THE COCCOLITHOPHORE *EMILIANIA HUXLEYI* AND GLOBAL CLIMATE.

WESTBROEK, PETER, Dept. of Chemistry, Univ. of Leiden, P.O. Box 9502, 2300 RA Leiden, the Netherlands.

Cells of *Emiliania huxleyi* are surrounded by 'coccoliths', minute, elegant scales of calcium carbonate. In all the oceans, particularly at mid-latitudes, this species forms gigantic blooms, readily visualized by satellite imagery. Coccolith-bearing organisms, of which *E. huxleyi* is by far the most abundant representative, are the major contributors to the ocean floor limestone sediments, and this in turn is the largest long-term sink of inorganic carbon on earth. In addition, *E. huxleyi* blooms emit vast amounts of dimethyl-sulphide (DMS), a gas which, on oxidation, is a dominant source of cloud nuclei. The profusion of *E. huxleyi* and its intimate involvement with the global biogeochemical cycles of both carbon and sulphur make it a key component of the greenhouse effect (CO_2), natural acid rain and albedo regulation.

E. huxleyi blooms are often almost monospecific. They can be visualized by satellite imagery and leave highly characteristic skeletal and macromolecular markers which accumulate on the deep-sea floor as a long-term record of their history. The organism is easily cultured in the laboratory and molecular genetical, biochemical and physiological studies are underway.

We focus on *Emiliania huxleyi* as a model organism to study interactions between oceanic plankton and climate. Benefits of this approach are: (1) to highlight the idiosyncratic non-linear character of these interactions; (2) to reveal the intimate coupling of the oceanic carbon cycle and DMS productivity; and (3) to allow an integrated modelling and experimental approach, integrating multi-disciplinary studies that range from the global down to the macromolecular level and through geological time. *E. huxleyi* coccoliths and specific biomarkers preserved in the geological archive not only provide information on the distribution of this organism in the geological past. The connection with extensive neontological research offers a unique opportunity to reconstruct the development of the entire *E. huxleyi* system, including its multifarious climatic interactions, through geological time.

The 'Global *Emiliania* Modeling Initiative' (GEM), started in 1990, is a European research program intended to investigate and model the *Emiliania huxleyi* system.