# Net Radiative Cooling Rates in cool coronal condensations

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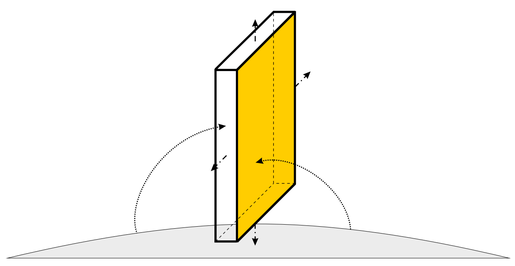
We present comprehensive tables of Net Radiative Cooling Rates (NRCR) in cool solar plasma with prominence-like properties. The derived NRCR are based on the 1D non-LTE radiative transfer modelling of prominences in the transitions of 5-level plus continuum hydrogen, Mg II and Ca II species. These transitions are the dominant contributors to the radiative energy balance of prominence-like plasmas.

The derived NRCR describe the balance between the radiative losses from the plasma in all considered transitions and the radiative gains in the form of incident radiation illuminating the prominence plasma from the solar disk. In other words, NRCR represent an energy sink (or source) due to the dominant radiative processes, both optically thick and thin. As such, the NRCR values can be used in conjunction with other energy source or sink terms in studies of energy balance or transport in the cool plasmas with prominence-like conditions - for example, in the evaporation-condensation processes forming the cool plasma, or studies of waves and oscillations in such plasma.

The NRCR are provided for specific values of temperature, pressure, and distances of the considered unit volume of plasma (voxel) from the nearest illuminated surface.

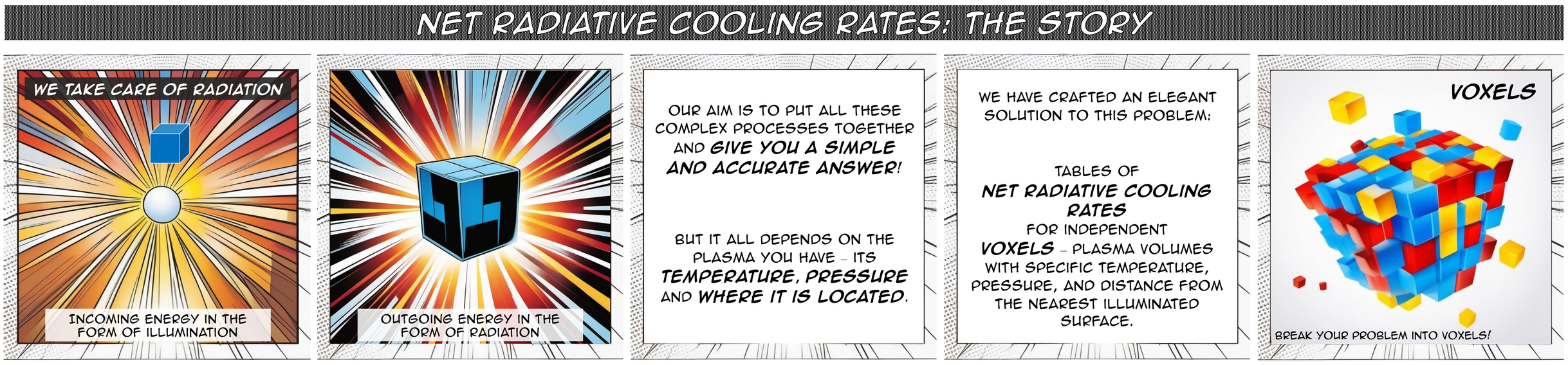
**Grid of 1D iso-thermal and iso-baric vertical slab models**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| $T$ K | 6,000 | 7,000 | 8,000 | 9,000 | 10,000 | 12,000 | 15,000 | 20,000 | 25,000 | 30,000 |
| $p$ dyn/cm$^2$ | 0.03 | | 0.05 | | 0.1 | | 0.3 | | 0.5 | 0.7 | 1.0 |
| **width** km | 500 | | | 1,000 | | | 2,000 | | 5,000 | | 10,000 |



**Other model parameters**:

- Altitude above the solar surface of 10,000 km
- Most recent incident radiation data
- No radial velocities



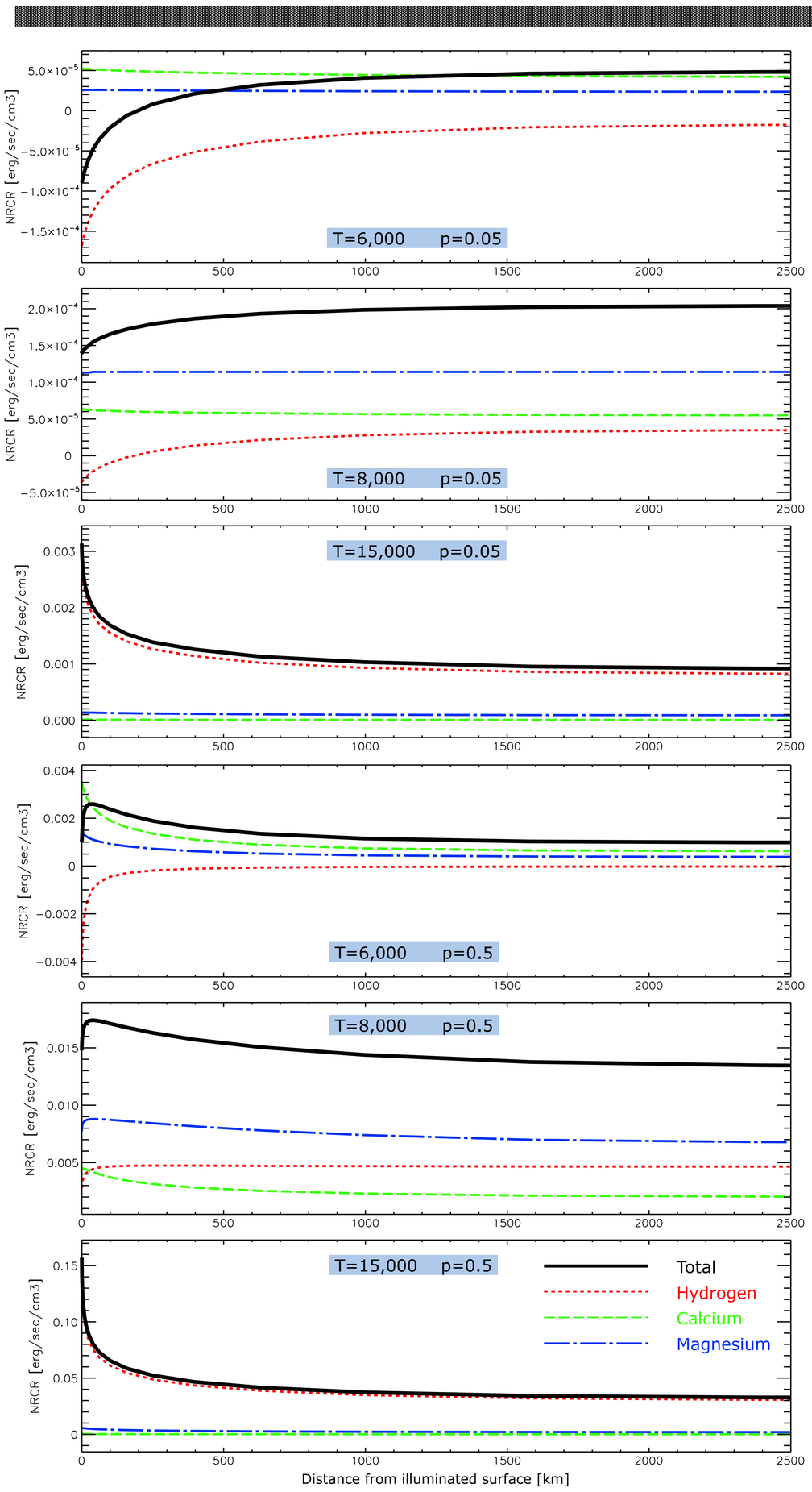




**Fig. 1** Variation of NRCR with the distance from the illuminated surface. We show six iso-thermal, iso-baric models with different $T$ (in K) and $p$ (in dyn/cm$^2$). All models have the width of 5,000 km and are axially symmetric. We thus show only the left half of each model.

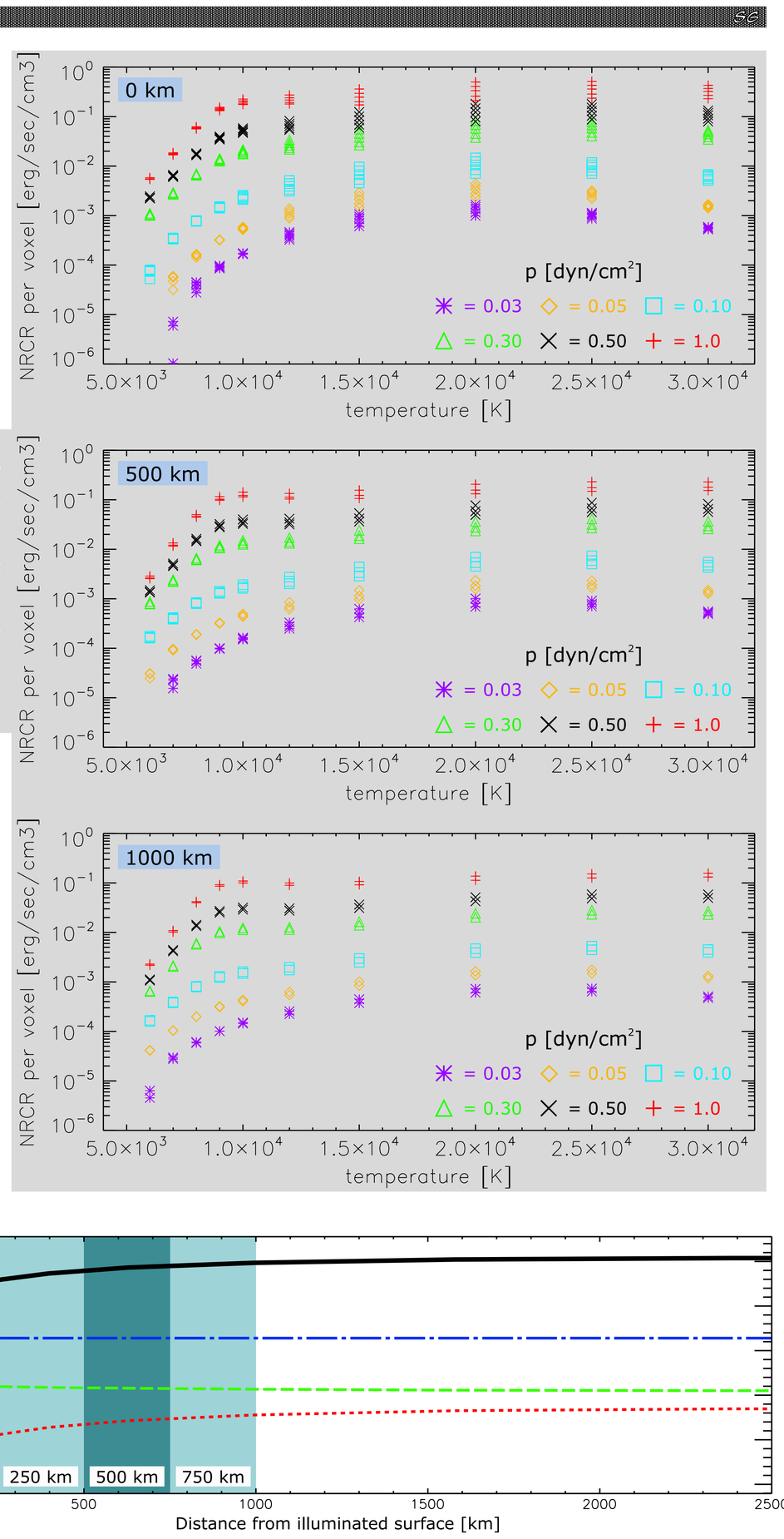



**Fig. 2** Total NRCR in all voxels with the distance from the nearest illuminated surface of 0, 500, and 1000 km. The x-axis indicates the temperature ranging from 6,000 to 30,000 K. Symbols indicate the pressure ranging from 0.03 to 1.0 dyn/cm$^2$.

**Fig. 3** Each model is divided into **voxels** – plasma volumes with specific **temperature**, **pressure**, and **distance from the nearest illuminated surface**. NRCR are averaged within each voxel and tabulated. Here, we illustrate four voxels with the distance from the illuminated surface of 0, 250, 500, and 750 km.