Limestones

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Limestones are sedimentary rocks but they are very different from clastic sediments.

Ca^{2+} and HCO_3^- ions end up in the sea as a result of weathering of rocks, where they unite to form 10% of the earth's sediments. Some are associated with mineral deposits and some are important as aquifers. Limestones precipitating directly from sea water are very rare. The majority are biogenic, with planktonic organisms and macroscopic organisms extracting Ca from sea water. 95% by area of marine calcareous sediments accumulate in ocean basins as calcareous oozes. These build up in slightly shallower areas, eg over ocean ridges, with deep accumulation being prevented by the fact that $CaCO_3$ re-dissolves below the carbon compensation depth. The remaining 5% develop in shelf seas as accumulations of shell debris. Shallow tropical waters are more super-saturated than cold water. Accumulation depends on the absence of siliciclastic sediments. Shelf seas were more extensive in the geological past than they are today.

Fabric

Limestones contain grains, a matrix and cement, with the 4 main constituents being skeletal and non-skeletal fragments, carbonaceous mud and cement.

Skeletal fragments include the shells of brachiopods, crinoids, trilobites and corals etc, which have shells and skeletons, which originally formed from aragonite; this changes over time to calcite.

Non-skeletal fragments are ooliths formed by direct precipitation of calcite material onto small particles that act as a nucleus, with the $CaCO_3$ having a radial aspect around the nucleus. They form in warm shallow seas with some wave action, which agitates and rounds the particles. $CaCO_3$ is deposited as aragonite concentric on the nucleus but this re-crystallises to radial calcite. They originate as oolitic sand before being cemented into rock and faecal pellets of 1-500μm often form the nucleus (a shrimp may produce up to 450 faecal pellets in one day). They are preserved only in low-energy environments.