

ELECTROMAGNETIC EARTH

"Science is more essential for our prosperity, our security, our health, our environment, and our quality of life than it has ever been before" - President Barack Obama at the National Academy of Sciences Annual Meeting on April 27, 2009

SPLASH 2013
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Homepage

This is a supplement for the Splash lecture "Electromagnetic Earth". Here you can find cool links, videos, labs, and news/science articles related to what was discussed in the lecture.

Related (and therefore cool) books

Our Magnetic Earth, *Ronald T. Merrill.*

A book to introduce laypeople to geomagnetism. This is a non-fiction book (not a textbook) and reads very well. Dr. Merrill is an emeritus professor at the University of Washington who made many important contributions to the field of geomagnetism.

The Space Odyssey Series, *Arthur C. Clarke.*

The first book in the series focuses on Saturn, but Clarke quickly realized the potential surrounding Jupiter and its moon Europa so the rest of the series is focused on that planet/moon. The books are not focused on geomagnetism, but rather on astrobiology. The books are:

2001: A Space Odyssey

2010: Odyssey II

2061: Odyssey III

3001: The Final Odyssey

Arthur C. Clarke has many other amazing science fiction books that have won the Hugo and Nebula awards– the most prestigious awards within science fiction.

The Mars Trilogy, *Kim Stanley Robinson.*

These books focus on terraforming Mars. Not directly related to geomagnetism, but Mars' lack of a magnetic field presents many challenges. These books have received the Hugo and Nebula awards. The books in this series are:

Red Mars

Green Mars

Blue Mars

Cool vids

The levitating frog, <http://youtu.be/2VIWonYfN3A>.

Read more about this here: <http://www.physics.org/facts/frog-really.asp> or here: <http://www.levitationfun.com/>

Los Alamos National Lab High Magnetic Field Laboratory.

<http://youtu.be/N0R8dyyXtTo>

The lab website is here: <http://www.lanl.gov/orgs/mpa/nhmfl/>

Magnetic field reversals, *NOVA*, <http://www.pbs.org/wgbh/nova/earth/when-our-magnetic-field-flips.html>.

This link has many cool geomagnetism articles covering the impact of magnetic reversals on animals and a gallery of auroras.

Dynamo models

The first simulation of the geodynamo, *Dr. Gary Glatzmaier*, Los Alamos National Lab, NM. **1995**

<http://www.es.ucsc.edu/~glatz/geodynamo.html>

Gary is now a professor at UC Santa Cruz.

Dynamo modeling for earth and beyond, *Dr. Sabine Stanley*, University of Toronto, Canada.

<http://www.physics.utoronto.ca/~stanley/>

Sabine is not limited by Earth and has tackled numerous planets in our solar system and beyond.

The International Geomagnetic Reference Field, *National Geophysical Data Center*, National Oceanic & Atmospheric Administration, Boulder, CO.

<http://www.ngdc.noaa.gov/AGA/vmod/igrf.html>

This is not actually a dynamo model, it is the latest version of a standard mathematical description of the Earth's main magnetic field that is used widely in studies of the Earth's deep interior, its crust and its ionosphere and magnetosphere.

Dynamo Experiments

UCLA's Simulated Planetary Interiors (SPIN) Lab, *Dr. Jonathan Aurnou*, University of California, Los Angeles, US.

<http://spinlab.ess.ucla.edu/>

UMD's Nonlinear Dynamics Lab, *Dr. Daniel P. Lathrop*, University of Maryland, US.

http://complex.umd.edu/research/MHD_dynamics/MHD_dynamics.php

Paleomagnetism & crustal magnetism

MIT's Paleomagnetism Laboratory, *Dr. Benjamin Weiss*, Massachusetts Institute of Technology, US.

<http://scripts.mit.edu/~paleomag/>

Caltech's Paleomagnetism Laboratory, *Dr. Joseph Kirschvink*, California Institute of Technology, US.

<http://www.gps.caltech.edu/MagLab/>

Scripps Institute for Oceanography Paleomagnetic Laboratory, *Dr. Lisa Tauxe*, University of California, San Diego, US.

<http://sorcerer.ucsd.edu/>

Institute for Rock Magnetism, University of Minnesota, US.

<http://www.irm.umn.edu/IRM/index.html>

Ocean electromagnetics

By the end of December my website will also be updated for ocean magnetism:

<http://web.mit.edu/nschnepf/www/Research/NRS.html>

Ocean tidal dynamo, *Dr. Stefan Maus*, National Geophysical Data Center, National Oceanic & Atmospheric Administration.

<http://geomag.org/info/ocean.html>

Tsunami generated magnetic signals, *Dr. Manoj Nair*, National Geophysical Data Center, National Oceanic & Atmospheric Administration.

<http://geomag.org/info/tsunami.html>

The ionosphere

Ionospheric currents, National Geophysical Data Center, National Oceanic & Atmospheric Administration.

http://geomag.org/info/ionospheric_currents.html

The magnetosphere

The magnetosphere, National Geophysical Data Center, National Oceanic & Atmospheric Administration.

<http://geomag.org/info/magnetosphere.html>

Our Solar Systems' Magnetic Fields

