Solar Magnetic Fields

Alan W. Hood, David W. Hughes

(Submitted on 5 Jul 2011)

This review provides an introduction to the generation and evolution of the Sun's magnetic field, summarising both observational evidence and theoretical models. The eleven year solar cycle, which is well known from a variety of observed quantities, strongly supports the idea of a large-scale solar dynamo. Current theoretical ideas on the location and mechanism of this dynamo are presented.

The solar cycle influences the behaviour of the global coronal magnetic field and it is the eruptions of this field that can impact on the Earth's environment. These global coronal variations can be modelled to a surprising degree of accuracy. Recent high resolution observations of the Sun's magnetic field in quiet regions, away from sunspots, show that there is a continual evolution of a small-scale magnetic field, presumably produced by small-scale dynamo action in the solar interior.

Sunspots, a natural consequence of the large-scale dynamo, emerge, evolve and disperse over a period of several days. Numerical simulations can help to determine the physical processes governing the emergence of sunspots. We discuss the interaction of these emerging fields with the pre-existing coronal field, resulting in a variety of dynamic phenomena.

Comments:	44 pages, 8 figures. To appear shortly in a special issue of Physics of the Earth and Planetary Interiors
Subjects:	**Solar and Stellar Astrophysics (astro-ph.SR)**
Journal reference:	Physics of the Earth and Planetary Interiors 187, 78-91 (2011)
DOI:	10.1016/j.pepi.2011.04.010
Cite as:	**arXiv:1107.0908v1 [astro-ph.SR]**

Submission history

From: David Hughes [view email]

[v1] Tue, 5 Jul 2011 15:49:46 GMT (2582kb)

Which authors of this paper are endorsers?