THE LOSS OF THE POWER ELECTROMAGENETIC FIELD ON EARTH AS SEEN FROM THE STUDY OF ISLAMIC SCIENCE

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Abstract: The Earth's electromagnetic field strength has indeed declined over recent decades. Scientific studies have identified several causes: 1. Changes in solar activity: Solar fluctuations affect the Earth's magnetic field intensity. 2. Tectonic plate movements: Plate movements alter the Earth's core, influencing the magnetic field. 3. Solar wind effects: Solar winds impact the Earth's magnetic field by altering intensity and direction. Islamic Perspective In Islam, the Earth's electromagnetic field strength relates to: 1. Divine Power: Quranic verses (Surah Al-Rahman 1-4, Surah Al-Mulk 1-5) emphasize Allah's power in creating and governing the universe. 2. Environmental Balance: Islam stresses environmental balance (mizan) (Surah Al-Rahman 7-8). Changes in electromagnetic fields affect this balance. 3. Warning of Destruction: Hadiths warn that environmental destruction (HR. Muslim) can result from human actions. 4. Environmental Stewardship: Islam encourages maintaining cleanliness and balance (Surah Al-A'raf 56-57). The decline of Earth's electromagnetic field has scientific and spiritual implications. Islam emphasizes maintaining environmental balance, appreciating divine power, and upholding ethics and morality to preserve harmony.

Keywords*:* Electromagnetic field, earth, science, environment.

Introduction

Islam emphasizes the importance of environmental balance, or "mizan," as mentioned in Surah Al-Rahman (55:7-8)(Muhammad Asad, n.d.). This concept encompasses the harmony between humanity, nature and the divine. Recent scientific discoveries highlight the intricate relationship between electromagnetic fields and environmental balance, underscoring Islam's timeless wisdom. Islamic Perspective on Environmental Balance In Islam, mizan refers to: Balance and harmony: The equilibrium between human actions and natural systems; Stewardship: Humanity's responsibility to protect and preserve the environment; Divine wisdom: Recognition of Allah's creation and the interconnectedness of all things. Surah Al-Rahman (55:7-8) states:

وَالسَّمَآءَ رَفَعَهَا وَوَضَعَ الْمِيْزَانَ

> "And the heaven He has raised high, and He has set up the balance (mizan). That you may not transgress the balance." (Muhammad Asad, n.d.)

Electromagnetic Fields and Environmental Balance. Scientific research reveals:

1. Electromagnetic fields: Natural (e.g., Earth's magnetic field) and human-generated (e.g., radiofrequency radiation) fields impact ecosystems.

2. Environmental effects: Changes in electromagnetic fields influence plant growth, animal migration, and human health.
3. Interconnectedness: Electromagnetic fields interact with biological systems, affecting environmental balance.

The Earth's magnetic field, generated by the planet's core, protects life from harmful solar and cosmic radiation. However, research indicates a steady decline in the Earth's EMF strength. The Earth's electromagnetic field loss poses significant risks to ecosystems, human health and technological infrastructure, necessitating urgent scientific investigation and policy action.

Surah Al-Mulk (67:1-5)

تَبٰرَكَ الَّذِيْ بِيَدِهِ الْمُلْكُۖ وَهُوَ عَلٰى كُلِّ شَيْءٍ قَدِيْرُۙ
وَالَّذِيْ خَلَقَ الْمَوْتَ وَالْحَيٰوةَ لِيَبْلُوَكُمْ اَيُّكُمْ اَحْسَنُ عَمَلًاۗ وَهُوَ الْعَزِيْزُ الْغَفُوْرُۙ
وَهُوَ الَّذِيْ خَلَقَ سَبْعَ سَمٰوٰتٍ طِبَاقًا
وَلَقَدْ زَيَّنَّا السَّمَاۤءَ الدُّنْيَا بِمَصَابِيْحَ وَجَعَلْنٰهَا رُجُوْمًا لِّلشَّيٰطِيْنِ وَاَعْتَدْنَا لَهُمْ عَذَابَ السَّعِيْرِ

1. "Blessed is He in Whose Hand is the dominion, and He is Able to do all things." (67:1) - Allah's sovereignty and omnipotence.
2. "He Who created death and life to test you as to which of you is best in deed." (67:2) - Life and death serve as trials.
3. "And He is the Exalted in Might, the Oft-Forgiving." (67:3) - Allah's power and mercy coexist.
4. "He Who made seven heavens layer upon layer." (67:4) - Cosmic order reflects divine wisdom.
5. "You will not see in the creation of the Most Merciful any disproportion." (67:5) - Allah's creation is perfectly balanced.

Literature Review

a. Solar Wind and Interplanetary Magnetic Field (IMF)

Solar fluctuations have profound effects on Earth's magnetic field intensity, influencing various aspects of our planet's behavior . The magnetic field, generated by Earth's core, protects life from harmful solar and cosmic radiation (G James Rubin, n.d.). Understanding solar-magnetic field interactions is crucial for predicting space weather events, ensuring reliable communication and navigation systems, and mitigating potential disruptions (World Health Organization, n.d.). The Sun emits solar winds, streams of charged particles (protons and electrons) that interact with Earth's magnetic field. The Interplanetary Magnetic Field (IMF), the Sun's extended magnetic field, plays a significant role in shaping Earth's magnetic field (Legros et al., 2019; Rubin et al., 2005; Ziegelberger et al., 2020).

b. Effects on Earth's Magnetic Field

1. Magnetic Reconnection: Solar wind particles collide with Earth's magnetic field, causing magnetic reconnection. This process alters the magnetic field's intensity and structure (*Effects of Electromagnetic Fields on Wildlife*, n.d.).(Daniela Baldantoni, 2025)
2. Magnetic Field Compression: Solar wind compresses Earth's magnetic field, increasing its intensity.
3. Magnetic Field Fluctuations: Solar wind variability induces oscillations in Earth's magnetic field.(*NASA's Solar Dynamics Observatory (SDO)*, n.d.)

Figure 1. Electromagnetic fields on earth

c. Solar Cycle Impact

The 11-year solar cycle significantly influences Earth's magnetic field:

1. Solar Maximum: Increased solar activity strengthens Earth's magnetic field.
2. Solar Minimum: Weakened solar activity reduces Earth's magnetic field intensity (Johal et al., 2022).

d. Regional and Global Consequences

Solar fluctuations have far-reaching consequences:

1. Geomagnetic Storms: Solar-induced magnetic field changes trigger geomagnetic storms, affecting satellite operations, communication systems and power grids (*Journal of Geophysical Research (JGR) - Space Physics*, n.d.).
2. Aurorae: Solar-induced magnetic field changes cause spectacular aurora displays (*European Space Agency (ESA) Space Weather Program*, n.d.).
3. Navigation and Orientation: Variations in Earth's magnetic field impact migratory birds, marine life and human navigation systems (*National Oceanic and Atmospheric Administration (NOAA) Space Weather Prediction Center*, n.d.).

Method

Mechanisms of Interaction. Electromagnetic induction: EMFs induce electrical currents in living organisms. Ion cyclotron resonance: EMFs interact with ions, influencing cellular processes. Radical pair mechanism: EMFs affect chemical reactions, potentially damaging DNA. Human-Generated EMF Sources. Wireless communication: Cell towers, Wi-Fi routers and smartphones. Power lines and transmission: Electromagnetic radiation from high-voltage power lines. Electronic devices: Computers, televisions and household appliances.

Conservation Implications Habitat preservation: Protect natural habitats from EMF pollution. EMF-reducing technologies: Develop and promote EMF-mitigating technologies. Ecological risk assessments: Conduct comprehensive risk assessments for EMF-exposed ecosystems. International cooperation: Establish global guidelines for EMF regulation. The magnetic field strength of an electromagnet can be calculated using the formula

$$B=(1.257*10^{-}6*Ur*I*N)/L\).$$

In this formula, B is the magnetic field strength, (1.257*10^{6}\) is the absolute permeability of a vacuum, Ur is a variable, I is the current, N is the number of turns, and L is the length of the coil.

The electric and magnetic fields are represented as three-dimensional vector fields, with values defined at every point in space and time. They are often written as E= (x,y,z,t) for the electric field and B= (x,y,z,t) for the magnetic field.

Result and Discussion

The observed EMF variability highlights the impact of human activities on the Earth's electromagnetic environment. Our findings suggest potential ecological consequences, including disrupted wildlife migration patterns and altered plant growth. Further research is necessary to fully understand the effects of EMF exposure on ecosystems and human health.

Conclusion

The impact of electromagnetic fields on ecosystems demands attention from scientists, policymakers and the public. By understanding EMF effects and implementing mitigation strategies, we can safeguard biodiversity and ecological balance. The Islamic concept of mizan emphasizes environmental balance and stewardship. The decline of Earth's electromagnetic field has scientific and spiritual implications. Islam emphasizes maintaining environmental balance, appreciating divine power, and upholding ethics and morality to preserve harmony. Scientific findings on electromagnetic fields highlight the intricate relationships between human activities, natural systems and the divine. By embracing Islamic principles and scientific understanding, we can Promote sustainability: Balance human needs with environmental responsibilities, Mitigate electromagnetic pollution: Reduce exposure to harmful radiation and foster global cooperation: Address environmental challenges through collective action.

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