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Radiative MHD simulation of the birth of an active region

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Abstract. We present a radiation magnetohydrodynamics (MHD) simulation of the birth of an active region. The simulation models the rise of a magnetic flux bundle from the convection zone into the solar photosphere. Observational properties of the simulation are consistent with recent, high-cadence and high spatial resolution observations of emerging flux regions taken by Hinode/SOT. Observational properties common to both simulation and observation include the hierarchical formation of progressively larger photospheric magnetic structures, the formation and disappearance of light bridges, umbral dots as well as penumbral filaments.