

A Science Service Feature

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? WHY THE WEATHER ?

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COEFFICIENT OF TRANSMISSION

We read much about the solar constant, that distant value of solar radiation outside the atmosphere. But it is the sunshine down here on the earth that we feel. What proportion of the solar radiation reaching the outside of the atmosphere gets through to the ground? There are many factors involved. Fundamental is, of course, the absorption and reflection by the atmosphere and whatever clouds and dust are in it. This loss in the atmosphere depends not only on the condition of the air, chiefly its water vapor content, the cloudiness and dustiness, but also on the angle at which the sun's rays penetrate this absorbing and dispersing medium. When the sun is 30 degrees above the horizon the sun's rays must pierce about twice as much air to reach the earth as when the sun is overhead.

In order to compare the effects of different atmospheric conditions it is the practice of solar observers to "reduce" the solar radiation values to what they would have been if the sun had been directly overhead. This value when expressed as a percentage of the solar constant is called the "coefficient of transmission".

At high altitudes and in regions of low absolute humidity the coefficient of transmission is large, approaching 100 per cent.; .95 per cent. is the greatest - obtained from balloons sent to considerable heights from Omaha, Nebr. Mountains two or three miles high have values averaging 90 per cent. or higher, except in the damper regions and seasons. Washington, D. C., according to H.H.Kimball, has 74 per cent. for the winter value (low vapor content of air) and 64 for summer (humid air).

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