

Exercise 1 Answers

Question 1.1 Section 2.2.1 of *The Cretaceous World* discussed the progressive northward opening of the North Atlantic, and the evidence from ODP drilling off northwestern Iberia for its having started there in the Early Cretaceous. We could thus expect rifting to have started – perhaps accompanied by uplift – alongside the western margin of the British Isles at about the same time.

Question 1.2 In both cases, it was essentially quartz. The glauconite in the glauconitic sandstone is a secondary (diagenetic) mineral that fills pore spaces, so would not have been part of the original sediment that was deposited. Likewise, the iron oxide in the pebbly quartz arenite is a cement.

Question 1.3 We cannot assume that the Cretaceous sediments were derived directly from the erosion of, say, igneous or metamorphic rocks that might have contained abundant minerals susceptible to chemical weathering. If the source rocks were themselves already relatively mature sedimentary rocks, then the amount of chemical weathering involved would have been slight.

Question 1.4 (a) The poor sorting implies limited transport (hence separation according to grain size) by currents prior to deposition. (b) By contrast, the rounding and sphericity of most of the grains suggest extensive abrasion.

Question 1.5 The grains of (a) are mostly quartz, which is chemically resistant. Silicate minerals (containing metal ions) that might participate in the silicate weathering equation (Section 2.1.1 of *The Cretaceous World*) are scarce. The clay minerals in (b) are hydrous aluminosilicates, which are already the products of weathering (e.g., of feldspars) and thus relatively resistant to further chemical attack. However, with extreme chemical weathering they could break down further to yield insoluble oxide residues such as bauxite, and the breakdown of the silicate component could then draw down some CO₂. However, against this must be set the oxidation of the organic material in the sediment, which would produce CO₂, so the net effect of weathering mudrocks such as this is uncertain. Finally, the limestone contains no silicate, so it cannot contribute to CO₂ drawdown according to the equation given in Section 2.1.1 *The Cretaceous World*.