

d20 Cenozoic Sedimentary sequences

< Northern Italy, Paris basin; Cannonball fm >

In northern Italy, the Neogene has its most complete record in thick (several thousand meters), mostly marine, fossiliferous, sedimentary strata.¹ Thickness and completeness, however, does not translate into easier-to-read. This is because its strata in Apennine exposures are also folded, and faulted, and often possess marked lateral changes in facies.

In the Paris basin, France, continuous below lower Neogene strata, the Paleogene is well represented by a very complete nearly 300 meters thick sequence of horizontal sediments.² There, in the classic area of its description, many interfingerings of marine and continental strata, most of which are highly fossiliferous, allow for good correlations of index fossils in both environments.

In North America is a very complete Cenozoic record in thick, unfolded, strata that exist as an enormous landward thinning wedge of sedimentary sequences along the eastern coast, across Florida, and in from the Gulf of Mexico to North Dakota.³ The sediments are mostly calcareous in the Florida area, and are mostly arenaceous (sandy, and composed of quartz and alumino-silicate mineral grains) to the north and west. An immense number of local stratigraphic names are in use because of pinchouts and facies changes. In the outer Gulf, Cenozoic sediments have a thickness of 12,000 meters (**Figure d20.1**). There, the older strata, in the absence of folding or faulting-uplift, are not exposed by erosion, and are known only from oil-prospection drillcore samples. However, as this formation was deposited during a regression of sea, the Cenozoic strata find natural exposures inland with progressively older strata in outcrop as one goes north. In southwestern North Dakota, the Cannonball Formation (of thickness to about 90 m), named for its naturally occurring sandstone spherical (over 2 feet in diameter) concretions,⁴ is marine and is Paleocene in age. It records the maximum encroachment in from the Gulf of Mexico of an epeiric sea called the *Zuni*.⁵

West of the Mississippi river, deposits of volcanic ash are widespread and increase in thickness and number going west as the Pacific rim was the site of much volcanism during the Cenozoic.

In the intermountain basins of the western United States, and off the west coast, thick, folded, Cenozoic sediments occur that contain angular unconformities that record mountain building pulses. The geology is known mostly from oil-prospection geophysics and drilling. □

Figure d20.1 ⁶ Cross section of the Gulf of Mexico showing the Cenozoic and Mesozoic sedimentary wedge that has accumulated at the passive southern margin of North American continent, the Sigsbee abyssal plain, and the Yucatan carbonate reef platform. The average rate of subsidence (and as currently observed)⁷ is 1.5 meters per 100 years. So a wide part of the present coast, including New Orleans, will be underwater by the end of this century.

