# Assessment of a Proposed Technique for Global Warming Mitigation via Albedo-Enhancement of Marine Stratocumulus Clouds

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A simplified version of a model of marine stratocumulus clouds was used to examine the sensitivity of a proposed albedo-enhancement global warming mitigation scheme (Latham, 1990, 2002) to the cloud and environmental aerosol characteristics, as well as those of the seawater aerosol of salt-mass $m_s$ and number concentration $\Delta N_d$ which – under the scheme – are advertently introduced into the clouds. Values of albedo-change $\Delta A$ and droplet number concentration $N_d$ were calculated for a wide range of values of $m_s$, $\Delta N_d$, updraught speed W, cloud-thickness $\Delta Z$ and cloud-base temperature $T_B$: for three measured aerosol spectra, corresponding to ambient air of negligible, moderate and high levels of pollution. Our choices of parameter-value ranges were determined by the extent of their applicability to the mitigation scheme, whose current formulation is still somewhat preliminary, thus rendering unwarranted in this study the utilisation of refinements incorporated into some other stratocumulus models. In agreement with earlier studies: (1), $\Delta A$ was found to be very sensitive to $\Delta N$ and (within certain constraints) insensitive to changes in $m_s$, W, $\Delta Z$ and $T_B$; (2), the magnitude of $\Delta A$ was greatest for clouds formed in pure air, and least for highly polluted air. In many situations considered to be within the ambit of the mitigation scheme, the calculated $\Delta A$ values exceeded those estimated by earlier workers as being necessary to produce a cooling sufficient to compensate, globally, for the warming resulting from a doubling of the atmospheric carbon dioxide concentration. These calculations, coupled with simple computations made with a Hadley Center (UK) GCM, provide quantitative support for the physical viability of the mitigation scheme, and offer new insights into its technological requirements. Questions are outlined regarding the meteorological ramifications of this mitigation scheme, and its current technological status is discussed.