

Desert dust as a potential source of Fe(II)

A. Cemal Saydam (1,3), Hamide, Z. Senyuva (2), Incigul Polat (3)

1) Graduate School of Marine Science (IMS), Middle East Technical University, Erdemli, Turkey

2) TUBITAK – Instrumental Analysis Laboratory (EAL), Ankara, Turkey

3) TUBITAK-Information Technologies and Electronics Research Institute (BILTEN), Ankara, Turkey

e-mail: saydam@tubitak.gov.tr

ABSTRACT:

The Cemiliana hypothesis put forward by Saydam(1996) suggests that the atmospheric transport of desert origin dust and its photochemical reduction within clouds to form Fe(II) and its subsequent wet intrusions over the sea surface can be a triggering mechanism for the formation of phytoplankton blooms and especially the blooms of *Emiliana huxleyi*. The results of experimental study by using desert soil imported from Sahara have confirmed this hypothesis and it was possible to illustrate that steady state Fe(II) concentration of 1600 nM can be reached within 30 min. at pH 3. Amongst various types of soil tested for Fe(II) production, Saharan dust was found to be an ideal source for bio-available iron. This unique property of Saharan dust lies in the fact that it has the capability of producing its reductant, oxalate, through the excretion products of its fungal content. The climatic implications of this study is of great importance as we have the technology to be at the right time, right place to seed the clouds with desert origin dust. This study further confirms the suggestions of late J. H. Martin "Give me a half a tanker of Iron and I'll give you an ice age"