Geophysical Research Abstracts
Vol. 20, EGU2018-13405, 2018
EGU General Assembly 2018

Flux canceling in 3D radiative MHD simulations

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The processes involved in the disappearance of magnetic flux between regions of opposite polarity on the solar surface is studied with realistic 3D MHD simulations. 'Retraction' below the surface driven by magnetic forces is found to be a very effective mechanism of flux canceling of opposite polarities. The speed at which flux disappears increases strongly with initial mean flux density. In agreement with existing inferences from observations we suggest that this is a key process of flux disappearance within active complexes. As intrinsic kG strength concentrations connect the surface to deeper layers by magnetic forces, its influence on the flux canceling process is studied. This is done by comparing simulations extending to different depths. For average flux densities of 50G and on length scales of order 3Mm in the horizontal and 10Mm in depth it appears to have only a mild influence on the effective rate of diffusion.