

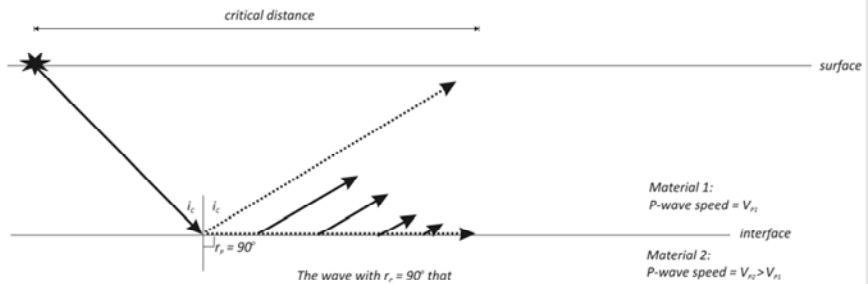
GEOL 2112

Week 4 Part 2 Lecture Notes
Structure of the Earth: Seismology

Reading:

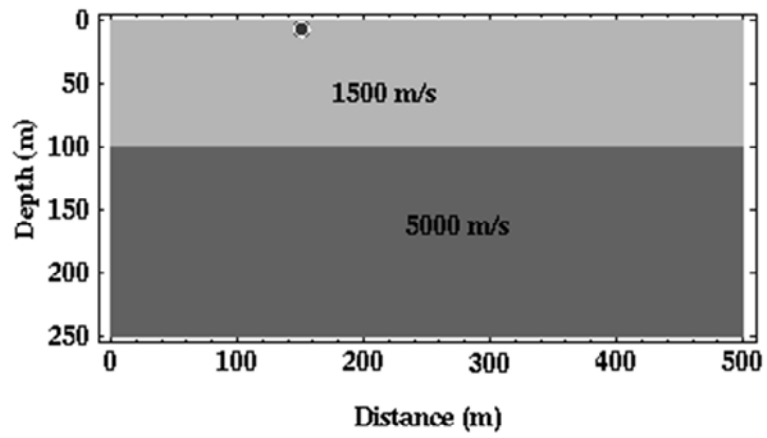
Fowler – Chapter 4, 8.1

One more source of waves to consider: 'Head Waves'

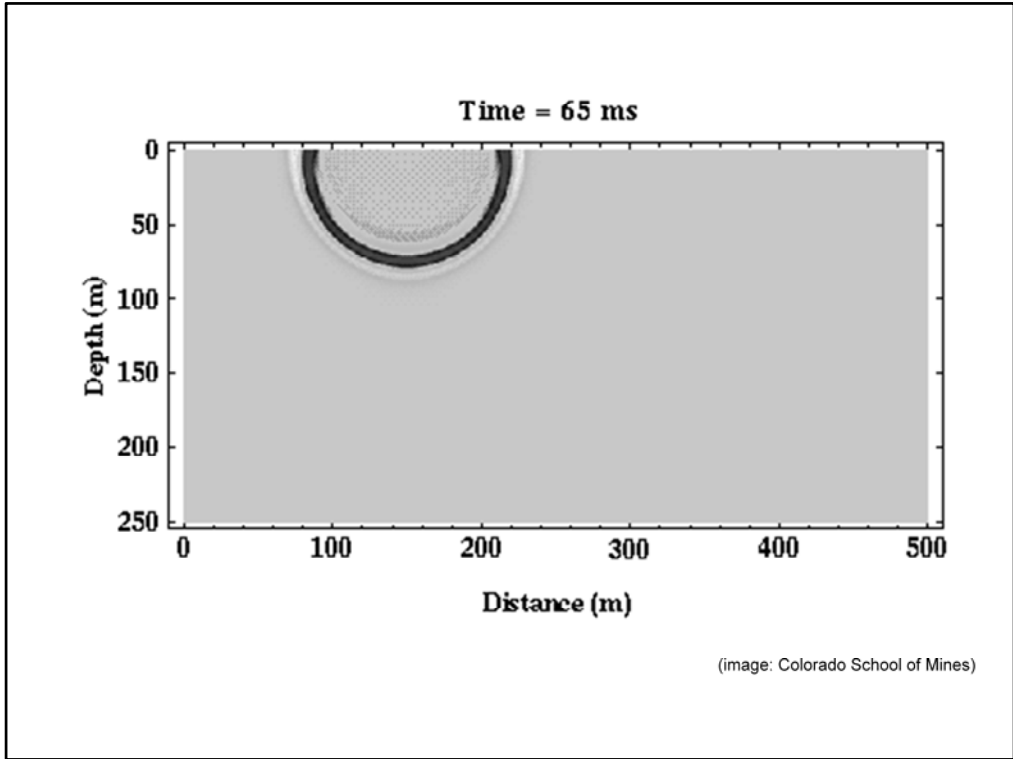


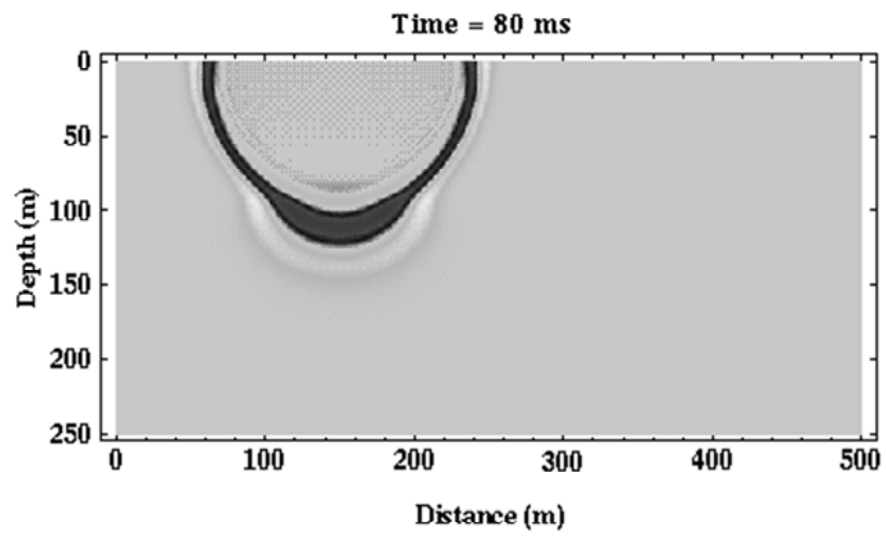
The wave with $r_i = 90^\circ$ that travels along the interface at V_{21} generates new 'reflected' waves in the upper layer at reflection angle i_c . These waves will arrive after the main reflected waves close to the critical distance, but since the head wave travels at V_{21} they will eventually get ahead and arrive first at a station some location beyond the critical distance

Velocity Model

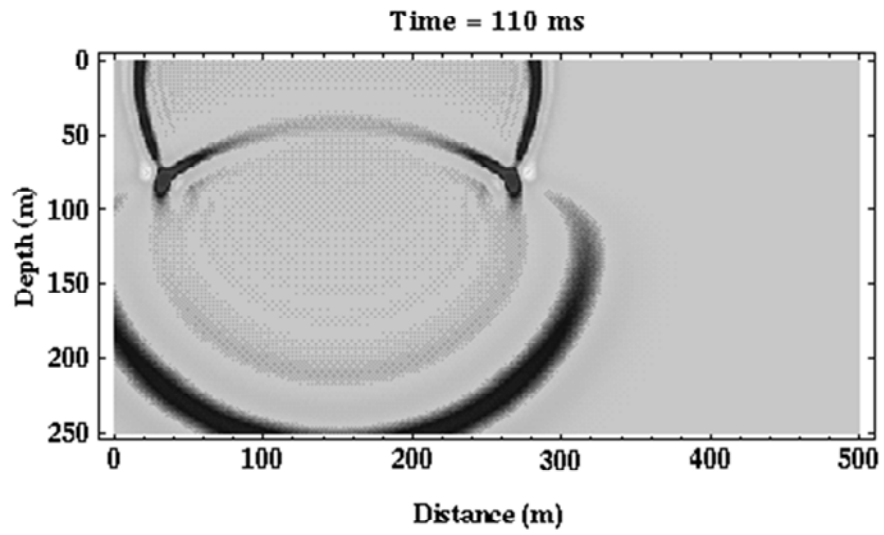


(image: Colorado School of Mines)

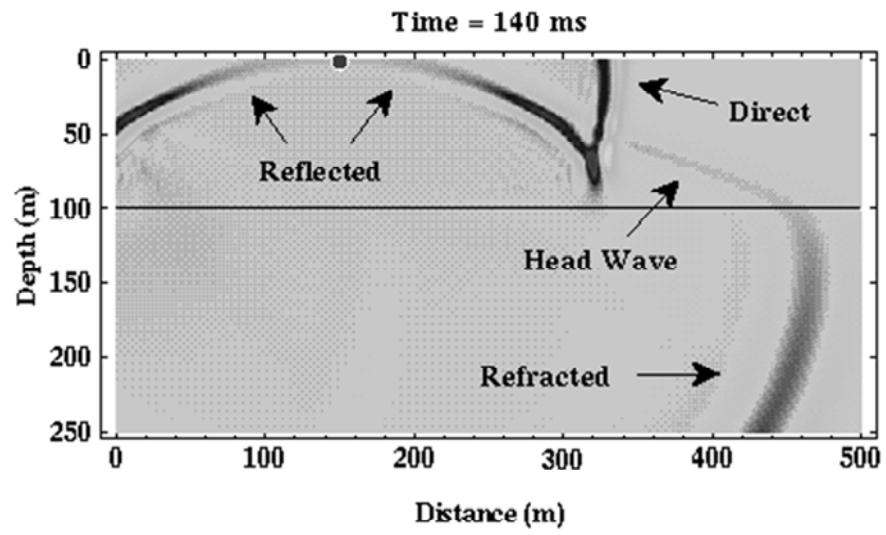




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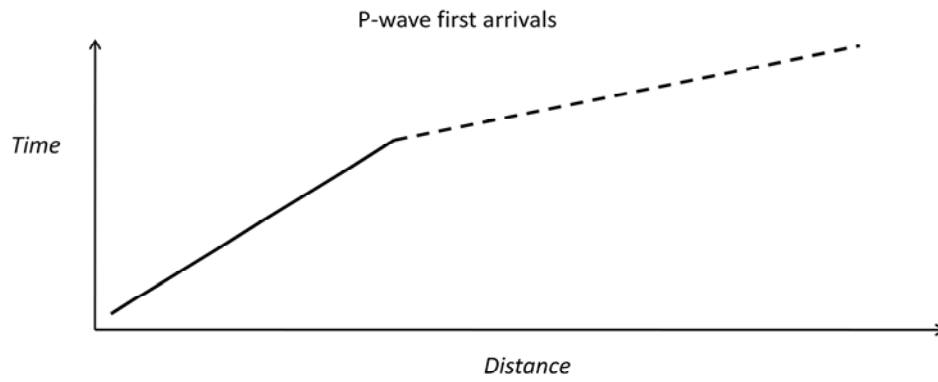
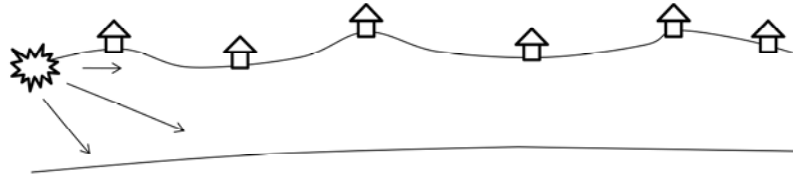


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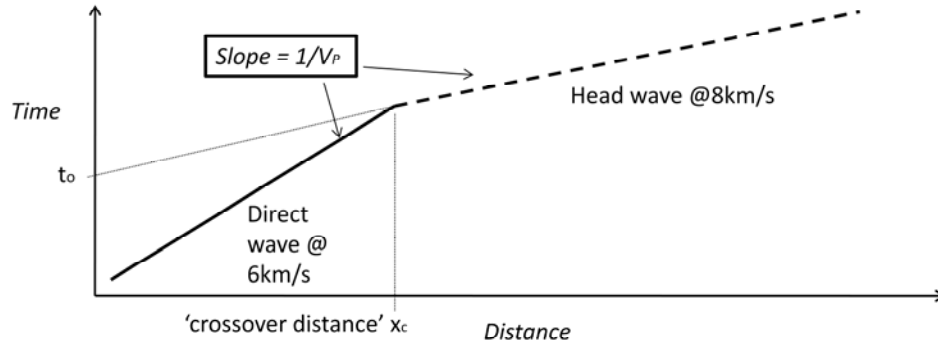
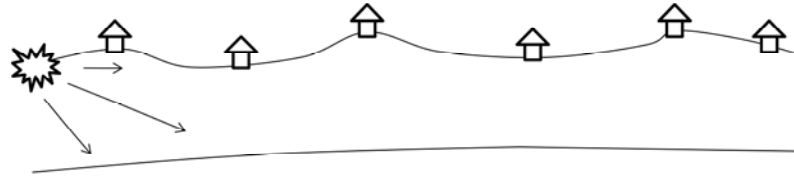


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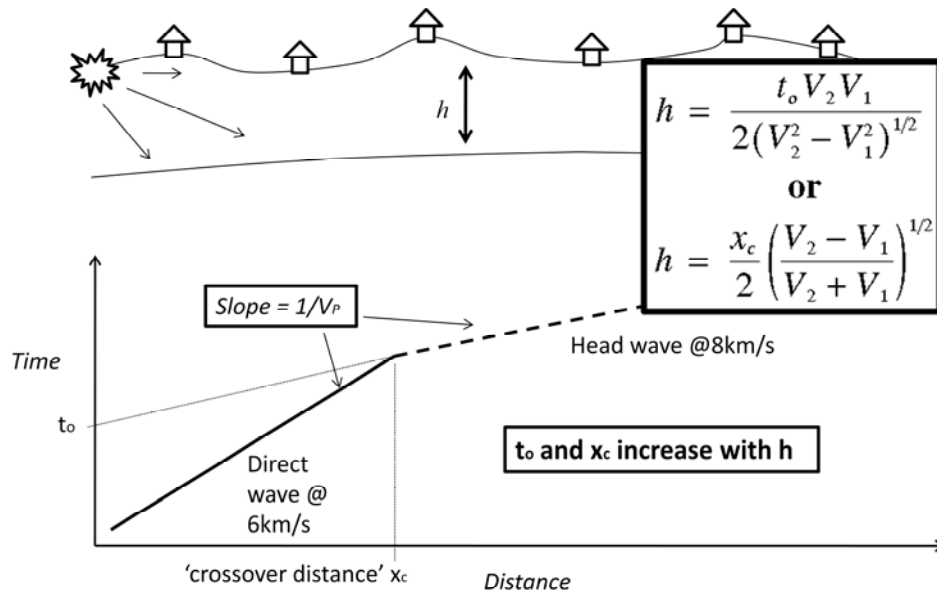
What did Mohorovic do in 1909 to discover the crust-mantle boundary?



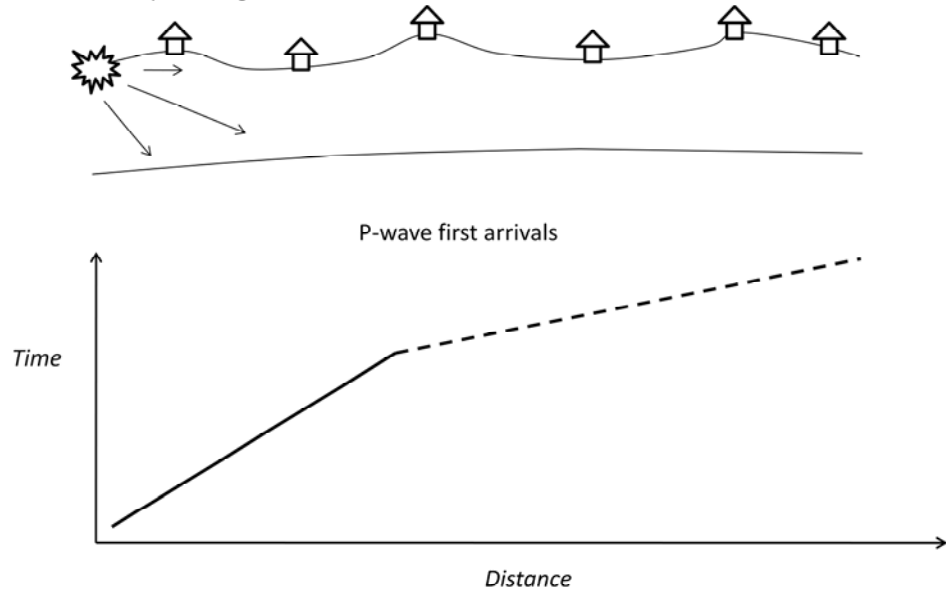
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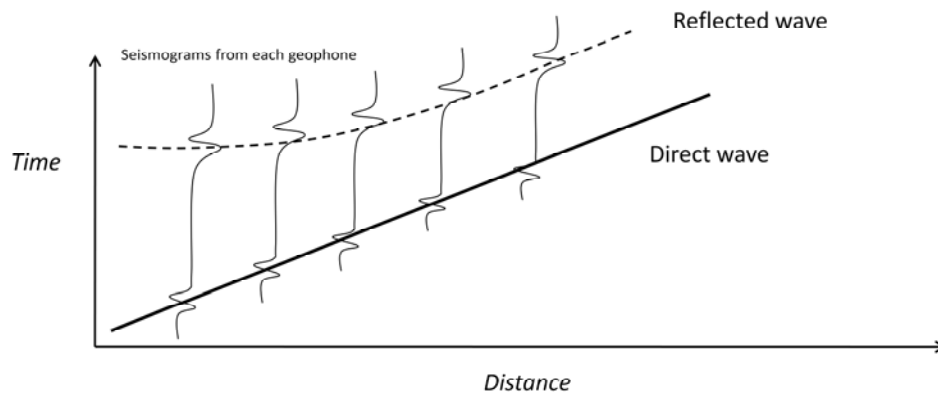
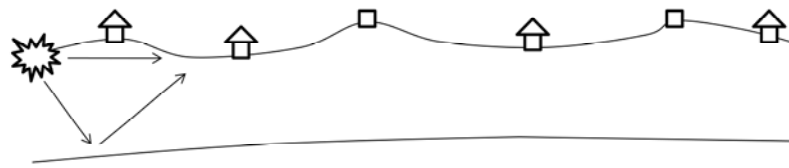
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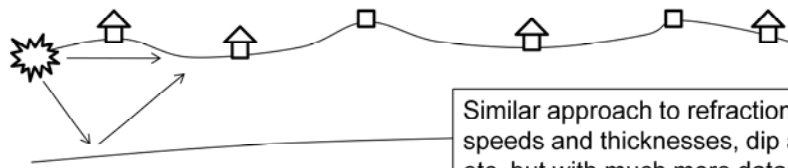
This is the basis for all 'refraction' studies: use only 1st arrival times and distances to determine depth to *higher V* interface



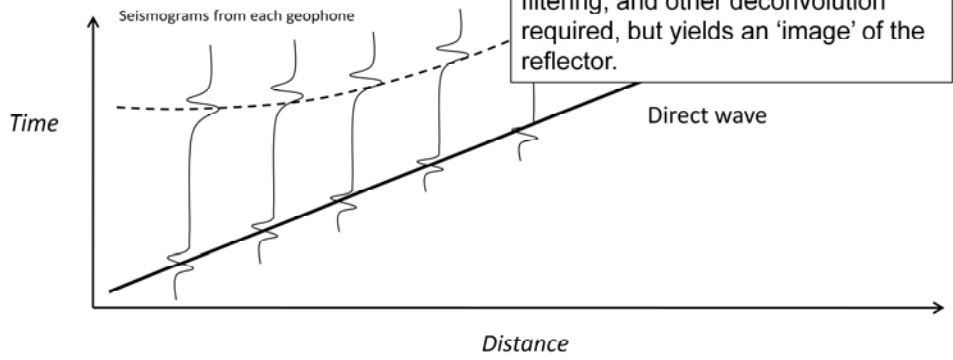
Reflection Profiling:

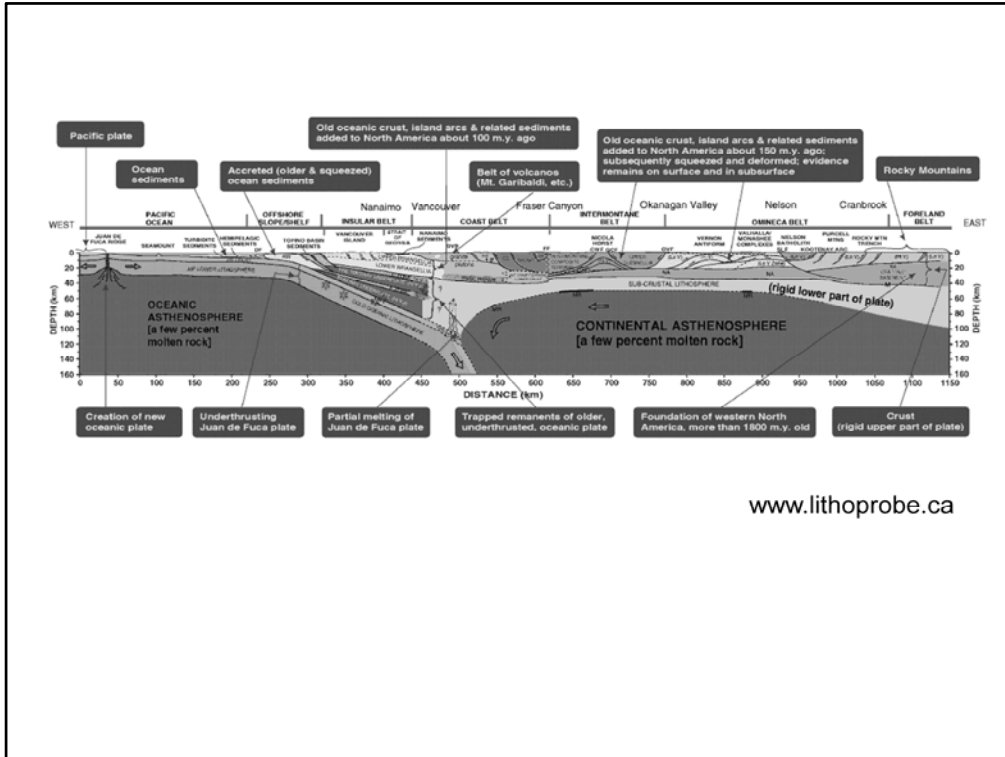


Reflection Profiling:



Similar approach to refraction to get speeds and thicknesses, dip angles, etc, but with much more data and processing required. Stacking, filtering, and other deconvolution required, but yields an 'image' of the reflector.





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