World Academy of Science, Engineering and Technology
International Journal of Mathematical and Computational Sciences
Vol:14, No:12, 2020

The Climate Impact Due to Clouds and Selected Greenhouse Gases by Short Wave Upwelling Radiative Flux within Spectral Range of Space-Orbiting Argus1000 Micro-Spectrometer

Authors : Rehan Siddiqui, Brendan Quine

Abstract : The Radiance Enhancement (RE) and integrated absorption technique is applied to develop a synthetic model to determine the enhancement in radiance due to cloud scene and Shortwave upwelling Radiances (SHupR) by O2, H2O, CO2 and CH4. This new model is used to estimate the magnitude variation for RE and SHupR over spectral range of 900 nm to 1700 nm by varying surface altitude, mixing ratios and surface reflectivity. In this work, we employ satellite real observation of space orbiting Argus 1000 especially for O2, H2O, CO2 and CH4 together with synthetic model by using line by line GENSPECT radiative transfer model. All the radiative transfer simulations have been performed by varying over a different range of percentages of water vapor contents and carbon dioxide with the fixed concentration oxygen and methane. We calculate and compare both the synthetic and real measured observed data set of different week per pass of Argus flight. Results are found to be comparable for both approaches, after allowing for the differences with the real and synthetic technique. The methodology based on RE and SHupR of the space spectral data can be promising for the instant and reliable classification of the cloud scenes.

Keywords : radiance enhancement, radiative transfer, shortwave upwelling radiative flux, cloud reflectivity, greenhouse gases
Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development
Conference Location : Chicago, United States
Conference Dates : December 12-13, 2020