A magnetic Signature of the solar Core in IMF Variations and geophysical Data?

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Based on the successful reconstruction of the global solar magnetic field by a number of investigators it seems clear that the field strength B(nT) has increased significantly during the last ˜300 years. However, it has been demonstrated that a weak field strength has unexpected consequences for the near-Earth environment, since under those conditions very large fluence SPE-nitrate events have an enhanced probability to be observed in the earth's ice caps. These results were explicable in terms of the linear dependence of the Alfven velocity upon the strength of the IMF, leading to higher shock compressions in the past.

For this reason, emphasis has been placed on evaluating the minimum values (Bmin) of the total magnetic flux (Solanki et al., 2000), which upon rough examination seems to resemble variations between sequential states of equilibrium which extend over several Schwabe cycles. Whereas the magnetic field strength B(nT) increases with decreasing cycle length, an inverse relationship can be demonstrated for the field strength with decreasing cycle length if the magnetic flux Bmax is expressed as a fraction of Bmin. This type of variation will be examined in view of varying contributions to the field strength by low and high order multipoles (2l-poles) of the magnetic flux of the solar magnetic field. The current understanding of this field is based on the dynamo action generated at the tachocline as revealed by helioseismic data. Such data have not yet revealed detailed structural information about the core. However, modulation of magnetic energy may have significant contributions from the self-sustained fusion processes in the energy generating region at the center of the sun. It is suggested that the results from an empirically derived solar luminosity variation model (C. Perry) involving a harmonic geometric progression with period doubling (2N), indicate a clear probability for superimposed contributions of magnetic energy when traced back to the magnetic moments and related NMR frequencies of 1H and 3He as part of the self-sustained nuclear fusion reactions in the core of the sun.