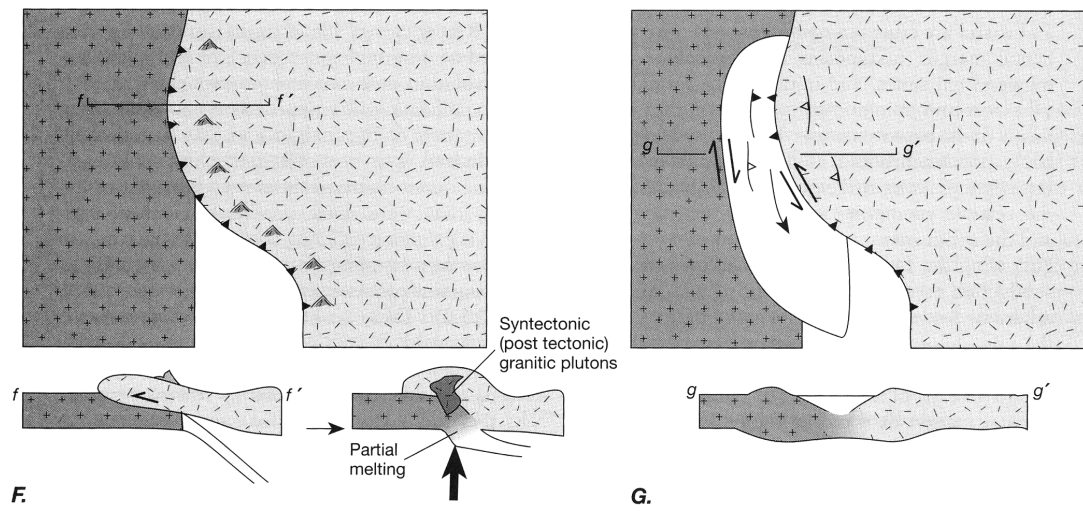
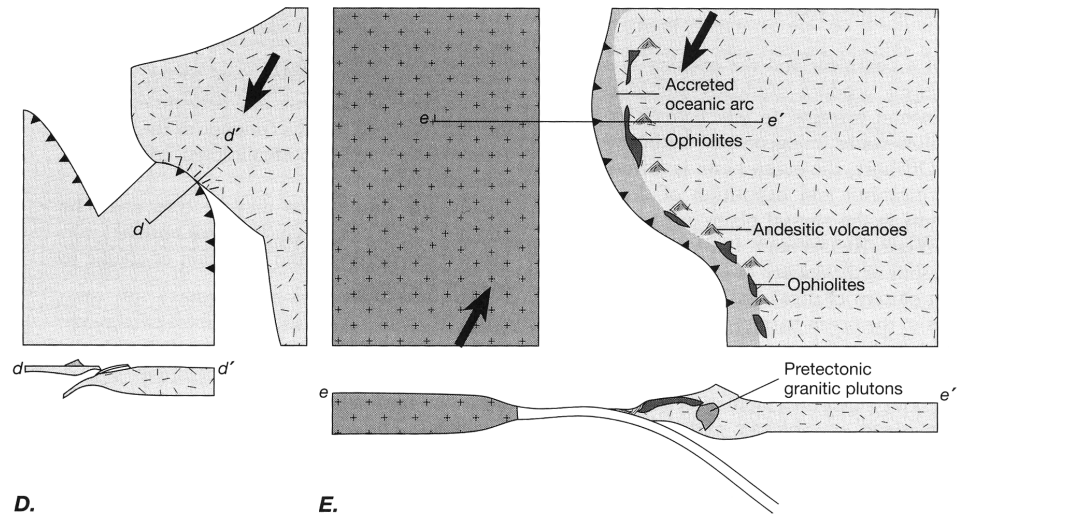
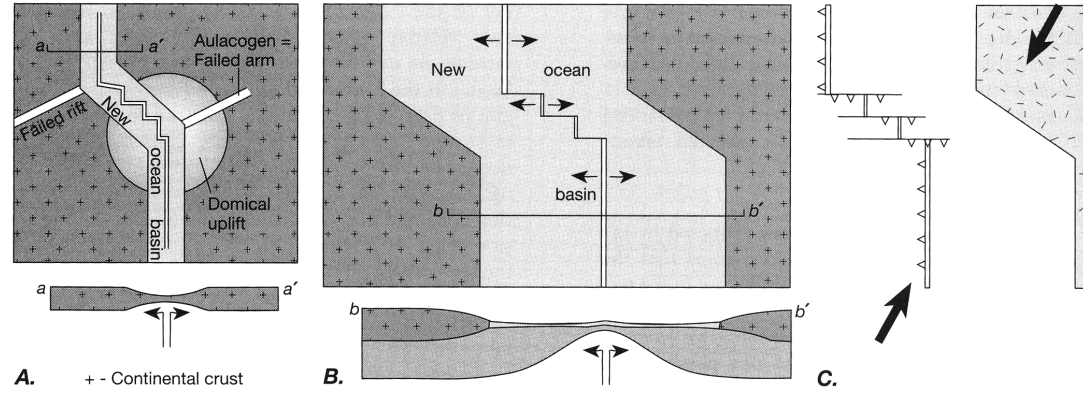


Figure 10.3 Cross section across a model composite orogenic belt. (After Hatcher and Williams, 1986)

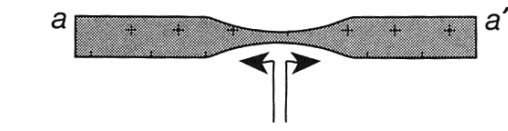
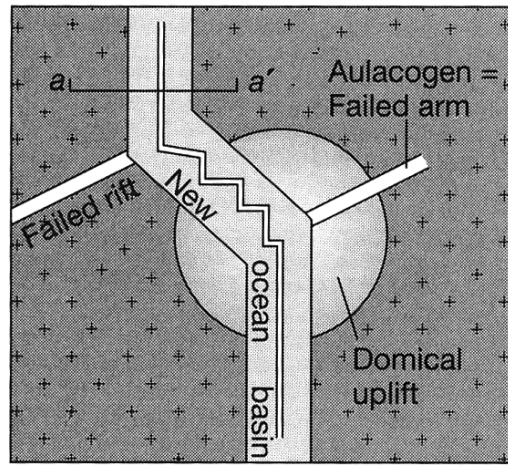


**Figure 10.2** Maps of three orogenic belts at the same scale, showing major tectonic features to be compared with the model cross section in Figure 10.3. Note also location of other figures. *A.* North American Cordillera. *B.* Alpine-Iranian, or western, segment of the Alpine-Himalayan Orogen. *C.* Appalachian-Caledonide orogenic belt (including the West African orogen), on a predrift reconstruction of the continents around the Atlantic Ocean. (*A.* after King, 1977; *B.* after Dewey, 1977; *C.* after Williams, 1984)

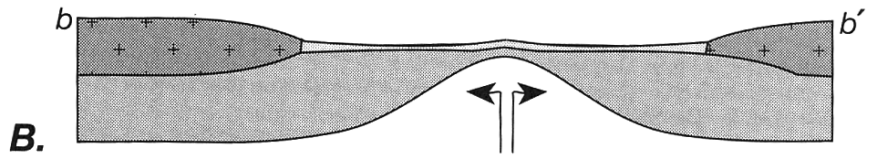
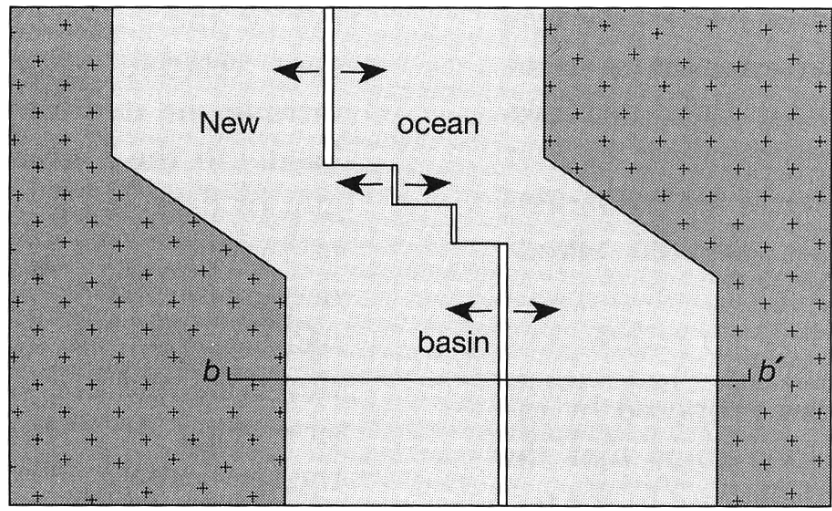


Wilson cycle

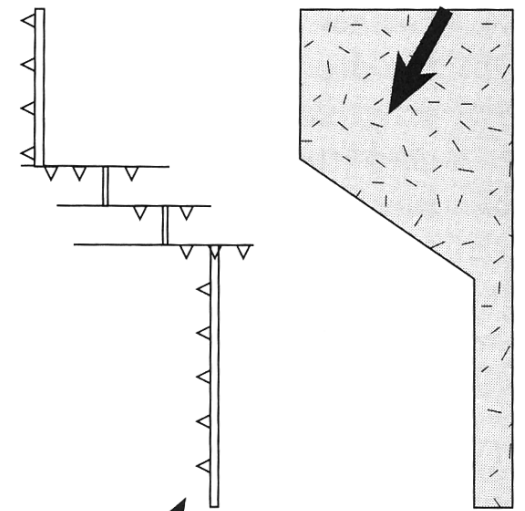




**A.** + - Continental crust

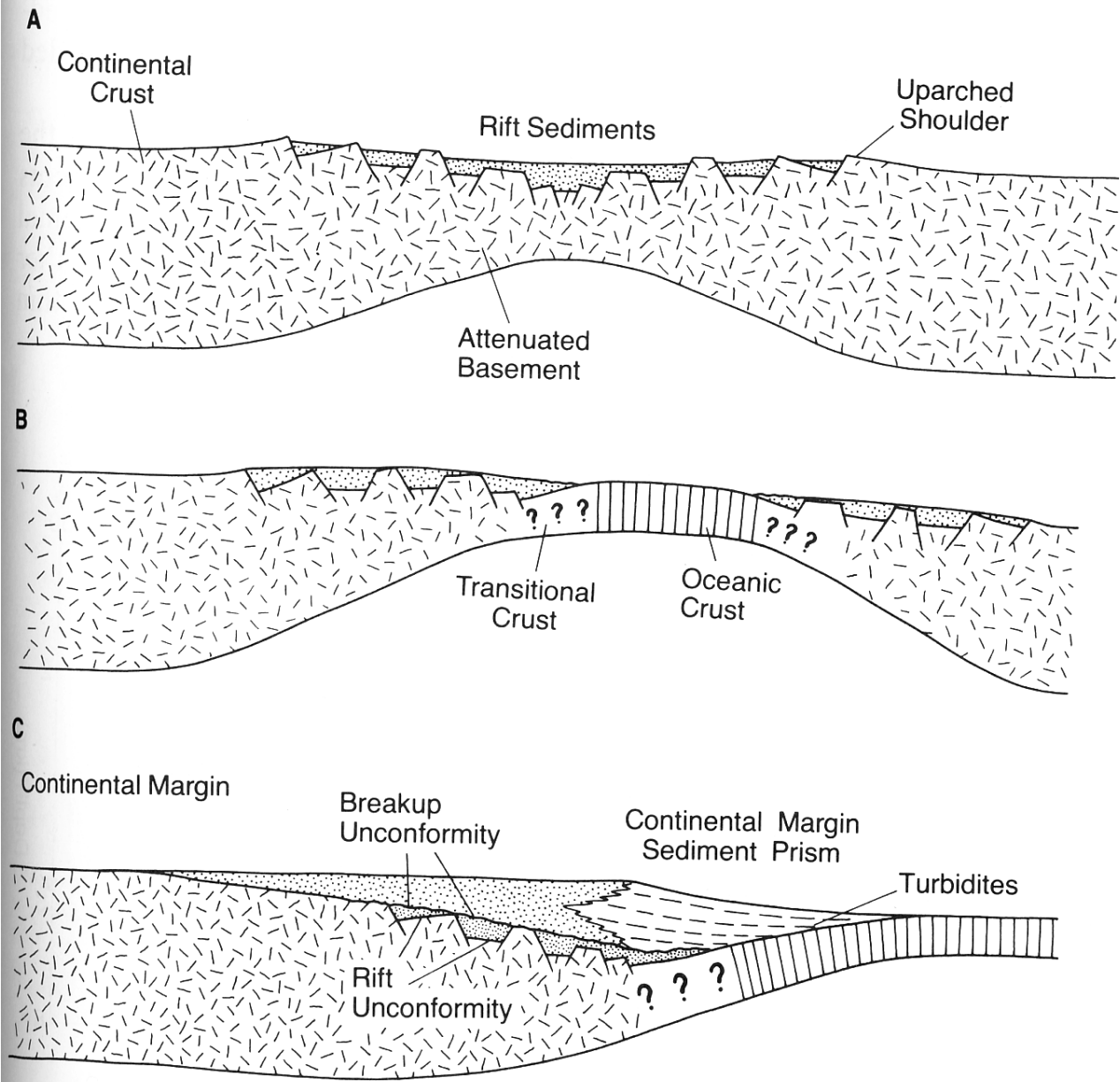


**B.**



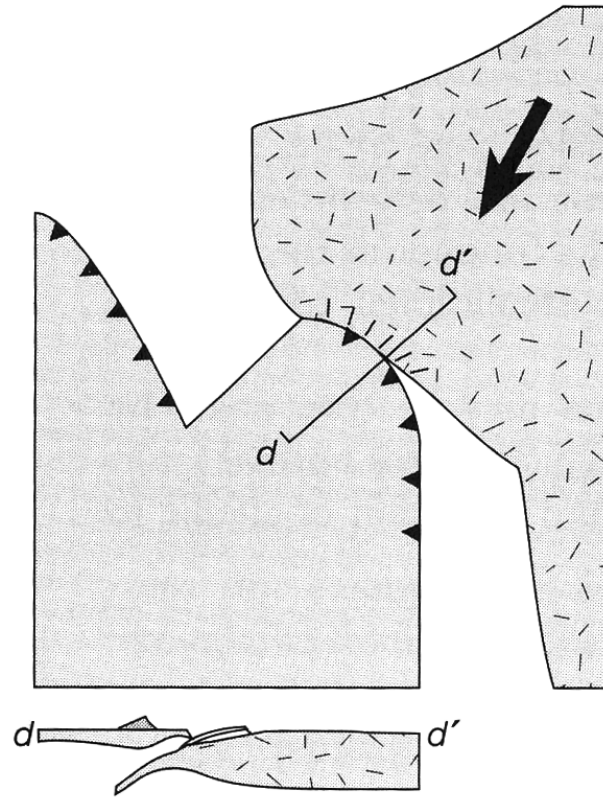
**C.**

Wilson cycle

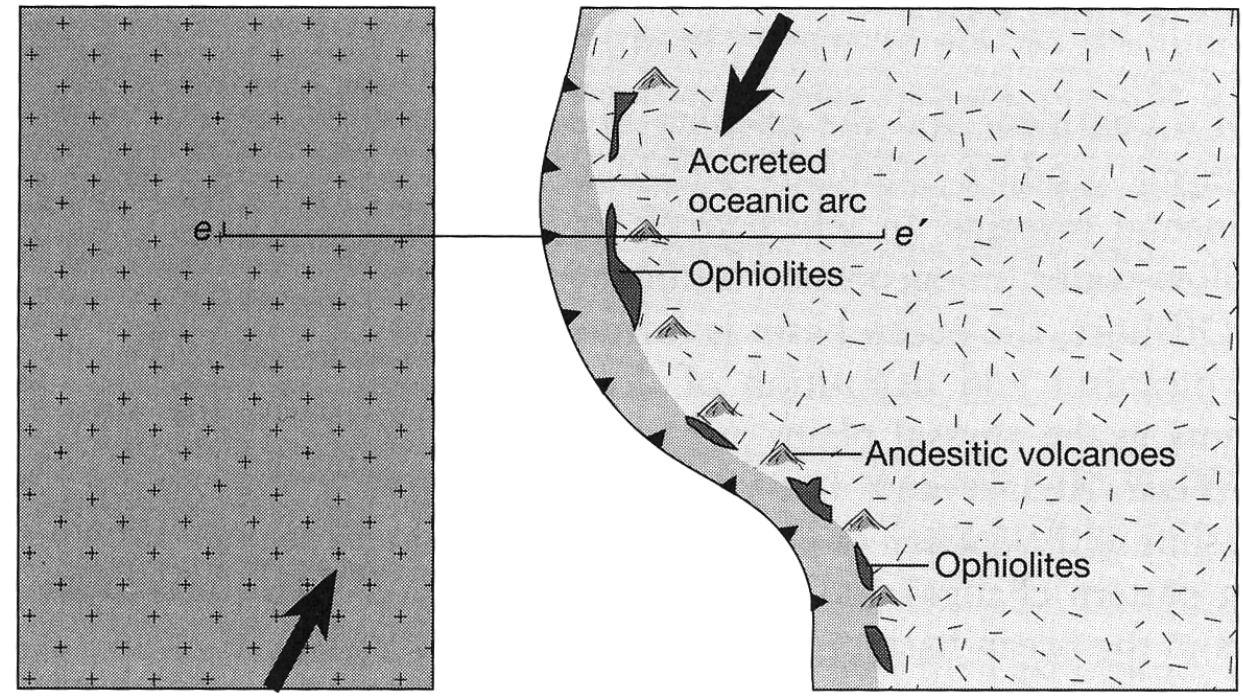


Miogeocline in plate tectonic sense

**Figure 10.15** Structural evolution of a passive margin. (A) Stretching and subsidence. (B) Emplacement of new oceanic crust; buoyant uplift. (C) Subsidence of the passive margin and formation of continental margin prism. [From Dickinson (1980). Published with permission of Geological Association of Canada.]

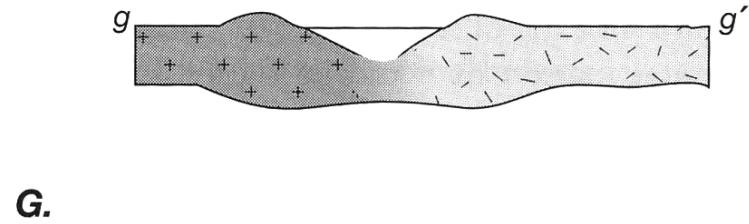
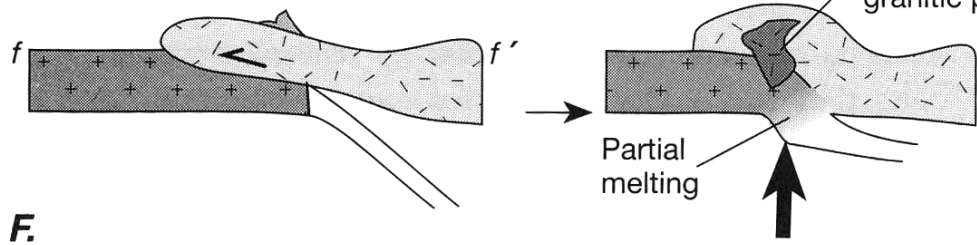
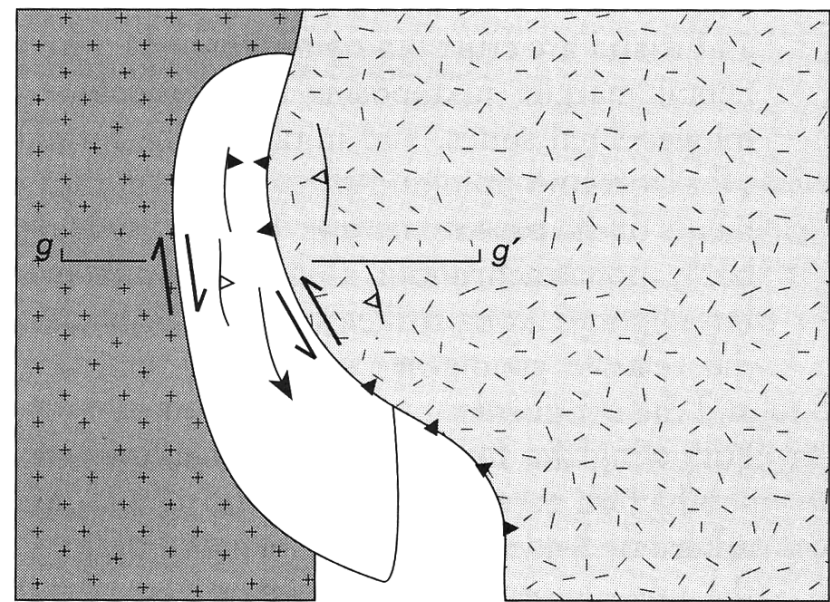
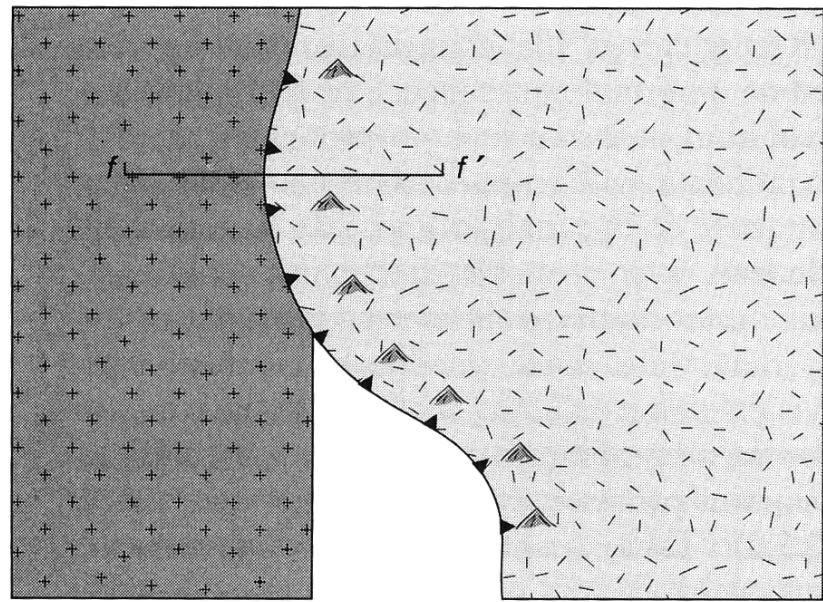


**D.**



**E.**

Wilson cycle

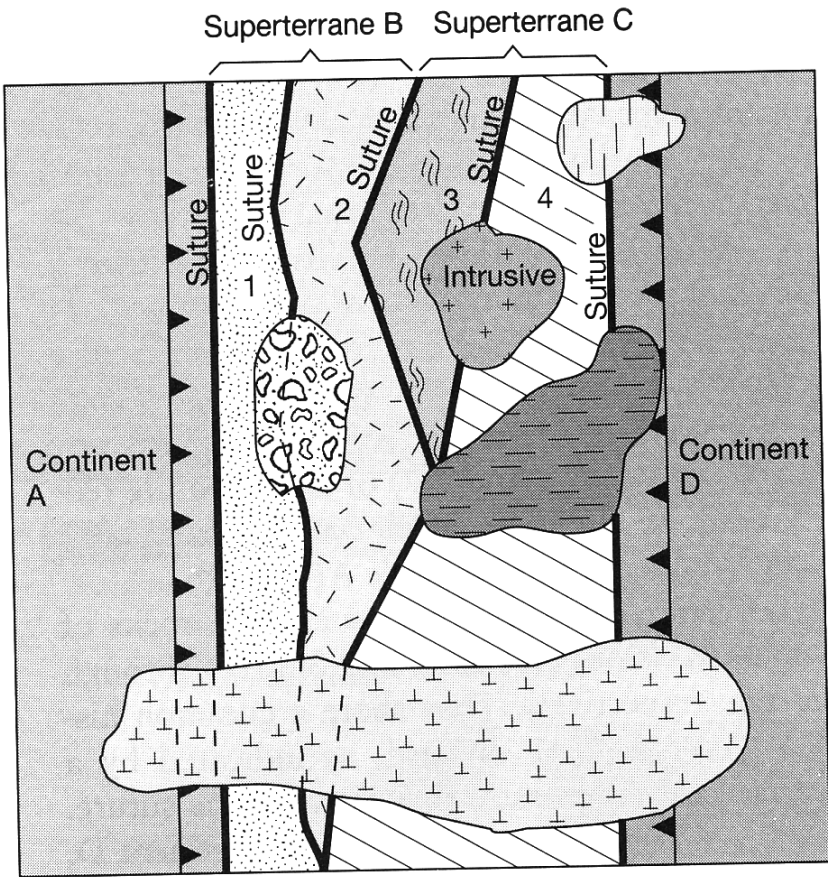


Syntectonic  
(post tectonic)  
granitic plutons

**F.**

**G.**

Wilson cycle

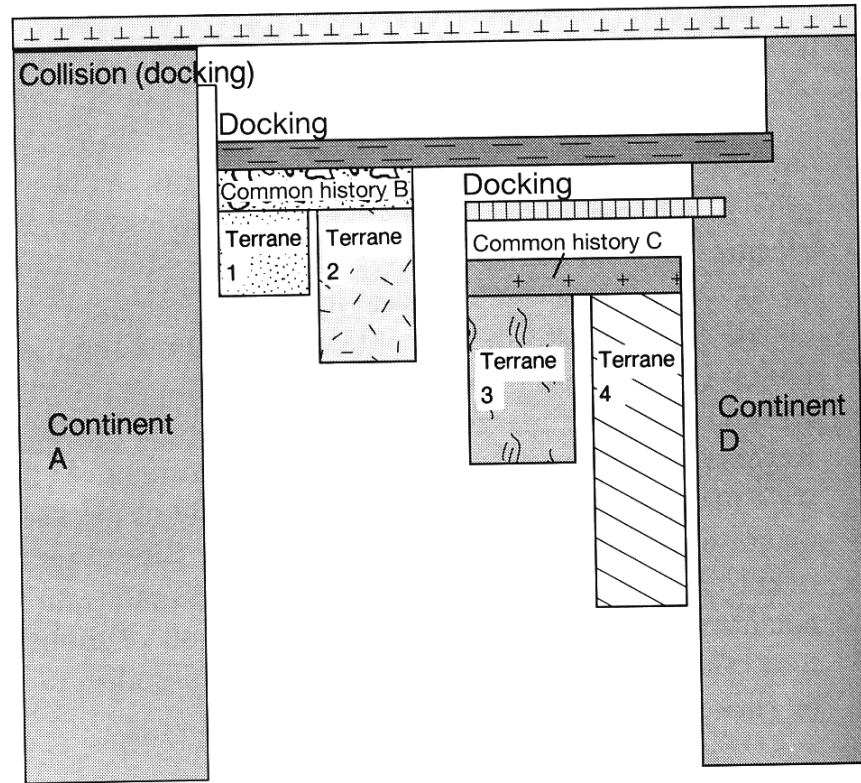


**A.**

Cenozoic	
Mesozoic	Cr
	J
	Tr
Paleozoic	P
	Cf
	D
	S
	O
	C

Precambrian

**B.**



**Figure 10.36** Analysis of exotic terranes. **A.** Schematic map of two continents separated by several exotic terranes. **B.** Stratigraphic-tectonic diagram illustrating ages of rocks in individual terranes, ages of “docking,” and ages of common histories. See text for discussion.

## Terrane analysis