M01a One-dimensional MHD simulations of Alfvén wave propagation in the chromosphere with realistic radiative cooling model

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The chromospheric and coronal heating problem that why the plasma in the chromosphere and the corona could maintain a high temperature is still unclear. Previous researches (e.g. Kudoh & Shibata, 1999; Matsumoto & Shibata 2010) uncover that Alfvén wave could carry enough energy that contributes to coronal heating. While previous researches usually ignore or treat chromospheric radiative loss crudely, we carry on 1.5D numerical simulation with realistic radiative loss introduced by Carlsson & Leenaarts (2013). In our simulation, Alfvén wave is initiated by transverse motion near the lower boundary which has a power spectra consistent with observation in order to mimic the convection motion at the solar surface. We find that under certain geometry setting, the amount of radiative loss as well as spatial distribution of radiative loss profile are consistent with observation. At the same time, the amount of energy transporting to the corona also meets the requirement of coronal heating. Our study indicates that Alfvén wave model has the potential to explain chromospheric heating as well as transporting enough energy to the corona for coronal heating simultaneously.