Geophysical Research Abstracts
Vol. 12, EGU2010-8207, 2010
EGU General Assembly 2010

POSSIBLE PRECESSIONAL, SUB-PRECESSIONAL AND GLACIAL/INTERGLACIAL OZONE LAYER MODULATION FROM CH3Br AND CH3Cl

Kostas Kourtidis (1) and Kleareti Tourpali (2)

(1) School of Engineering, Demokritus University of Thrace, Lab. of Atmospheric Pollution and Pollution Control Engineering of Atmospheric Pollutants, Dept. of Environmental Engineering, Xanthi, Greece (kourtidi@env.duth.gr, +30 25410 79379), (2) Lab. of Atmospheric Physics, Physics Department, Aristotle University of Thessaloniki, Thessaloniki, Greece

Present knowledge presents some circumstantial evidence that precessional, sub-precessional and/or glaciation/deglaciation oceanic productivity variations might have led to increases in the atmospheric abundance of methyl bromide and methyl chloride. Although it is difficult to quantify the magnitude of these increases, we present some calculations here showing that we cannot rule out, based on present knowledge, that they might have been up to five-fold. The impact of five-fold increases in the preindustrial holocene atmospheric abundance of these two gases on the ozone layer is examined with a 2-D model. Simulations predict significant decreases in the mean annual total ozone column (up to 6% locally). During October, ozone depletion at 75 deg S simulated decreases were up to 70% locally. These results indicate that if Milankovitch variations in the CH3Cl and CH3Br natural emissions have resulted in changes of their atmospheric abundances in the past, they could have induced a significant biospheric forcing to the total ozone column. Advances in our present knowledge on the natural biogeochemical mechanisms that regulate the production and exchange of biogenic gases between the ocean and the atmosphere are needed to validate and better quantify the results presented here.