

# SEDIMENTARY ROCKS AS ENVIRONMENTAL INDICATORS

## c1 Beds and strata as readable records < paleogeography >

The past is never dead. It's not even past.

—William Faulkner, *Requiem for a Nun*, 1951.<sup>1</sup>

Sediments (*L. sedimentum*, a settling) are accumulations of Earth materials that have undergone transportation prior to their deposition. So soils which are the *in situ* products of weathering are *not* sediments. Erosion of soil, tephra (volcanic ash or any solid material ejected during a volcanic eruption), jointed rock, and frost-riven rock, by gravity, wind, glaciers, rain wash, channeled water, and leaching, and abrasion of rock, puts into transportation the materials that accumulate as sediments. Detrital sediments are composed of rock and mineral fragments (clasts) that originated as solids, were transported as solids, and accumulate as solids.<sup>2</sup> Chemical sediments are composed of materials that were formerly in solution.<sup>3</sup>

A sedimentary bed records a single depositional event. A thick bed or a sequence of conformable beds of the same composition and texture is called a stratum (plural, *strata*).

The importance of sedimentary strata to historical geology is that each of their beds, each stratum, and succession of strata, can inform about the condition of the local and global state of the world at the time of deposition. Detrital sediments inform about their source: its scenery (mountainous, flat, ...), its geology (volcanism, raised former sediments, grabening, ...), its climate (wet tropical, glacial desert, ...), and also about the environment of deposition (fluvial, deep marine, ...). Chemical sediments, although often not traceable to the place of their origin, inform similarly.<sup>4</sup>

A geological map (**Figure c1.1**, left) shows type and distribution of rocks that have accumulated during a time in the past. From this a paleogeographic map (**Figure c1.1**, right) can be reconstructed for that time which shows (as an hypothesis) the distribution of the land (its mountains, lowlands, ...), the sea (its shallows, deeps, ...), the inferred climate, drainage, water currents, prevailing winds, and where to prospect for ores, placers, salts, and fossil fuels. □

Figure c1.1<sup>5</sup>

In the geological map at left, conventional symbols used are: stippling for sand, hachures of shale, and bricks for limestone.

The paleogeographic map at the right, shows areas of different environments.

