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THE THERMAL RADIATION OF THE ATMOSPHERE AND ITS ROLE IN THE SO CALLED GREENHOUSE EFFECT

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Knowledge about thermal radiation of the atmosphere is rich in hypotheses and theories but poor in empiric evidence. Thereby, the Stefan-Boltzmann relation is of central importance in atmosphere physics, and holds the status of a natural law. However, its empirical foundation is little, tracing back to experiments made by Dulong and Petit two hundred years ago. Originated by Stefan at the end of the 19th century, and theoretically founded afterwards by Boltzmann, it delivers the absolute temperature of a blackbody or rather of a solid opaque body (*SOB*), as a result of the incident solar radiation intensity, the emitted thermal radiation of this body, and the counter-radiation of the atmosphere. Thereby, a similar character of the blackbody radiation describable by the expression $\sigma \cdot T^4$ and the atmospheric counter-radiation was assumed. But this appears quite abstruse and must be questioned, not least since no pressure-dependency is provided. Due to the author's recently published work about proposing novel measuring methods, the possibility was opened up not only to find an alternative approach for the counter-radiation of the atmosphere, but also to verify it by measurements. This approach was ensued from the observation that the IR-radiative emission of gases is proportional to the pressure and to the square root of the absolute temperature, which could be bolstered by applying the kinetic gas theory. The here presented verification of the modified counter-radiation term $A \cdot p \cdot T^{0.5}$ in the Stefan-Boltzmann relation was feasible using a direct caloric method for determining the solar absorption coefficients of coloured aluminium-plates and the respective limiting temperatures under direct solar irradiation. For studying the pressure dependency, the experiments were carried out at locations with different altitudes. For the so-called atmospheric emission constant A an approximate value of 22 $Wm^{-2}bar^{-1}K^{-0.5}$ was found. In the non-steady-state, the total thermal emission power of the soil is given by the difference between its blackbody radiation and the counter-radiation of the atmosphere. This relation explains to a considerable part the fact that on mountains the atmospheric temperature is lower than on lowlands, in spite of the enhanced sunlight intensity. Thereto, the so-called greenhouse gases such as carbon-dioxide do not have any influence.

Biography

Thomas Allmendinger was born on August 15th 1947 in Zurich (Switzerland) where he have gone through the Swiss school and education system followed with studies at the ETH (Eidgenössische Technische Hochschule, i.e. Swiss Federal Institute of Technology) and a Master degree (Diploma) in organic and general chemistry in 1971. However, his life cannot be understood as a conventional career being based on fixed initial conditions and solely taking place inside established institutions. Rather it alternated between those institutions on the one hand – also as a teacher in chemistry at different schools -, and independent activities such as the performance of own research & development work, on the other hand, leading to a permanent education and self-improvement. Meanwhile, times were changing to a considerable degree: e.g. at the time of his graduation, the pc and all the more internet were unknown, and the climate problem didn't exist while environmentalism was just arising. Thus, from the professional point of view, it was an advantage to undertake my doctoral research study only twenty years later, namely in the context of an own project, carried out at the PSI (Paul Scherrer Institute) and at the ETH about a methanol/air fuel cell, and tackling another professional field (electrochemistry). This project became possible only thanks to a serious preparation which was based on the experience reached during my previous work in an environmental laboratory and, subsequently, by the independent development of an indicator for deep-frozen foods. However, since none of these projects could be realized commercially although viable results had been achieved, my further activities were first focussed on a research service with an own laboratory at the Technopark in Zurich (in association with the AFIF = Arbeitsgemeinschaft für Industrielle Forschung) concerning electrochemistry and alternative energies, and, later, on electroplating as an employee of an industrial firm (Collini AG). Thereby, again and again he had to deal with physical characterization methods for surfaces. They have recently been published. And after his retirement in 2012, he have tackled climate physics as a novel research field which has, after a settling-in period but based on a life-long experience, delivered some significant contributions to the global climate problem. Besides, after many years my part-time occupation with quantum mechanics has led to a considerable result which could be possibly pioneering for future physics. His present contributions solely concern recent work while the former publications, mainly concerning electrochemistry, are quoted in Orcid (https://orcid.org/0000-0002-3340-3063). The earliest published article dates from his time as teacher in chemistry. It already had to do with atomic models and was entitled „Die Van der Waals-Kräfte im Lichte des Kugelwolkenmodells", PdN-Ch. 3/34 (1985), 31-39.

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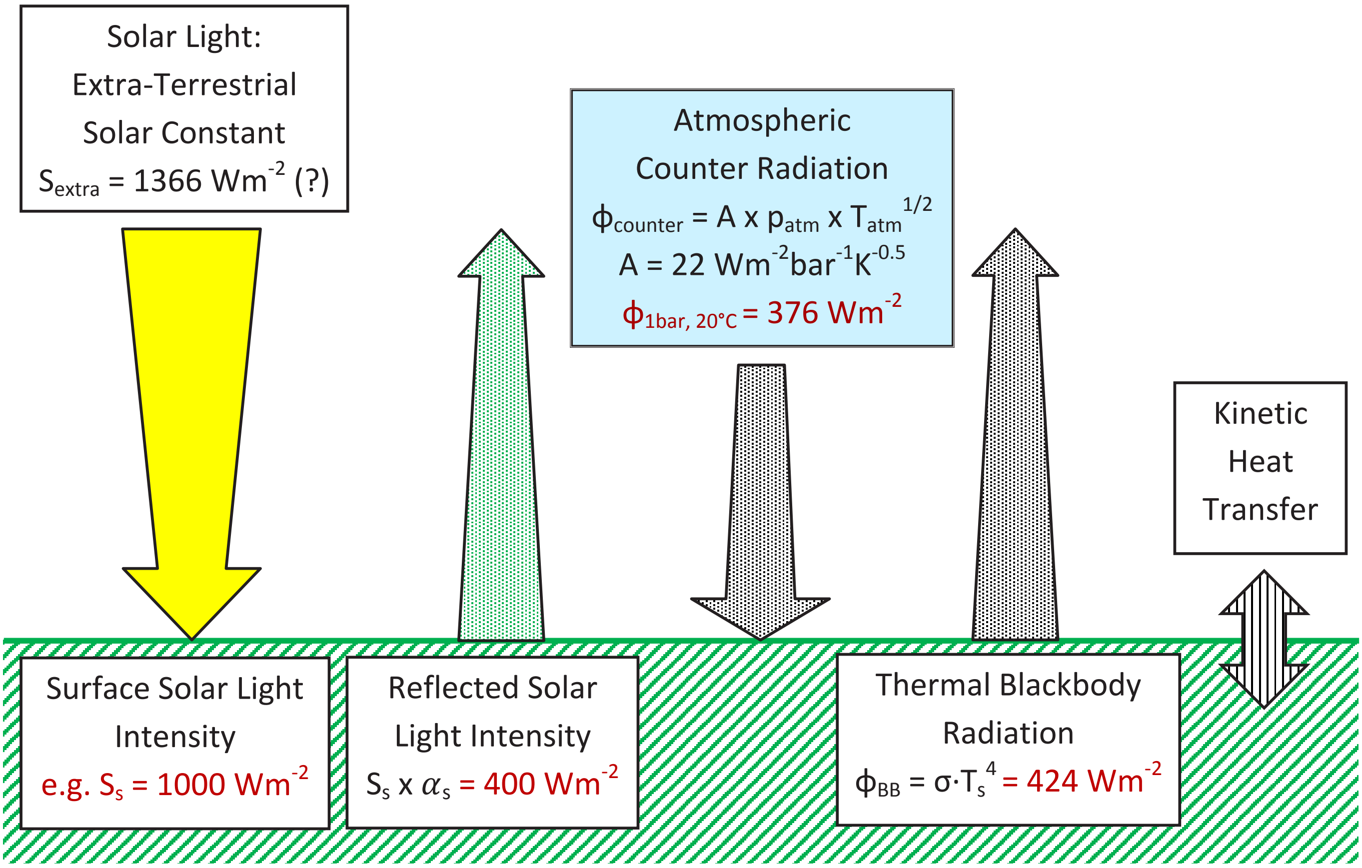

Atmospheric Radiation Schema at the Earth Surface