The coccolithophore *Emiliania huxleyi* is often regarded as a globally ubiquitous species; however the truth is rather that it has a variety of morphotypes and genotypes able to exist successfully in a wide variety of marine environments. This study has assembled sampling data from four cruise locations to investigate the physiological differences and distribution among morphotypes of *E. huxleyi* as well as their major environmental drivers. Morphotype A is widespread within the whole Atlantic Ocean, especially in the northern hemisphere. Type B and B/C dominated mainly in the Southern Atlantic along with few type B and B/C open. Type A's similar physiological morphotype Corona presented similar distribution to type A, and type R was not found in any of the sampling locations. Distinct methods from Young and Westbroek (1991) has been used to contribute morphological observations using SEM including elements like, Distal Shield Length (DSL), Central area (CA) and Element ribs (ER) (Table 11). Several issues require further examination for example, whether DSL should be included in the distinction of *E. huxleyi* morphotypes or not; whether type B and B/C should be distinct to each other or not; and whether type 'O'(open central area) should be another morphotype of *E. huxleyi* or not. Environmental divers have been discussed contradictorily towards distributions in *E. huxleyi* morphotypes in recent years. Variables like temperature, salinity, irradiance, nutrient availability and ocean acidification, have all been found influential to *E. huxleyi* variations in morphology and size (Watabe and Wilbur, 1996; Passche and Brucbak, 1994). However, distinguishing the main influential environmental drivers is severely hampered by knowledge of each morphotypes and intra-strain variability in physiological responses to environmental drivers. Moreover, biogeographic distributions of individual species also change substantially through geological time as a result of changes in the environment (Brand, 1994).