List of publications cited in the 2018 FDEPS Course

Henri-Claude Nataf

Univ Grenoble Alpes, Univ Savoie Mont Blanc, CNRS, IRD, IFSTTAR, ISTerre, 38000 Grenoble, France

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1 Overview and basic concepts

1.1 dimensional analysis

The dimensional analysis *pi* theorem of Buckingham (1914).

1.2 convection and pattern formation

Convection in a centrifuge by Weijermars (1988).
Rayleigh-Bénard convection cells from differential interferometry by Nataf and Richter (1982).
Differential interferometry to retrieve temperature gradients in Nataf et al. (1981).
Convection planforms in temperature-dependent Rayleigh-Bénard convection from White (1988).

1.3 Earth's interior

The global stacks of seismograms yielding travel-time curves can be found at: https://ds.iris.edu/ds/products/gl
The *hum* of the Earth as reviewed by Nishida (2013).
Travel times and ray paths in the AK135 model of the Earth's interior by Kennett (2005).
A must :the Preliminary Reference Earth Model of Dziewonski and Anderson (1981).
The *spheroidal* free oscillations of the Earth after the great Tohoku earthquake as seen in water wells by Yan et al. (2016).
The *toroidal* free oscillations of the Earth after the great Tohoku earthquake captured by rotation sensors from Nader et al. (2012).
A chapter of the *Treatise on Geophysics*: 'Temperatures, heat and energy in the mantle of the Earth' by Jaupart et al. (2015).
Geoneutrinos observations by the KamLAND collaboration (Gando et al., 2011).

2 Mantle convection and plate tectonics

2.1 Mantle convection with T-dependent viscosity

Onset of Rayleigh-Bénard convection in a temperature-dependent viscosity fluid by Stengel et al. (1982); Richter et al. (1983).

2.2 The mantle plume paradox

Mantle plume buoyancy flux of hotspots estimated by Sleep (1990).
The GPlates software can be downloaded for free from: http://www.earthbyte.org/gplates-1-5-software-and-data-sets.
How hotspots came to the world (Wilson, 1965).
The classical article on the mantle plume model by his inventor (Morgan, 1971).
The cavity plume model of Griffiths and Campbell (1990).
Linking the Dekkan traps to the La Runion mantle plume (Courtillot et al., 1986).
Plume heads and tails (Richards et al., 1989).
Mantle plumes from ancient oceanic crust by Hofmann and White (1982).
The mantle plume paradox of Nataf (1991).
Experiments on mantle plumes (Kumagai and Kurita, 2000).

2.3 Seismic tomography

The global stacks of seismograms yielding travel-time curves can be found at: https://ds.iris.edu/ds/products/gl
Ancestors' tomograpic models of the upper mantle (Nataf et al., 1984, 1986; Woodhouse and Dziewonski, 1984).
The unbelievable high resolution of a recent tomographic mode by Debayle et al. (2016).
The fantastic survey of subducting slabs behaviours conducted by Fukao and Obayashi (2013).
Disputed detection of mantle plume by 'scattering tomography' (Ji and Nataf, 1998).
Disputed detection of mantle plumes by finite-frequency banana-doughnuts (Montelli et al., 2004).
Broad mantle plumes from whole waveform tomography according to French and Romanowicz (2015).

3 Core dynamics and the geodynamo

3.1 The Earth's magnetic field

Four centuries of geomagnetic secular variation: the key historical compilation of Jackson et al. (2000).
Reconstruction of the Holocene magnetic field of the Earth (Korte et al., 2011).
Global changes in intensity of the Earth's magnetic field during the past 800 kyr by Guyodo and Valet (1999).
Magnetic anomaly map of the World as of Korhonen et al. (2007).
The Geologic Time Scale of the Geological Society of America (Walker et al., 2013).
About *magnetic* Rossby waves in Hori et al. (2015).

3.2 Dynamics of rotating fluids

Inertial modes in a liquid sodium experiment at the University of Maryland (Kelley et al., 2007).
Read the reference book on Turbulence in rotating, stratified and electrically conducting fluids by Davidson (2013).
Another reading: Treatise on Geophysics' chapter on Waves in the core and mechanical core-mantle interactions by Jault and Finlay (2015).
Yet another key Treatise on Geophysics' chapter: Thermal and Compositional Convection in the Outer Core by Jones (2015) (Also see Professor Chris Jones FEDPS 2017 Course).
The classical landmark article on thermal instabilities in rapidly rotating systems by Busse (1970).
A very recent reassessment of the scale of convection in a rapidly rotating sphere by Guervilly, Cardin and Schaeffer: preprint at: https://arxiv.org/abs/1810.09553.

3.3 Dynamos

The famous anti-dynamo theorem of Cowling (1933).
For a historical perspective: Interview of Thomas Cowling by David DeVorkin on 1978 March 22, Niels Bohr Library & Archives, American Institute of Physics, College Park, MD USA, www.aip.org/history-programs/niels-bohr-library/oral-histories/4563.
The first experimental dynamo (more solid than fluid!) (Lowes and Wilkinson, 1963, 1968), based on the geometry proposed by Herzenberg (1958).
The Karlsruhe dynamo experiment of Stieglitz and Müller (2001), following the analytical dynamo model of G.O. Roberts (1972).
The Riga dynamo experiment of Professor Agris Gailitis and his colleagues (Gailitis et al., 2000, 2001) built following the analytical proposal of Ponomarenko (1973).
Observation of a turbulence-induced large scale magnetic field in the Madison liquid sodium experiment (Spence et al., 2006).
The von Karman sodium (VKS) dynamo experiment in Cadarache, France (Monchaux et al., 2007) and the beautiful magnetic reversal records it produced (Berhanu et al., 2007).
Dynamo bursts (Zimmerman et al., 2014) in the monster 3m-diameter liquid sodium experiment of Professor Dan Lathrop at the University of Maryland.
Under construction: DRESDYN, the precession dynamo experiment in Dresden (Stefani et al., 2017).

3.4 Core flows

Another reference chapter in the Treatise on Geophysics: Large-scale flow in the core by Holme (2015).
A giant off-centered anti-cyclone in the Earth's core (Pais and Jault, 2008).
The magnetic secular variation spectrum and stochastic core-flow inversion (Gillet et al., 2015).
The discovery of geostrophic Alfvén waves in the core by Gillet et al. (2010).
Hannes Alfvén's discovers hydromagnetic waves, which have his name now (Alfvén, 1942).

3.5 Numerical simulations of the geodynamo

A guided tour of one of the highest resolution numerical simulation of the geodynamo performed by Schaeffer et al. (2017).

4 Turbulence in planetary cores

4.1 What is turbulence?

4.2 Fundamentals of turbulence

The foundation of *universal* turbulence theory by Kolmogorov (1941).
Obukhov (1941) demonstrates the famous $k^{-5/3}$ law.

4.3 tau-ell regime diagrams

This part closely follows the chapter of Nataf and Schaeffer (2015) in the Treatise on Geophysics.
A very recent reassessment of the scale of convection in a rapidly rotating sphere by Guervilly, Cardin and Schaeffer: preprint at: https://arxiv.org/abs/1810.09553.
The critical balance idea and its implication by Nazarenko and Schekochihin (2011).
A great review on MHD turbulence and dynamos: the chapter of Tobias et al. (2013) in the book entitled '10 chapters in turbulence' by Davidson et al (2013).

5 The formation of planets

5.1 The Sun and helioseismology

Helioseismology in a bottle: modal acoustic velocimetry by Triana et al. (2014).
The reference book on asteroseismology by Aerts et al. (2010). Detection of the first normal modes in Jupiter (Gaulme et al., 2011).
Normal modes in Saturn discovered through the signature they impress on its C-rings (Rosen et al., 1991; Hedman and Nicholson, 2013; Marley, 2014).

5.2 The formation of the solar system

Mayor and Queloz (1995) discover the first planet orbiting a solar-like star!
The very first exoplanets to be discovered are orbiting a pulsar (Wolszczan and Frail, 1992).
(Balbus and Hawley, 1991) propose the magnetorotational instability (MRI) as a major ingredient for the accretion of discs aroung forming stars.
Dynamics of protoplanetary discs: the HDR manuscript of Geoffroy Lesur, Univ. Grenoble Alpes, 2018.
Hints for the magnetorotational instability in a liquid sodium spherical Couette experiment, at the University of Maryland (Sisan et al., 2004).

See also Stefani et al. (2017) for more about MRI experiments.
Amazing direct infra-red images of accretion discs (Benisty et al., 2015; Ginski et al., 2016).
Global simulations of protoplanetary disks of Béthune et al. (2017).
A landmark article proposing the 'Composition of the Earth' by McDonough and Sun (1995).

5.3 The formation of the Earth

Laboratory experiments to investigate the equilibration of metal diapirs in the primordial magma ocean (Landeau et al., 2014).

6 Research seminar

Here are references for the research seminar entitled: 'Torsional Alfvn waves in a dipolar magnetic field: experiments and simulations'.
An article describing our results (same title, same authors) has just been submitted, and should soon be available on ArXiv.
Several references on previous studies performed with the *Derviche Tourneur Sodium* experiment in Grenoble: Nataf and Gagniere (2008); Brito et al. (2011); Nataf (2013); Schmitt et al. (2008, 2013); Kaplan et al. (2018); Nataf et al. (2008); Cabanes et al. (2014, 2015).
The XSHELLS numerical simulation tool developed by Nathanael Schaeffer is described in Figueroa et al. (2013). It uses the very efficient spherical harmonic transform software SHTns (Schaeffer, 2013).
The role of the Coriolis force on Alfvén waves, first investigated by Lehnert (1954b).
Also see Jault (2008) in the context of the core.
Experimental confirmation of Alfvén waves in liquid metal: Lundquist (1949); Lehnert (1954a); Jameson (1964); Alboussiere et al. (2011).

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