

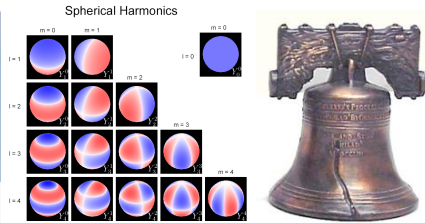
EAS 4801 - Planetary Sound

Lec #6: Recording devices

Dr. Zhigang Peng
01/17/2020
Spring 2020



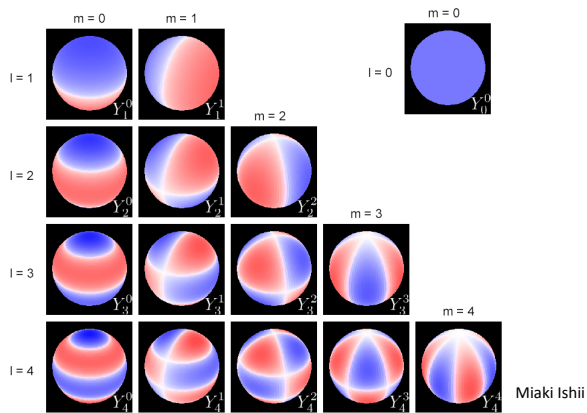
U.S. Navy F/A-18 approaching the sound barrier. The white cloud forms as a result of the supersonic expansion fans dropping the air temperature below the dew point.^{[1][2]}



Today's schedule

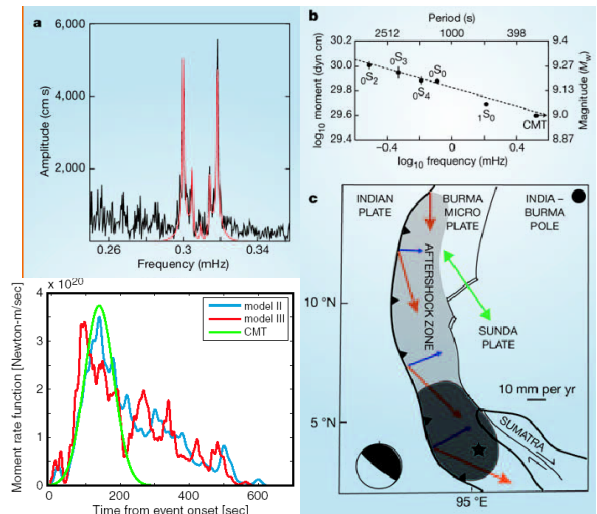
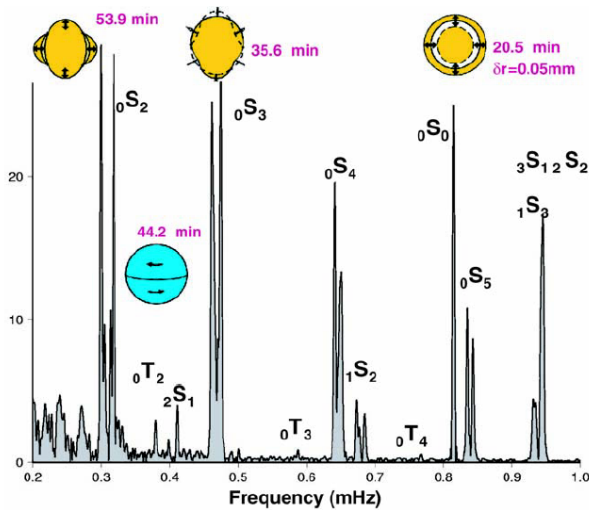
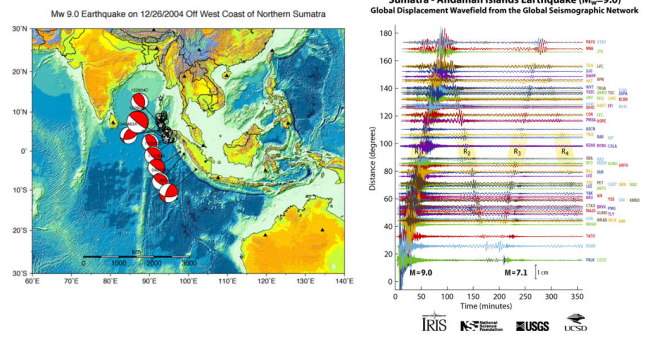
- Remaining part on "Standing Waves"
- Quiz
- Project
- Recording devices

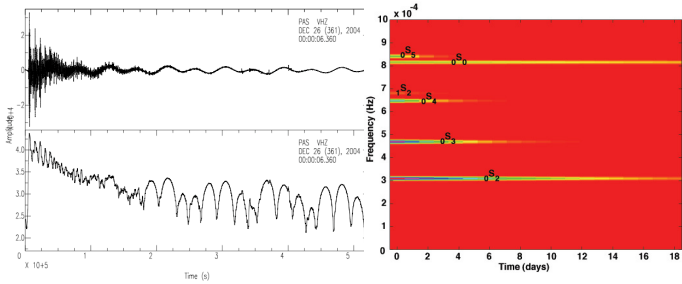
Spherical Harmonics



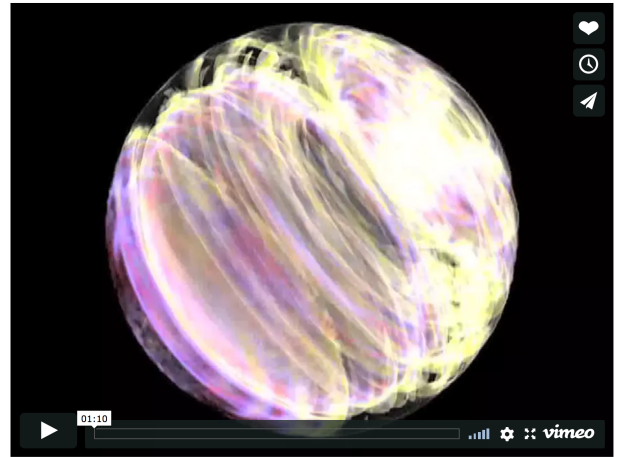
<https://saviot.cnrs.fr/terre/index.en.html>

Free oscillation observed after the 2004 Sumatra earthquake





2004 Sumata Earthquake



<http://www.ideo.columbia.edu/news-events/listening-earthquakes-inside-earth>

Resonance Bowl

<https://www.youtube.com/watch?v=Lf42yIZP3og>



Chinese Spouting Bowl in Slow Motion - The Slow Mo Guys



Bowed violin string in slow motion

Quiz and Project

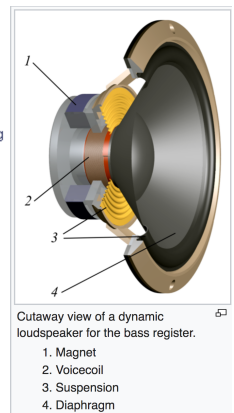
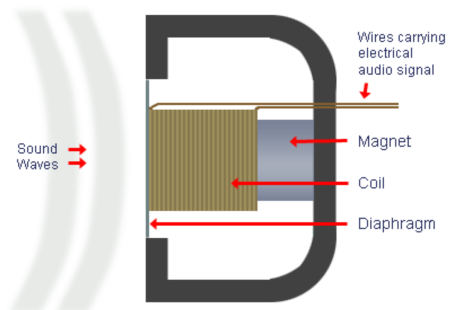
- Description: students use either professional equipment or personal device to record vibrations/sounds, or analyze recordings by others to understand the physical processes of the sources and propagating medium.
- 14 students, 7 teams (find a teammate and determine the by Jan 24th – email me the info.)
- 10-min presentation on 2/7/2020 (Friday 12:20-1:10 pm) (10% of grade)
- Writing report: 2/7/2020 (?) (8 pages, 12 pt font, figures/references included) (15% of grade)

Recording Sound Vibrations

A microphone, colloquially named mic is a device – a transducer – that converts sound into an electrical signal.

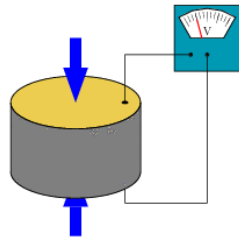
<https://en.wikipedia.org/wiki/Microphone>

Cross-Section of Dynamic Microphone



Hydrophone

A hydrophone is a microphone designed to be used underwater for recording or listening to underwater sound. Most hydrophones are based on a piezoelectric transducer that generates an electric potential when subjected to a pressure change, such as a sound wave.



<https://oceanservice.noaa.gov/facts/hydrophone.html>

<https://en.wikipedia.org/wiki/Hydrophone>

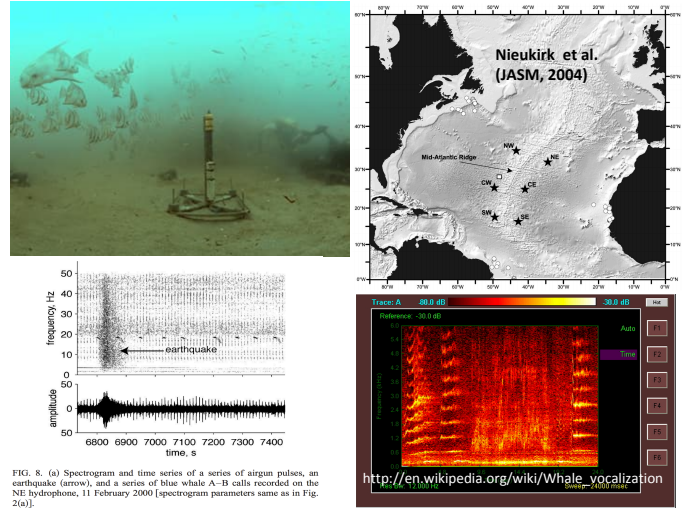
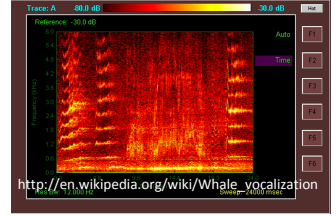


FIG. 8. (a) Spectrogram and time series of a series of airgun pulses, an earthquake (arrow), and a series of blue whale A-B calls recorded on the NE hydrophone, 11 February 2000 [spectrogram parameters same as in Fig. 2(a)].



http://en.wikipedia.org/wiki/Whale_vocalization

