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3D structure of the outer atmosphere: combining models and observations

Stephane Regnier

University of St Andrews

Abstract. In this review, I will focus on the structure and evolution of the coronal magnetic fields modeled from observations. The development of instruments measuring the photospheric and chromospheric magnetic fields with a high spatial and time resolutions allows us to improve the modelling of the coronal fields based on extrapolation and evolution techniques. In particular, I will detail the advance modelling of quiet-Sun areas, active regions and full-disc evolution. I will discuss the structure of coronal magnetic features such as filaments, sigmoids and coronal loops as well as their time evolution and instability. The complexity of the coronal field and the origin of open flux are also investigated in these different areas. I will discuss the future improvements in terms of instruments and models required to understand better the coronal field. The perspective of applying these solar models to stellar coronae is also tackled.