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Twilight tropospheric and stratospheric photodissociation rates derived from balloon borne radiation measurements

A. Kylling[1], T. Danielsen[1], M. Blumthaler[2], J. Schreder[2], and B. Johnsen[3]
[1]Norwegian Institute for Air Research, Kjeller, Norway
[2]Institute of Medical Physics, University of Innsbruck, Innsbruck, Austria
[3]Norwegian Radiation Protection Authority, Oslo, Norway

Abstract. A new ligthweight multichannel moderate bandwidth filter instrument designed to be flown on balloons, is described. The instrument measures the radiation field within the short UV (center wavelength at 312 nm) and long UV (center wavelength at 340 nm). The angular and spectral characteristics of the instrument are discussed and the calibration procedure outlined. Measurements made during a stratospheric balloon flight at twilight conditions from Gap-Tallard, France, are presented and compared with state-of-the-art radiative transfer model simulations. The model simulations and the measurements agree within ±10% (±20%) for solar zenith angles smaller than 93° (90°) for the 340 (312) nm channel. Based on the model simulations of the measured radiation, actinic flux spectra are reconstructed. These are used to calculate various photodissociation rates.

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