



## **Radiative cooling in still air**

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A basic long wave radiation scheme with two channels has been considered that distinguishes between the atmospheric IR radiative transfer of gases and of condensed matter. The spatial range of the two channels is significantly different in clear air and similar in clouds. This basic IR radiation scheme has been implemented in a 1d mass flux model with a vertical resolution of 10 m. At this high vertical resolution of the 1d model the vertical divergence of the IR radiation becomes non-local for both channels.

Processes like

- the nocturnal cooling of cloud tops
- the nocturnal cooling of unsaturated moist layers at their top
- the nocturnal cooling close to the ground

were simulated with this 1d model for zero wind conditions. For the last process the skin temperature of the ground was considered and related to the net radiation and soil properties.

The nocturnal cooling rate, the stable lapse rate and the depth of the temperature inversion were investigated for typical cases in zero wind. They will be presented and related to the spatial range of the IR radiation in both channels considered.