In this review we will concentrate on some general genome features of marine organisms and their evolution, ranging from vertebrate to invertebrates until unicellular organisms. Before genome sequencing, the ultracentrifugation in CsCl led to high resolution of mammalian DNA (without seeing at the sequence). The analytical profile of human DNA showed that the vertebrate genome is a mosaic of isochores, typically megabase-size DNA segments that belong in a small number of families characterized by different GC levels. The recent availability of a number of fully sequenced genomes allowed mapping very precisely the isochores, based on DNA sequences. Since isochores are tightly linked to biological properties such as gene density, replication timing and recombination, the new level of detail provided by the isochore map helped the understanding of genome structure, function and evolution. This led the current level of knowledge and to further insights.