Walter Randall and Steffani Randall (1991) The Solar Wind and Hallucinations – A Possible Relation Due to Magnetic Disturbances. Bioelectromagnetics 12:67-70.

The study looked at a total of 49 cases of visual "hallucinations", typically of recently deceased relatives of those who experienced the hallucination. The cases were taken from a 43 year period between 1845 and 1888. When those experiences were grouped by the month of occurrence, and compared to records of solar wind activity during a similar period, also averaged by month, the two data sets were significantly correlated (Spearman correlation coefficient 0.64, $p<0.5$ two tailed). See figure 1 below, taken from the paper.

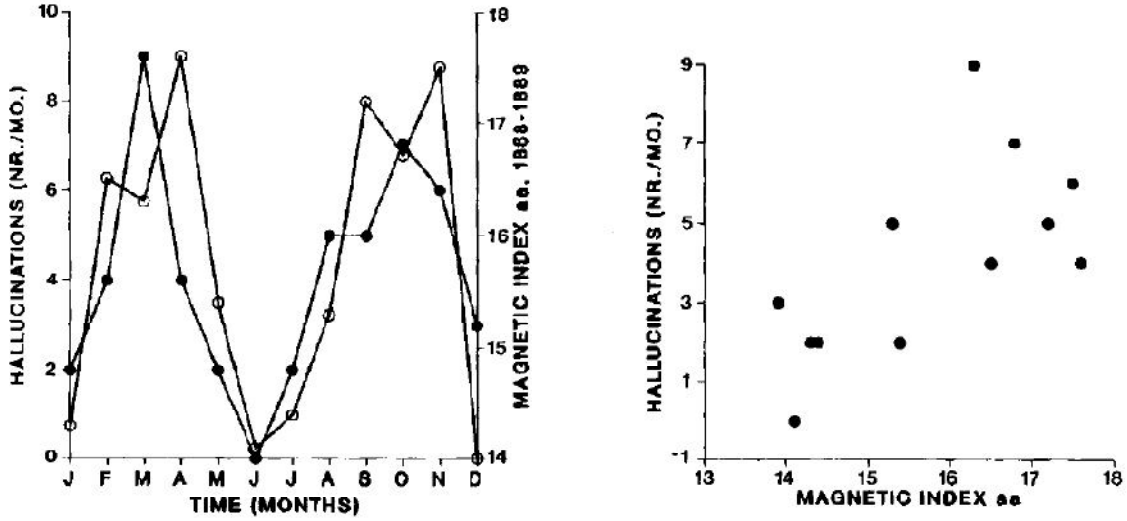

Fig. 1. Both longitudinal (left half) and scatterplot (right half) formats for the data on hallucinations and the magnetic index *aa*. Total number of hallucinations each month is plotted with the average monthly value of the magnetic index *aa*.

The fluctuations in solar wind emanating from the sun's surface, particularly during periods when sun spots occur is known to interact with the earth's magnetic field, resulting in magnetic field fluctuations.

A correlation by definition only states whether the two variables (in this case solar wind/magnetic field activity and frequency of hallucinations) are mutually related. Thus the results cannot imply cause and effect, and there may well be any number of other factors which are the cause of the observed relationship. However if true, the data is tantalizingly suggestive that hallucinations, which may at least partly account for haunting phenomena are in some way related to fluctuations in sun induced natural magnetic field fluctuations.

My experience with transcranial magnetic stimulation (TMS) shows that very strong magnetic fields, in the order of several Tesla, can readily affect neural activity which can

result in muscle movements or more subtle cognitive changes. It is a powerful technique which is currently being applied (experimentally) to areas such as treating drug resistant depression or helping rehabilitation of motor deficit resulting from stroke. From discussions with colleagues in the field of TMS and neurology, the possibility of weak magnetic fields (in the order of millitesla) affecting neural tissue is generally dismissed out of hand. There is a strong and consistent attitude that such small fields, yet still an order of magnitude greater than the earth's magnetic field (which is around 30-60 microtesla) could not have a significant effect. I believe that this is partly due to the currently understood mechanism by which TMS acts on the brain. The strong and rapidly changing magnetic field passes uninhibited through the scalp and when it interacts with the neural tissue a current is induced to flow. This current when passing through neurons forces them to discharge. This artificial discharge in effect acts as a sort of noise in the system during which time real (meaningful) data processing is interrupted. Thus an artificial, very brief (in the order of milliseconds) and reversible virtual lesion is created which can tell us about processing that that part of the brain is responsible for. Both theory and practise have shown that this direct depolarization can only reach perhaps 2 cm below the skull. This is currently the only known, common sense mechanism by which a magnetic field is known to interact with brain tissue. Therefore, weak magnetic fields, which cannot directly depolarize neural tissue, are not seriously considered.

However Michael Persinger's group in Laurentian University, Canada has published numerous papers reporting the effect of low strength magnetic fields inducing semi-religious experiences in participants. His group induced emotional responses associated with temporal lobe activation and possibly deeper structures such as the amygdala, which has an important role in generation of emotional states. All of this activation is believed to be induced by weak, diffuse alternating magnetic fields created by playing back recorded brain activity traces via specially designed magnetic coils.

The Randall and Randall paper suggests that even weaker (natural) fields may be somehow associated with hallucinations and/or ghost activity. A very exciting prospect because it generates a hypothesis that can be tested by scientific means.

However the magnetic field at best can only be a partial explanation. Hallucinations and not ghosts were the topic of discussion in the Randall & Randall paper. Generally the individuals reporting these hallucinations only had a single unique experience. Ghost and haunting activity can be perceived by numerous people and/or multiple times.

The two links below may be of interest with respect to geomagnetism:

http://gsc.nrcan.gc.ca/geomag/field/index_e.php

http://gsc.nrcan.gc.ca/geomag/field/magdec_e.php - variability in the earth's field