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A Science Service Feature

? WHY THE WEATHER ?

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EARLY CUMULI SOON GONE

A characteristic of a hot sunny spell of weather is often an early formation of cumulus clouds and their quick disappearance a few hours after sunrise, leaving most of the day practically cloudless. At first thought, one would expect such clouds, formed as they are in ascending heated air, to be seen in the afternoon rather than in the cool of the morning. In fact, in ordinary weather in cooler middle latitudes such is the case.

After a bright and hot day, when evaporation from all available sources has been considerable, the lower air includes an abundance of vapor in an absolute sense, but only a little in relation to what might be present at the high temperature. During the clear night the temperature falls rapidly from its high levels and by sunrise may have reached or nearly descended to the temperature at which some of the vapor must condense, the dewpoint, in other words. The drier air at moderate heights is helpful in allowing the more humid lower layer to lose heat by radiation.

At sunrise the surface of the earth with its complement of dew begins to warm, and the dew to evaporate. The air next the ground is warmed more rapidly than that a little higher up, and soon becomes unstable with respect to the heavier air. Small masses of warm air are pushed up, but they are so humid that but little elevation with its attendant cooling by expansion suffices to produce little half-puffball clouds.

Soon, however, the dew is mostly gone, the temperature rapidly rises. Drier air is now mixing in volumes with the lower humid layer. And by 9 or 10 a.m. the convection of heated air even to greater and greater heights fails to cool the air to the dewpoint; so the sky clears.

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