Overview

• Use ambient noise in ocean to determine environmental parameters
  – Seabed depth
  – Sub-bottom sediment layering & properties
• Sponsor: ONR (Office of Naval Research)
• People
  – Dr Martin Siderius (Associate Professor)
  – Lanfranco Muzi (PhD research assistant)
  – John Gebbie (PhD research assistant)
  – Joel Paddock (B.S. student)
Reflection Loss

- Snell’s Law governs reflection coefficient (R)
- Reverberation
  - Multiple interfering reflections
- Can compute reflection loss (RL) from R

\[ R_{12} = \frac{\rho_2 c_2 / \sin \theta_2 - \rho_1 c_1 / \sin \theta_1}{\rho_2 c_2 / \sin \theta_2 + \rho_1 c_1 / \sin \theta_1} \]

\[ RL = -10 \log |R|^2 \]

Reflection Loss

• Plot reflection loss as a function of:
  – Grazing angle
  – Frequency

• Frequency dependence contains information about separation and properties of layers

Reflection Loss

- Can compute RL from real data
- Use adaptive beamformer to obtain noise power from positive and negative angles
- Divide to get ratio – this is also RL!


