GG 450 Homework April15, 2010

Due April 22, 2010

1) Using the equation for reflection coefficient:

$$R = \frac{\rho_2 V_2 - \rho_1 V_1}{\rho_2 V_2 + \rho_1 V_1}$$

and the following rock properties:

Rock type	Velocity (km/sec)	Density (gm/cm^3)
Shale	1.8	1.9
Sandstone	2.2	2.1
Limestone	2.7	2.5

Calculate reflection coefficients for:

a) Shale over Sandstone
b) Sandstone over Limestone
c) Limestone over Sandstone

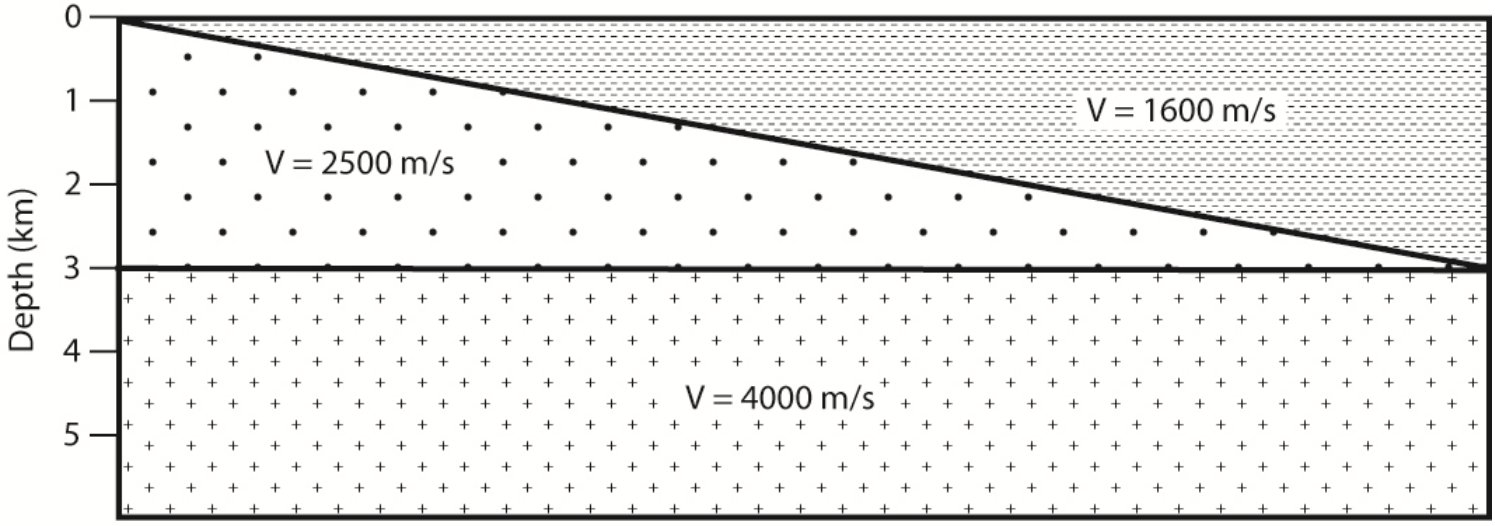
2) Given the formula: $\lambda = V/f$

Calculate the wavelength of seismic waves with the following velocities and frequencies:

a) V = 2 km/sec, f = 80 Hz (approximates sediments at ~ 500 meters burial depth in the ocean)

b) V = 4 km /sec, f = 20 Hz (approximates sediments at ~4000 m burial depth in the ocean)

3) On the next two pages are two hypothetical geological cross sections (upper portion). In the lower portion of each diagram, draw the seismic reflection time section that would be generated by a survey over the upper section. Make your depths as accurate as possible.


0
1
2
3
4
5
Depth (km)
V = 1600 m/s
V = 2500 m/s
V = 4000 m/s


0
1
2
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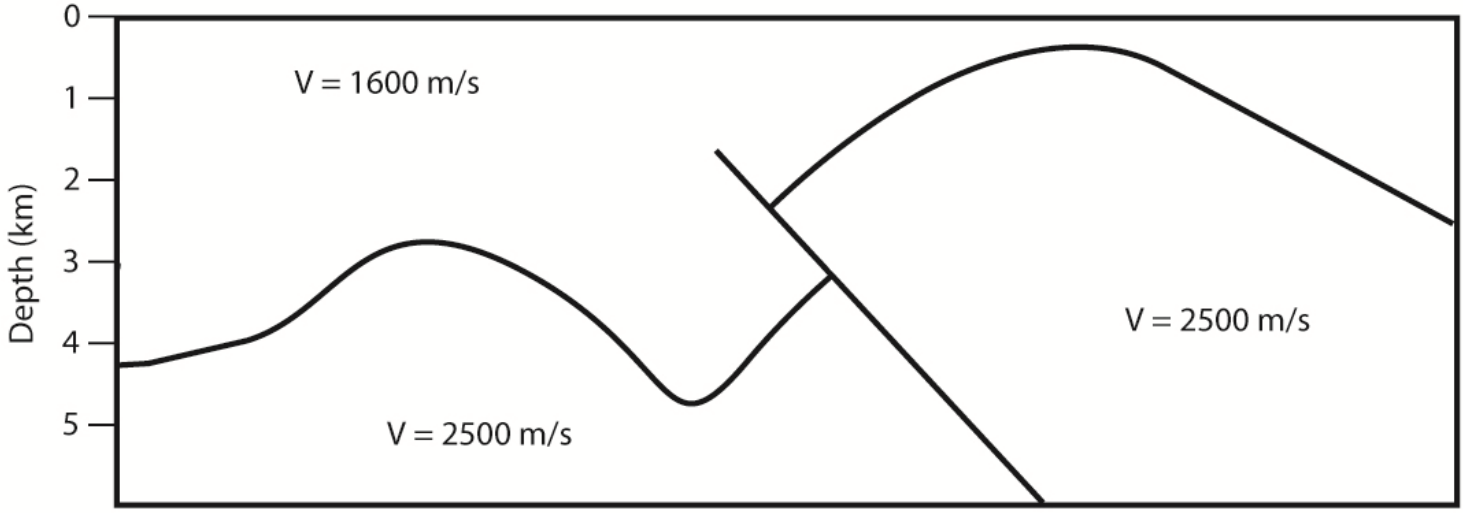
5
Two-way Time (s)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Depth (km)
V = 1600 m/s
V = 2500 m/s
V = 2500 m/s


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Two-way Time (s)