

---

**TABLE 1. SUMMARY OF THE TECTONIC FORMATION OF THE APPALACHIAN PROVINCE, PIEDMONT PROVINCE, ATLANTIC OCEAN, AND ATLANTIC CONTINENTAL MARGIN THAT CONTAINS THE COASTAL PLAIN AND CONTINENTAL SHELF PROVINCES.**

**I. THREE EPISODES OF COLLIDING TECTONIC PLATES**

Orogenies or Mountain Building Episodes resulting from convergent plate boundary dynamics—compressional forces pushing together

- A. Taconic Orogeny (Ordovician Period ~480 to ~440 mya\*)
- B. Acadian Orogeny (Devonian Period ~380 to ~340 mya\*)
- C. Alleghanian Orogeny (Carboniferous to mid-Permian ~300 to ~240 mya\*)

**II. CONSEQUENCES**

- A. Collision and incorporation of volcanic islands and continental fragments with Proto-North America
- B. Closure of Proto-Atlantic Ocean
- C. Formation of Appalachian and Piedmont Provinces
- D. Intrusions of Spruce Pine pegmatites in the Appalachian Province and granite plutons in the Piedmont Province (major sources of economic mineral deposits today)
- E. Formation of PANGAEA super continent that existed from mid-Permian to lower Triassic (~300 to ~240 mya\*)

**III. RIFTING OF PANGAEA SUPER CONTINENT**

- A. Breakup of Pangaea resulting from divergent plate boundary dynamics—tensional forces pulling continental fragments apart
- B. Breakup forms Rift Valleys (upper Triassic to lower Jurassic ~225 to ~180 mya\*)
- C. Triassic rift valley deposition by volcanic, alluvial, riverine, and lakes sedimentation
- D. Appalachian and Piedmont Provinces supply weathered sediments to developing river drainage system that will deliver sediments to the rift valleys, continental margin, and new Atlantic Ocean

**IV. CONSEQUENCES**

- A. Drowning of rift valley and formation of the Atlantic Ocean (Jurassic Period ~180 to ~150 mya\*)
- B. Formation of Coastal Plain and Continental Shelf Provinces (Cretaceous to Quaternary Periods ~150 mya\* to TODAY)
- C. Repeated events of continental margin submergence by the Atlantic Ocean deposited sediment wedge that ranges from 0 feet thick at the outer Piedmont edge to 10,000 feet thick at Cape Hatteras and ~40,000 feet thick at the outer edge of the continental margin
- D. Deposition of clastic sediments derived from weathering and erosion of the Appalachian and Piedmont Provinces were mixed with marine chemical sediments
- E. Today's surface morphology of the Coastal Plain has been developed by multiple marine high stands that flooded the Coastal Plain and was then severely modified during subsequent low stands by the incisement of the drainage system into the marine sediments

\* mya = millions of years ago

---