<<全球气候变化中的紫外线辐射>>

图书基本信息

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前言

Over the past three decades, the scientific community has realized the urgency ofobtaining a better understanding of the interaction between the earth's atmosphere/biosphere and the sun's radiant energy. Most of the research has focused on theradiant energy balances in the solar and infrared regions of the spectrum, and theway these energy flows affect the climate. During this same time frame, in arelated arena, a smaller group of dedicated individuals has concentrated on therole of ultraviolet （UV） radiation as it affects the overall welfare of the planet.Although comprising only a small fraction of the radiation balance that may playa role in global climate change over the next centuries, UV radiation has thecapacity to cause direct and more immediate harm to virtually all living organismsand especially to human health. Cumulative high doses of UV radiation areconsidered a major causal factor in the development of skin cancer and cataracts.Ultraviolet radiation can weaken the human immune system, and can also affectcrop production and ocean bio-productivity. Concerns about the increased levels of UV-B radiation reaching the earth'ssurface have led to the development of ground- and space-based measurementprograms to provide long-term records of its levels. Accurate long-termmeasurements are difficult to obtain, especially when limited to the bandwidthregions that contain the most harmful solar photons. A core of concernedscientists from across the globe realizes that much work is needed in quantifyingthe harmful radiation levels and defining their adverse effects. In assessing theeffects of UV-B radiation, it is important to realize the complexity of theinteractions of living organisms that cause adverse responses with radiant energydirectly, as well as in combination with other climate stressors, such as drought,increased temperatures, and CO2.

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内容概要

大量研究指出紫外线（UV）辐射对生物有机体有害，并且危害人类健康。
对地表UV-B辐射强度增加的研究极大地促进了地基和空基相关观测项目的发展；人们还需要进一步对UV辐射的观测、建模和影响进行深入研究。
本书各章描述了过去30年来世界范围内与UV辐射相关的研究工作，涉及的领域有：①UV辐射的当前与预测水平及其对生态系统、人类健康、经济与社会的影响；②UV辐射观测仪器的最新发展，地基和空基观测仪器定标进展情况以及观测方法，建模与有关应用；③全球气候变化对紫外线辐射的影响。
对于涉及全球气候变化、气象学、气候学、环境科学、生物学和农林科学的大专院校高年级本科生、研究生和教师，本书是一本很有价值的参考书。
相关领域的科学家、决策者和普通公众亦能受益于此书。

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章节摘录

插图：Measurements of solar UV irradiance performed during the last 18 years at sixhigh-latitude locations and San Diego have revealed large differences of the sites'UV climates. The ozone hole has a large effect on the UV Index at the three Antarcticsites, and to a lesser extent at Ushuaia. UV Indices measured at South Pole duringthe ozone hole period are on average 20%-80% larger than measurements atcomparable solar elevations during summer months. When the ozone hole passedover Palmer Station late in the year, the UV Index was as high as 14.8 and exceededthe maximum UV Index of 12.0 observed at San Diego. The maximum UV Indexat Ushuaia was 11.5, which is comparable with summer-time measurements atSan Diego. UV Indices at the two Arctic sites Barrow and Summit are lower thanat southern-hemisphere sites as ozone columns are generally larger in the northernhemisphere, and ozone depletion is less severe. A comparison of UV levels at the network sites revealed that differencesbetween sites depend greatly on the data product used. Average noontime UVIndices at San Diego during summer are considerably larger than at Antarcticsites under ozone-hole conditions, but the difference disappears when daily dosesare compared. This contradicts the common notion that UV levels at highlatitudes are small because of small solar elevations. Reconstructions of historical UV Indices based on long-term ozone recordsand climatological cloud and aerosol patterns indicate that contemporary UVIndices measured during the ozone hole period at Antarctic sites are on average30%- 85% larger than estimates for the past. These reconstructions were basedon the assumption that cloud, albedo, and aerosol conditions have not changedover the last 40 years.

编辑推荐

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