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Nota di contenuto	1. Scientific summary of the German CAWSES priority program -- 2. Models of solar total and spectral irradiance variability of relevance for climate studies -- 3. Investigation of solar irradiance variations and their impact on middle atmospheric ozone -- 4. Solar activity, the heliosphere, cosmic rays and their Impact on the Earth's atmosphere -- 5. Do galactic cosmic rays impact the cirrus cloud cover? – 6. Laboratory experiments on the microphysics of electrified cloud droplets -- 7. Investigations of the solar influence on middle atmospheric water vapour and ozone during the last solar cycle - analysis of the MPS data set -- 8. Influence of solar radiation on the diurnal and seasonal variability of O3 and H2O in the stratosphere and lower mesosphere, based on continuous observations in the tropics and the high Arctic -- 9. Data assimilation and model calculations to study chemistry climate interactions in the stratosphere -- 10. The response of atomic hydrogen to solar radiation changes -- 11. High-latitude thermospheric density and wind dependence on solar and magnetic activity -- 12. Global sporadic E layer characteristics obtained from GPS radio occultation measurements -- 13. Atmospheric ionization due to precipitating charged particles -- 14. EISCAT's contributions to high latitude ionosphere and atmosphere -- 15. The influence of energetic particles on the chemistry of the middle

atmosphere -- 16. The impact of energetic particle precipitation on the chemical composition of the middle atmosphere: measurements and model predictions -- 17. Simulation of particle precipitation effects on the atmosphere with the MESSy model system -- 18. Solar variability and trend effects in mesospheric ice layers -- 19. Charged aerosol effects on the scattering of radar waves from the D-region -- 20. Impact of short-term solar variability on the polar summer mesopause and noctilucent clouds -- 21. Observations and ray tracing of gravity waves: Implications for global modeling -- 22. Atmospheric coupling by gravity waves: climatology of gravity wave activity, mesospheric turbulence and their relations to solar activity -- 23. Infra-red radiative cooling/heating of the mesosphere and lower thermosphere due to the small-scale temperature fluctuations associated with gravity waves -- 24. The influence of zonally asymmetric stratospheric ozone on the coupling of atmospheric layers -- 25. Extending the parameterization of gravity waves into the thermosphere and modeling their effect -- 26 The geospace response to nonmigrating tides -- 27. Solar diurnal tides in the middle atmosphere: Interactions with the zonal-mean flow, planetary waves and gravity waves -- 28. Short period dynamics in the mesosphere: Morphology, trends, and the general circulation.- 29. Solar effects on chemistry and climate including ocean interactions -- 30. Interannual variability and trends in the stratosphere -- 31. The atmospheric response to solar variability: Simulations with a general circulation and chemistry model for the entire atmosphere -- 32 Long-term behaviour of stratospheric transport and mean age as observed from balloon and satellite platforms -- Index.

Sommario/riassunto

CAWSES (Climate and Weather of the Sun-Earth System) is the most important scientific program of SCOSTEP (Scientific Committee on Solar-Terrestrial Physics). CAWSES has triggered a scientific priority program within the German Research Foundation for a period of 6 years. Approximately 30 scientific institutes and 120 scientists were involved in Germany with strong links to international partners. The priority program focuses on solar influence on climate, atmospheric coupling processes, and space climatology. This book summarizes the most important results from this program covering some important research topics from the Sun to climate. Solar related processes are studied including the evolution of solar radiation with relevance to climate. Results regarding the influence of the Sun on the terrestrial atmosphere from the troposphere to the thermosphere are presented including stratospheric ozone, mesospheric ice clouds, geomagnetic effects, and their relevance to climate. Several chapters highlight the importance of coupling mechanisms within the atmosphere, covering transport mechanisms of photochemically active species, dynamical processes such as gravity waves, tides, and planetary waves, and feedback mechanisms between the thermal and dynamical structure of the atmosphere. Special attention is paid to climate signals in the middle and upper atmosphere and their significance relative to natural variability. Audience: This book will be of interest to scientists and researchers in atmospheric physics/chemistry and in climate.