



Toward a possible next geomagnetic critical transition?

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The geomagnetic field is subject to possible reversals or excursions of polarity during its temporal evolution. Considering the characteristics of the recent geomagnetic field, a possible imminent geomagnetic reversal or excursion would not be completely unexpected. In that case, such a phenomenon would represent one of the very few natural hazards that are really global. The South Atlantic Anomaly (SAA) is a great depression of the geomagnetic field strength at the Earth's surface, caused by a reverse magnetic flux in the terrestrial outer core. In analogy with critical point phenomena characterized by some cumulative quantity, we fit the surface extent of this anomaly over the last 400 yr with power law or logarithmic functions in reverse time, also decorated by log-periodic oscillations, whose final singularity (a critical point t_c) reveals a great change in the near future (2034 ± 3 yr), when the SAA area reaches almost a hemisphere. An interesting aspect that has recently been found is the possible direct connection between the SAA and the global mean sea level (GSL). That the GSL is somehow connected with SAA is also confirmed by the similar result when an analogous critical-like fit is performed over GSL: the corresponding critical point (2033 ± 11 yr) agrees, within the estimated errors, with the value found for the SAA. From this result, we point out the intriguing conjecture that t_c would be the time of no return, after which the geomagnetic field could fall into an irreversible process of a global geomagnetic transition that could be a reversal or excursion of polarity.