

Meeting abstract

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New approach to radiation amplification factor

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One important factor for the estimation of climate change is the Radiation Amplification Factor (RAF) defined as the percentage increase in UVbio that would result from 1% decrease in the column amount of atmospheric ozone [1,2]. RAF can generally be used only to estimate effects of small ozone changes, e.g. of a few percent, because the relationship between ozone and UVbio becomes non-linear for larger ozone changes. In other words RAF is ratio of relative changes of UVbio and the ozone column. We can say also that RAF is differential slope of UVbio to the ozone column relationship in log-log scale.

It is necessary to note that the main peculiarity of this approach is its dimensionless properties. This enables us to compare values with various and different physical meanings. RAF values can give additional possibilities or information. A detailed and comparative analysis of dimensionless RAF values (from the point of denentionless nature) can give the following results.

1) A relatively strong influence and superlinear dependence is observed for: skin erythema, photocarcinogenesis, fish melanoma, generalized DNA damage, mutagenicity and fibroblast killing, cyclobutane pyrimidine dimer formation, occupational exposure limits, membrane-bound K⁺-stimulated ATPase inactivation, isoflavonoid formation in bean, inhibition of motility (*Euglena gracilis*), tropospheric photolysis O₃+hn-O(D')+O₂.

2) An approximately linear dependence was found for: SKH-1 corrected for human skin transformation, elastosis, damage to cornea, immune suppression, tropospheric photolysis HNO₃+hn-OH+HNO₂, photodegradation of nitrate ions, photodegradation of HCHO (Biscayne Bay), UVB (280–315 nm).

3) A weak dependence is for: fibroblast killing, substrate binding in Chinese hamster, DNA damage in Alfalfa, tropospheric photolysis H₂O₂+hn-OH+OH, HCHO+hn-H+CHO, yellowness induction in polycarbonate.

4) A very weak dependence was found for: melanoma in fish, photosynthetic electron transport, inhibition in photosynthesis (*Phaeodactylum sp.*), tropospheric photolysis O₃+hn-O(3P)+O₂, HCHO+hn-H₂+CO, photoproduction of H₂O₂ in fresh water.

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References

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