Observation and modelling of main-sequence star chromospheres – X. Radiative budgets on Gl 867A and AU Mic (dM1e), and a two-component model chromosphere for Gl 205 (dM1)

Titre	Observation and modelling of main-sequence star chromospheres – X. Radiative budgets on Gl 867A and AU Mic (dM1e), and a two-component model chromosphere for Gl 205 (dM1)
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Résumé en anglais	We report on high-resolution observations of two dM1 stars: Gl 867A, an active dM1e star, and Gl 205, a less active dM1 star. The wavelength coverage is from 3890 to 6820 Å with a resolving power of about 45 000. The difference spectrum of these two stars allows us to make a survey of spectral lines sensitive to magnetic activity. We chose these two stars because, to within measurement errors, they have very close properties: Gl 867A has R= 0.726 R⊙, [M/H]= 0.080 dex and Teff= 3416 K, and Gl 205 has R= 0.758 R⊙, [M/H]= 0.101 dex and Teff= 3493 K.We find that besides traditional chromospheric lines, many photospheric lines are 'filled-in' in the active star spectrum. These differences are, most of the time, weak in absolute fluxes but can be large in terms of differences in the spectral-line equivalent widths. We calculate the differences in surface fluxes between these two stars for many spectral lines. We derive the radiative budgets for two dM1e stars: Gl 867A and AU Mic. We show that the sum of the numerous spectral lines represents a significant fraction of the radiative cooling of the outer atmosphere. We also re-investigate the cooling from the continuum from the visible to the extreme ultraviolet; we find that earlier predictions of the calculations of Houdebine et al. (Paper V) are in good agreement with observations. We emphasize that if this radiative cooling is chromospheric in character, then in chromospheric model calculations, we should include the radiative losses in Ca i, Cr i, V i, Ti i and Fe i. From simple constraints, we derive model chromospheres for quiescent and active regions on Gl 205. We show that the quiescent regions have a strong absorption Hα profile. The plage regions show a filled-in intermediate activity Hα profile. We also present possible spectral line profiles of quiescent and active regions on Gl 867A.
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