

DESCRIPTION, CLASSIFICATION, AND NOMENCLATURE OF SEDIMENTARY ROCKS

Part IV: Primary Sedimentary Structures

INTRODUCTION

Structures formed on the sediment surface or within sedimentary layers during deposition and determined by the conditions of deposition are called primary sedimentary structures. Physical (hydrodynamic), biological, and chemical processes are responsible for their formation. In the stratigraphic record, primary structures can be used as criteria for recognition of depositional processes, water depth, current direction, sediment consistency, and other paleoenvironmental conditions, and for stratigraphic up and down in structurally complex areas. Because many geologists use the term primary to denote primary physical structures only, the term biogenic is applied to primary structures formed by living organisms. Structures formed at some time after sediment deposition are called secondary structures. These record conditions of sediment compaction and diagenesis.

STRATIFICATION

Physical Stratification

Layering of sediments created by physical processes such as fluid flow is called physical stratification, and is distinct in some features from layering produced by organisms (biostratification) or by chemical precipitation (chemical stratification). Sedimentary layers of all modes of formation are classified in the field according to their thicknesses. Figure 1 presents a widely used scheme in which beds are defined as layers of 1 cm or greater thickness, and laminae as layers less than 1 cm in thickness (singular lamina). Both beds and laminae are made visible in rocks by differences in the grain size and/or composition of sedimentary particles, reflecting changing conditions of deposition. The surface that defines the boundary between two adjacent beds or laminae is called a bedding plane. The bedding plane represents the depositional surface on which the next sedimentation unit accumulated, be it thin or thick.