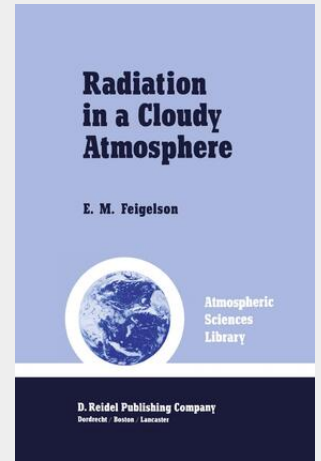


Feigelson

Radiation in a Cloudy Atmosphere

Radiative heat transfer is a fundamental factor in the energetics of the terrestrial atmosphere: the system consisting of the atmosphere and the underlying layer is heated by the Sun, and this heating is compensated, on the average, by thermal radiation. Only over a period of 1-3 days from some specified initial moment can the dynamic processes in the atmosphere be considered to be adiabatic. Global dynamic processes of long duration are regulated by the actual influxes of heat, one of the main ones being the radiative influx. Radiation must be taken into account in long-term, weather forecasting and when considering the global circulation of the atmosphere, the theory of climate, etc. Thus it is necessary to know the albedo of the system, the amount of solar radiation transmitted by the atmosphere, the absorptivity of the atmosphere vis-a-vis solar radiation, and also the effective radiation flux, the divergence of which represents the radiative cooling or heating. All these quantities have to be integrated over the wavelength spectrum of the solar or thermal radiation, and they must be ascertained as functions of the determining factors. The relationships between the indicated radiation characteristics, the optical quantities directly determining them, the optically active components of the atmosphere, and the meteorological fields will be discussed in this book.

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