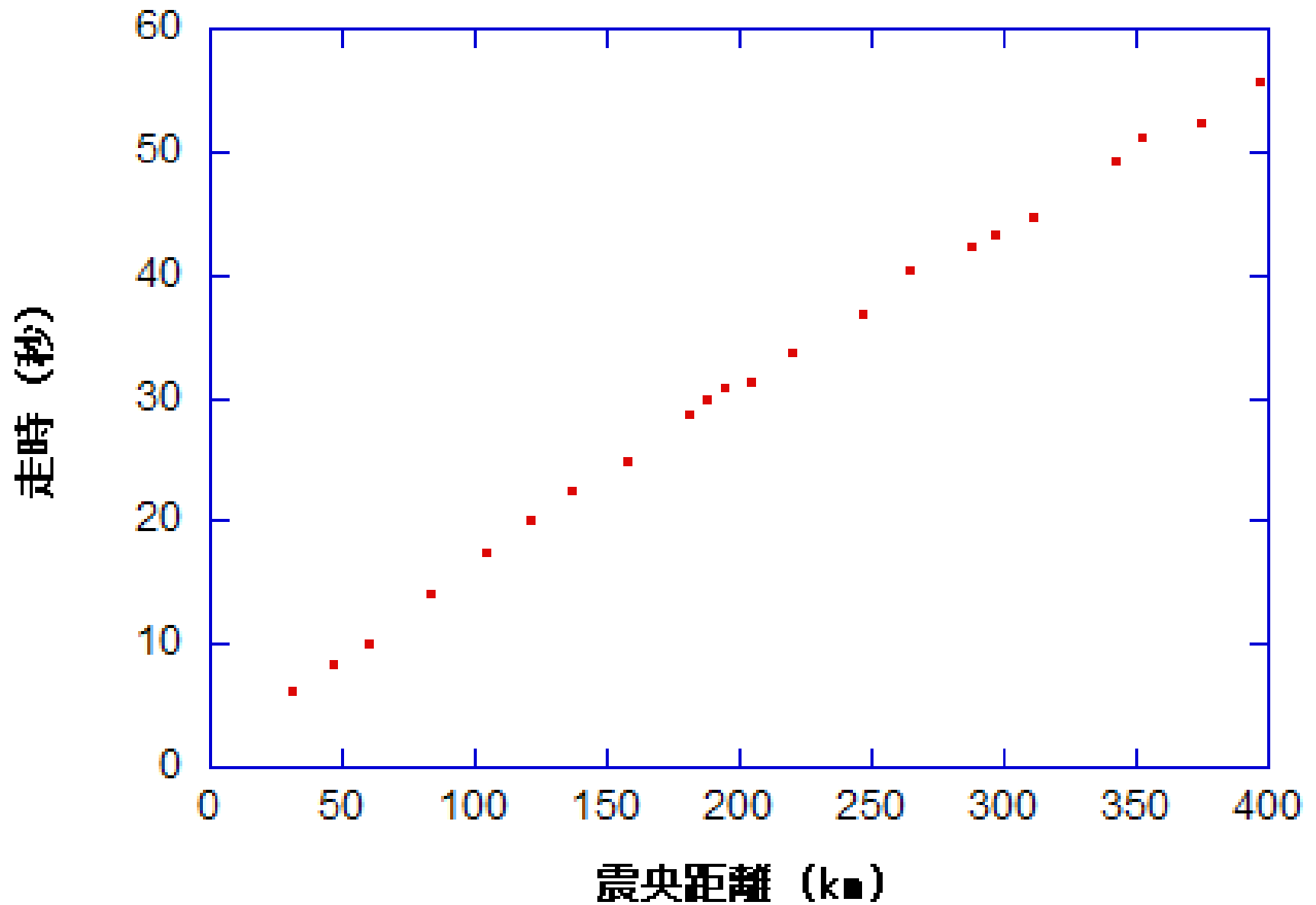


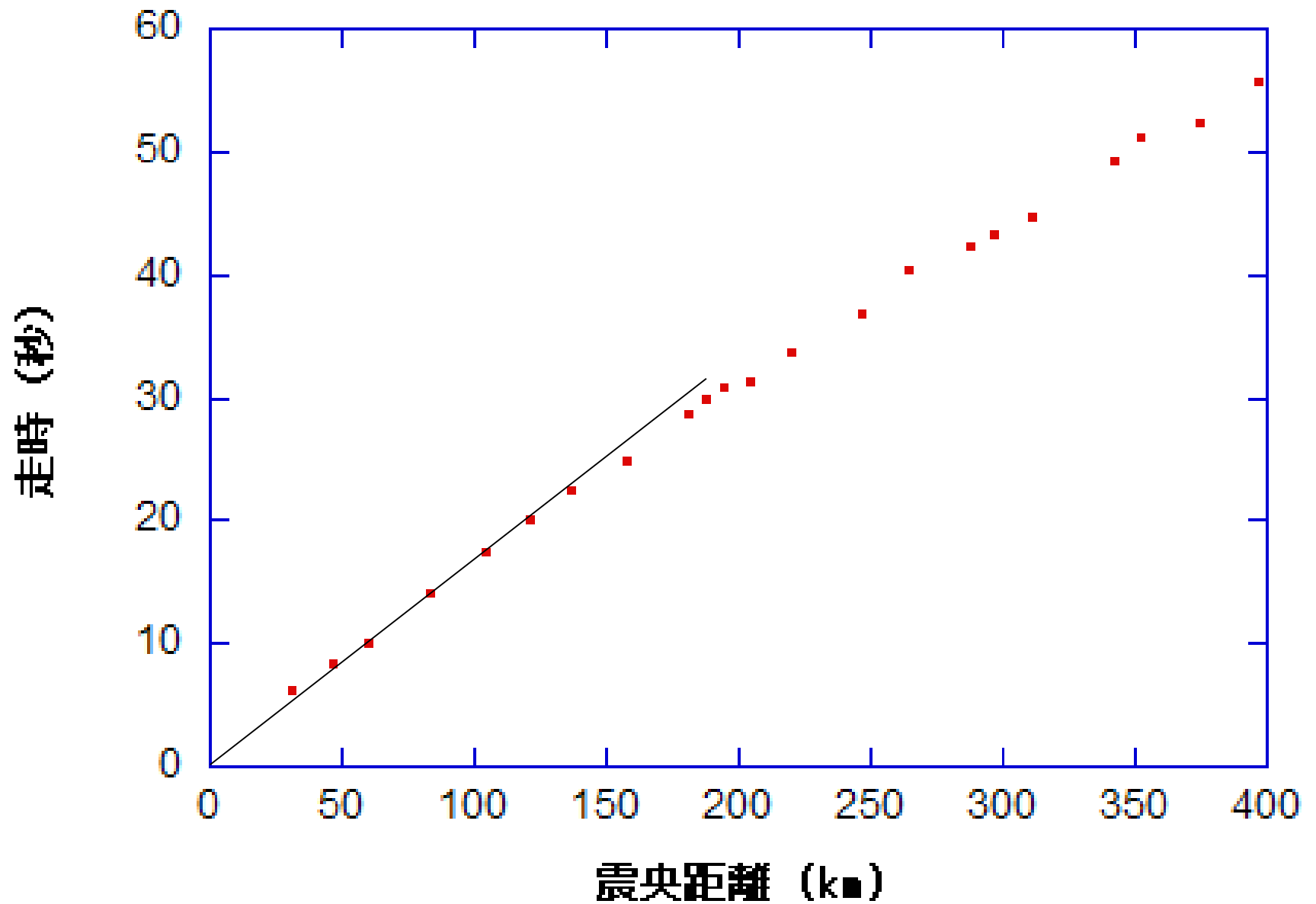
地球内部物理学

2019.12.20

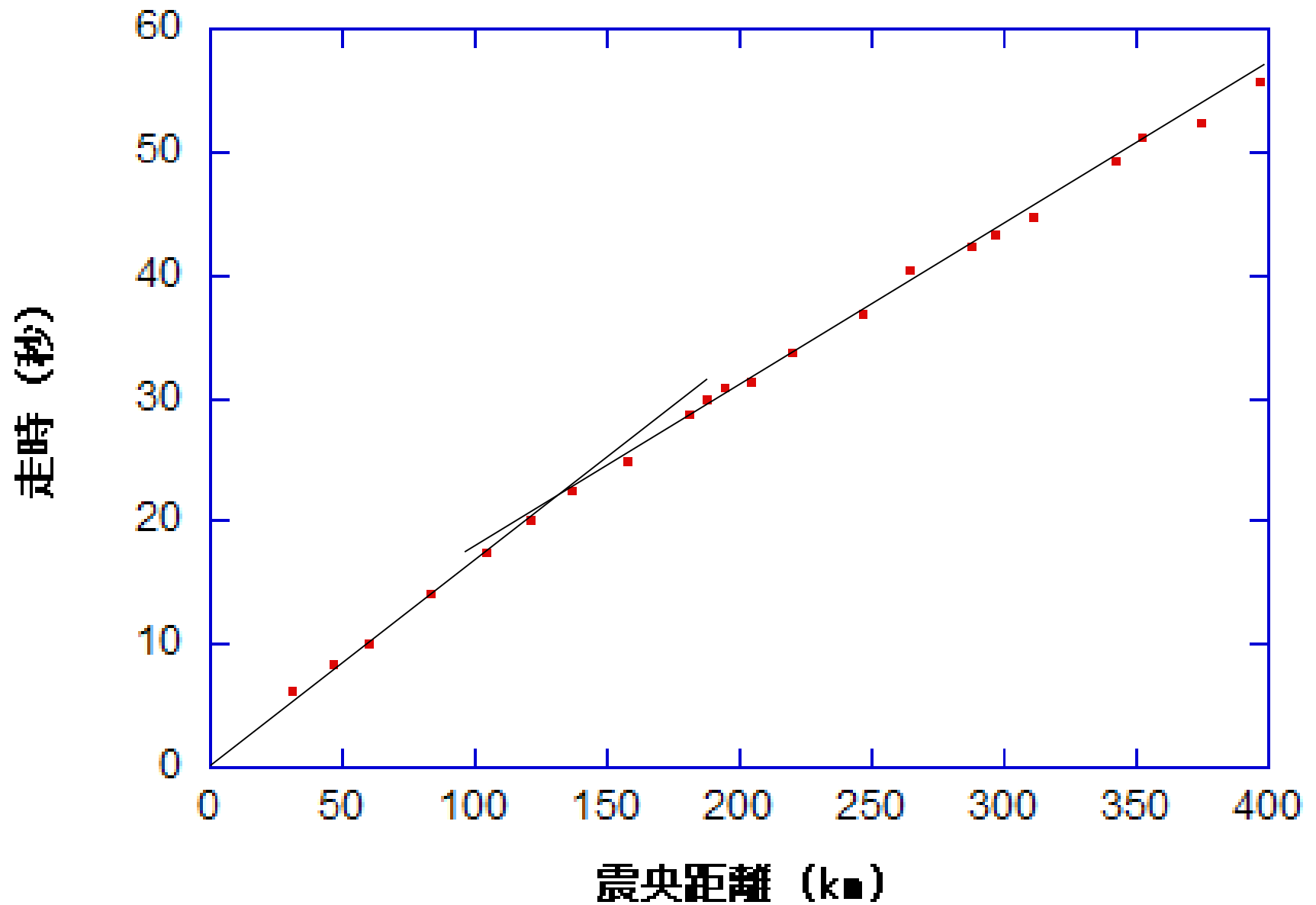
兵庫県南部地震



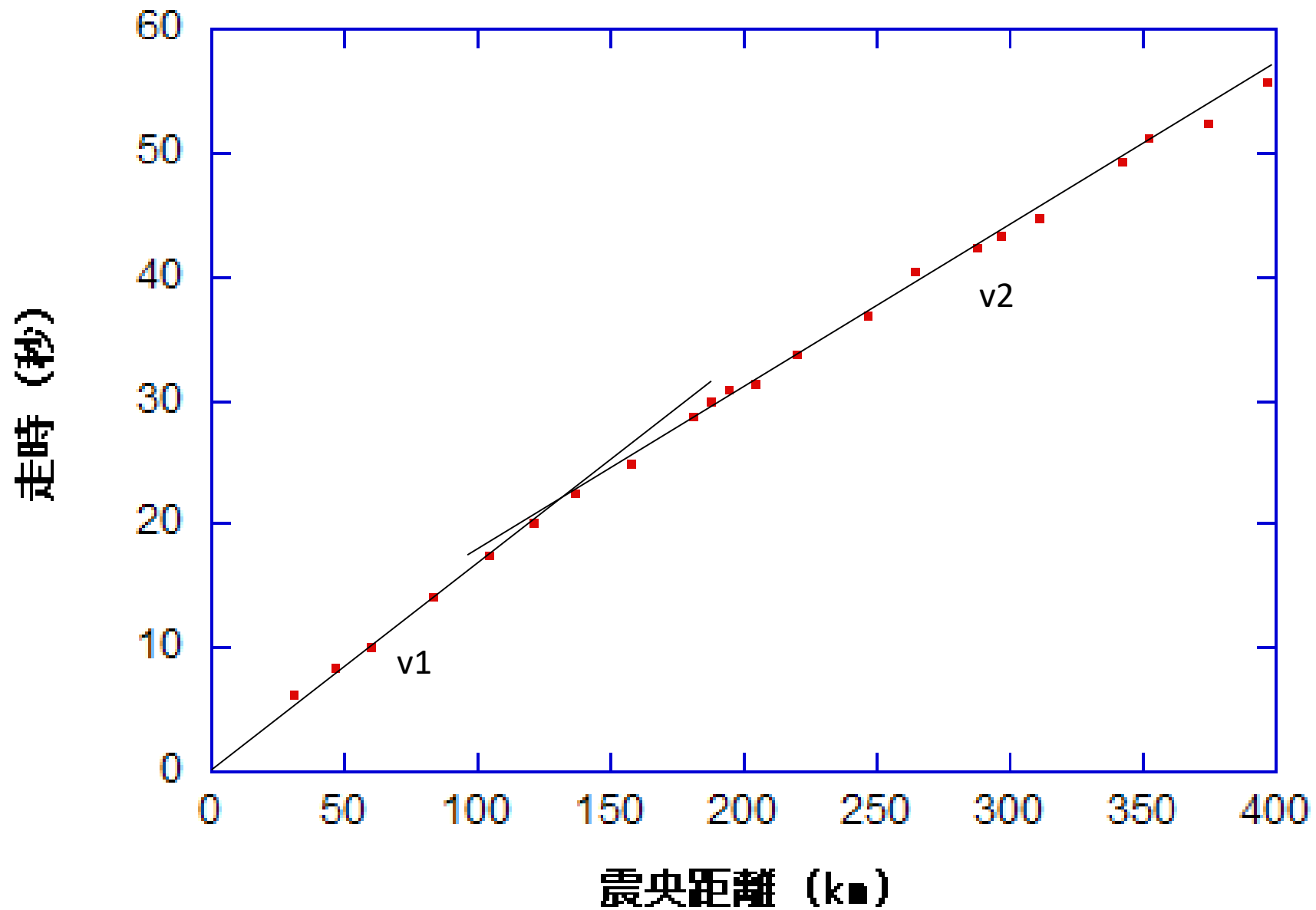
兵庫県南部地震



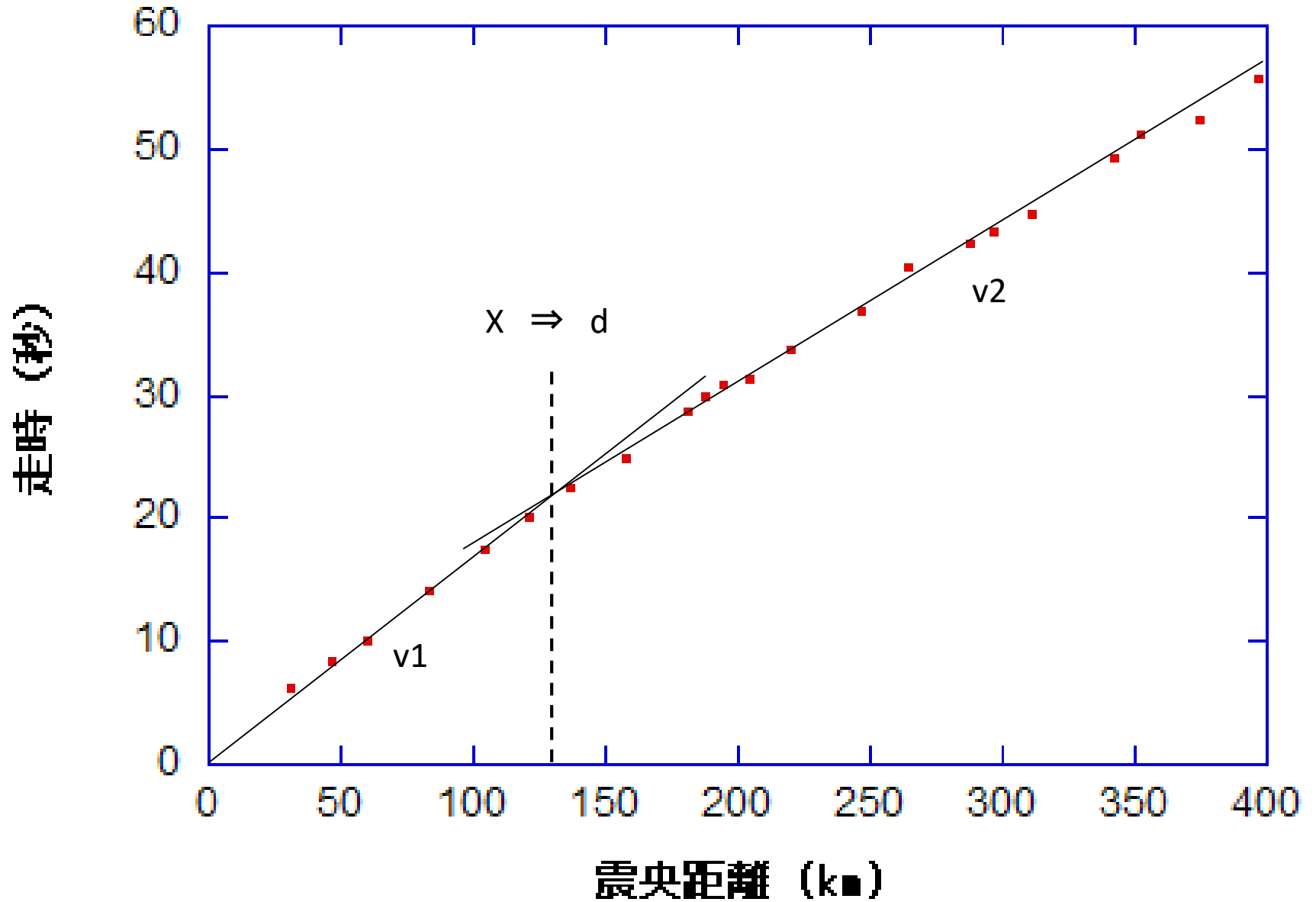
兵庫県南部地震



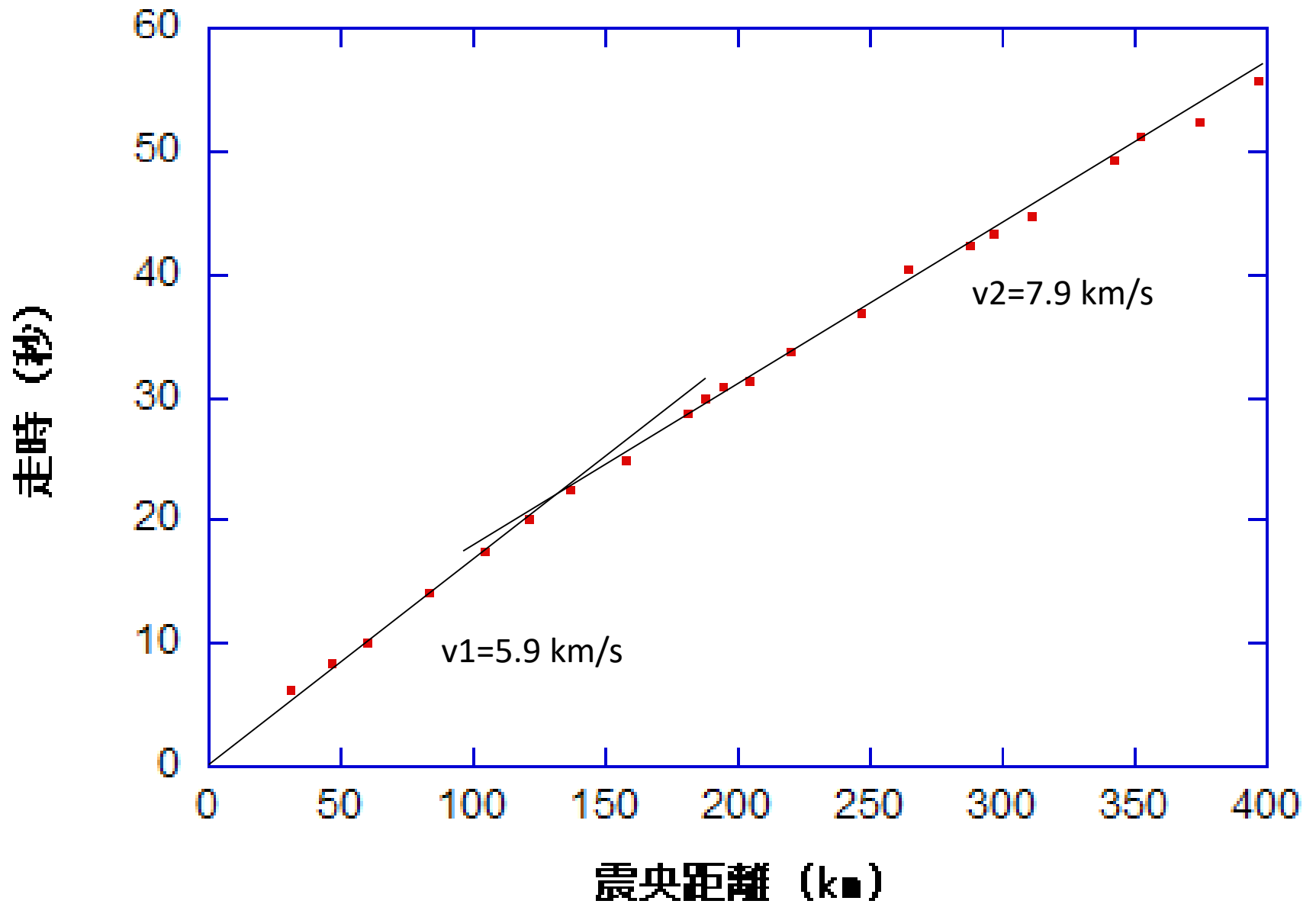
兵庫県南部地震



兵庫県南部地震

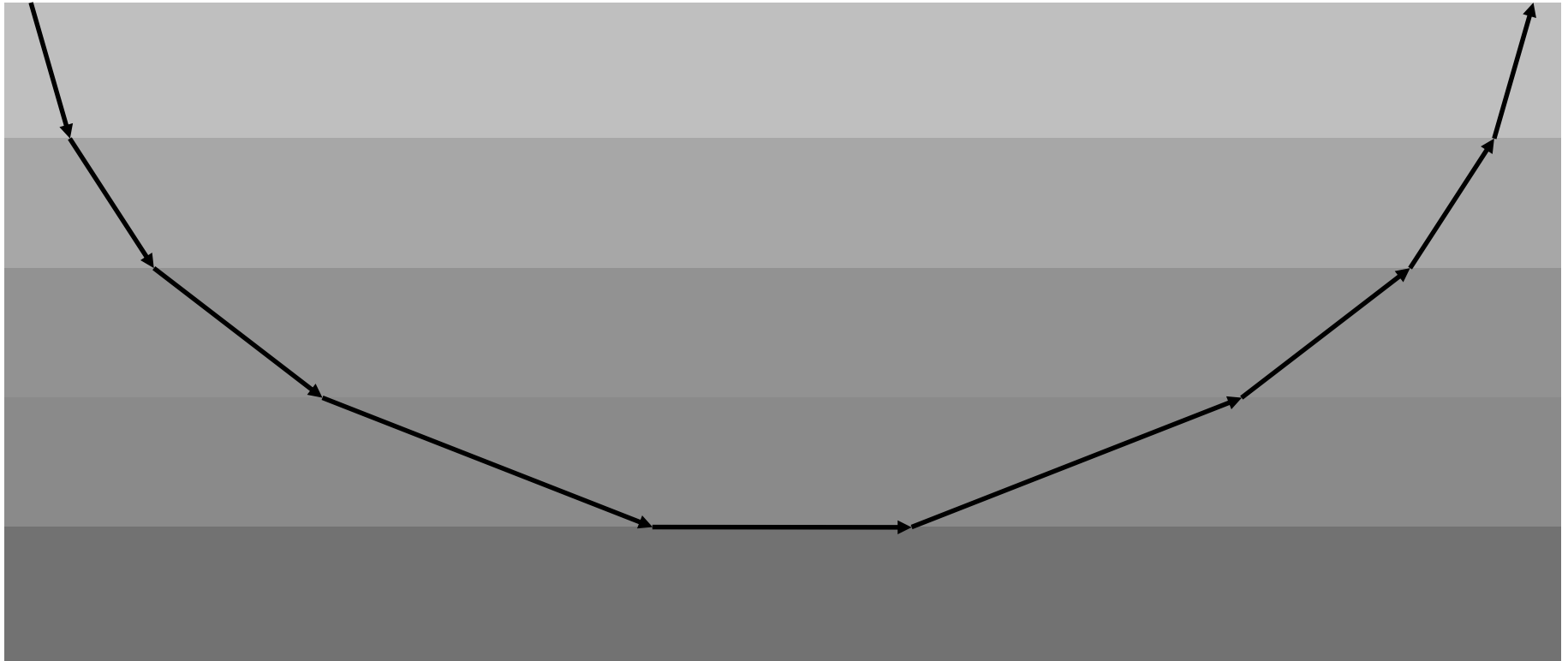


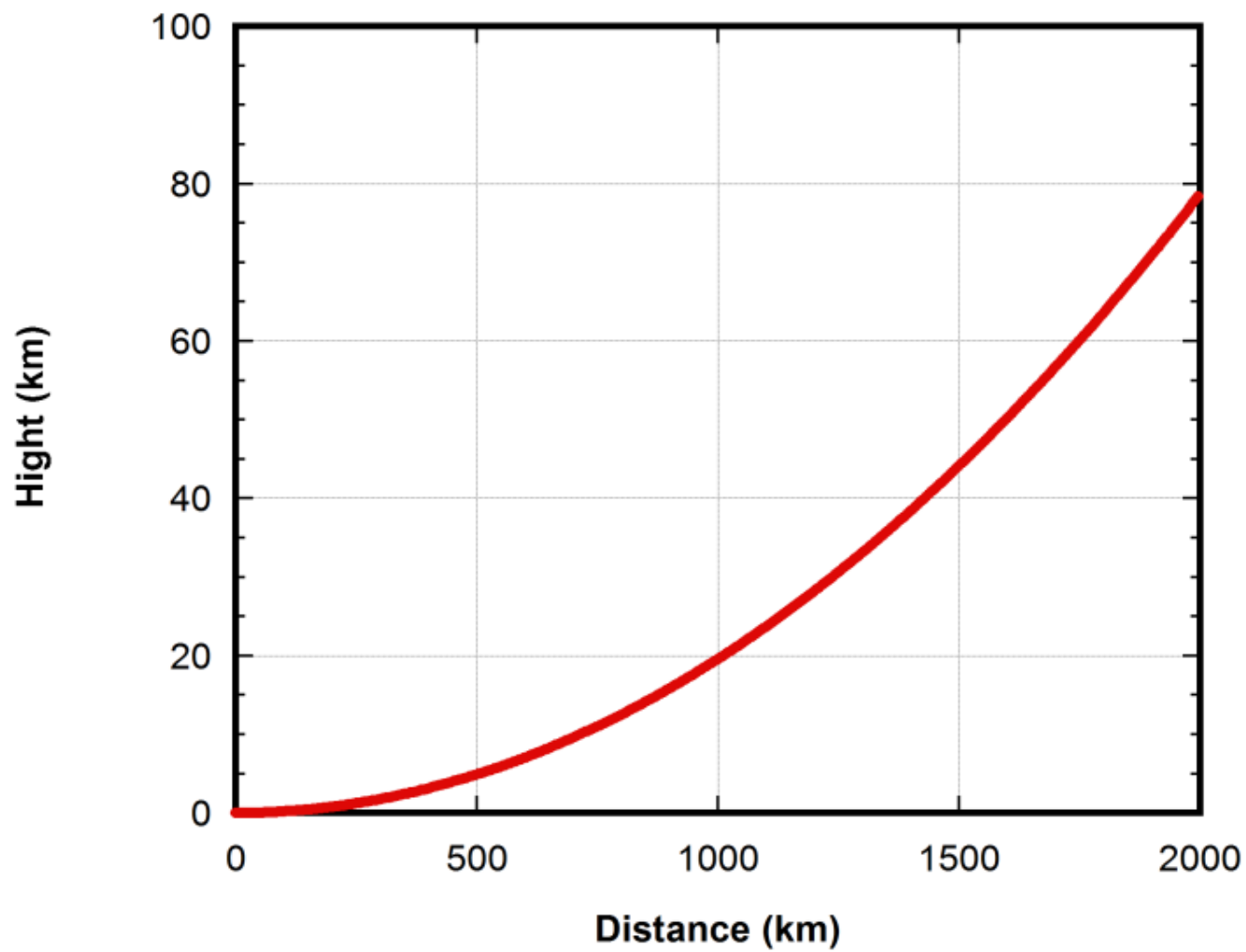
兵庫県南部地震

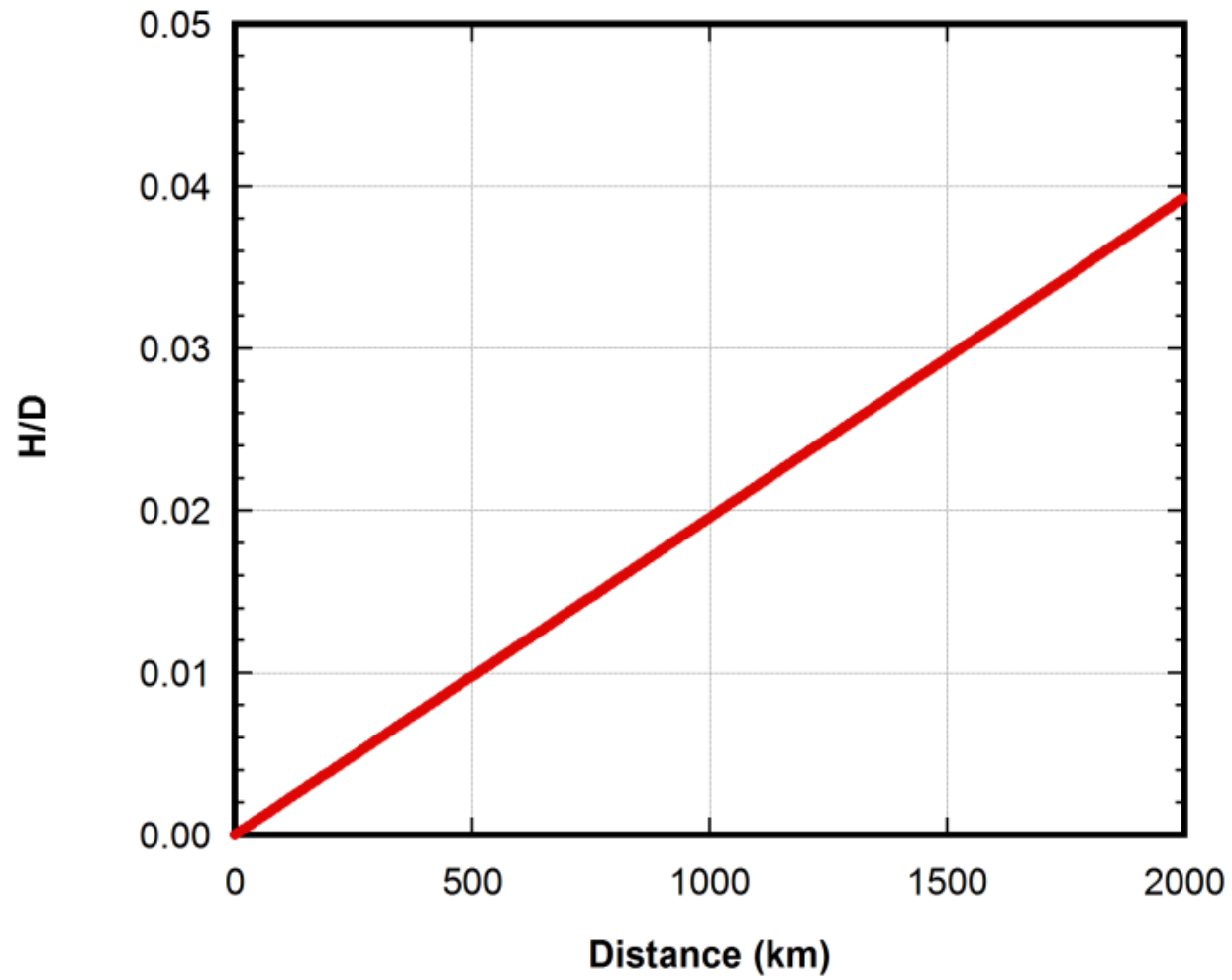


地震波の伝播

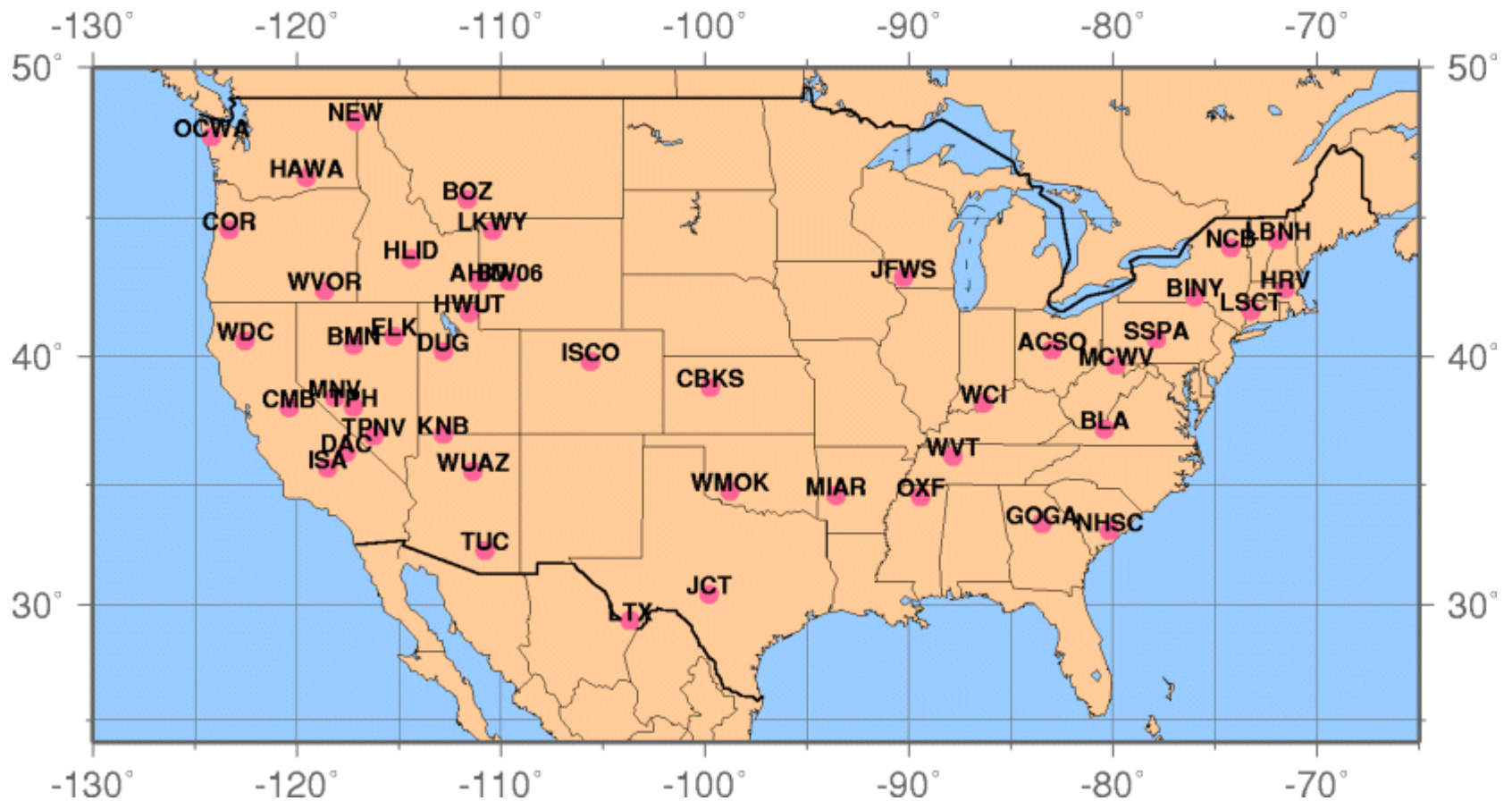
深いほど速度が速ければ、入射した波はいずれ戻ってくる



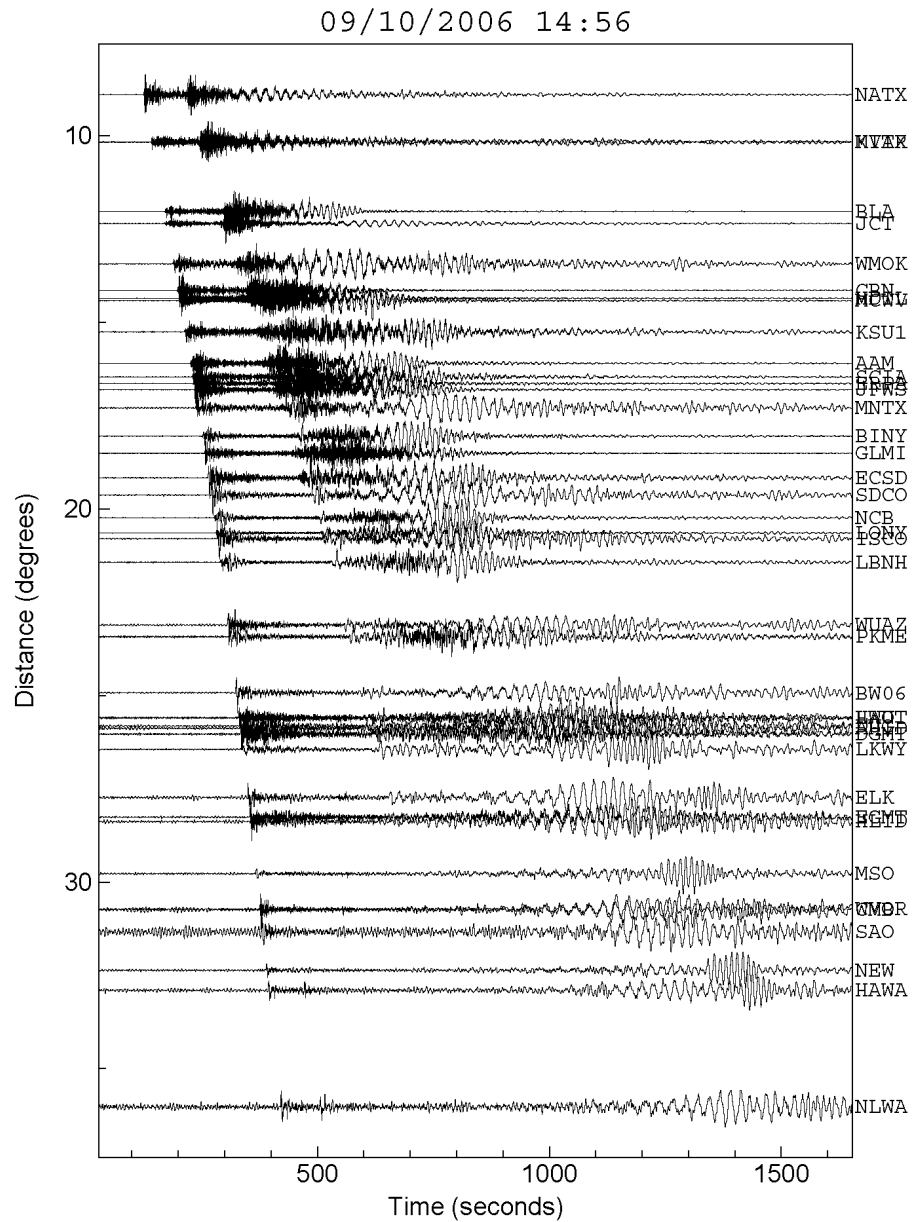




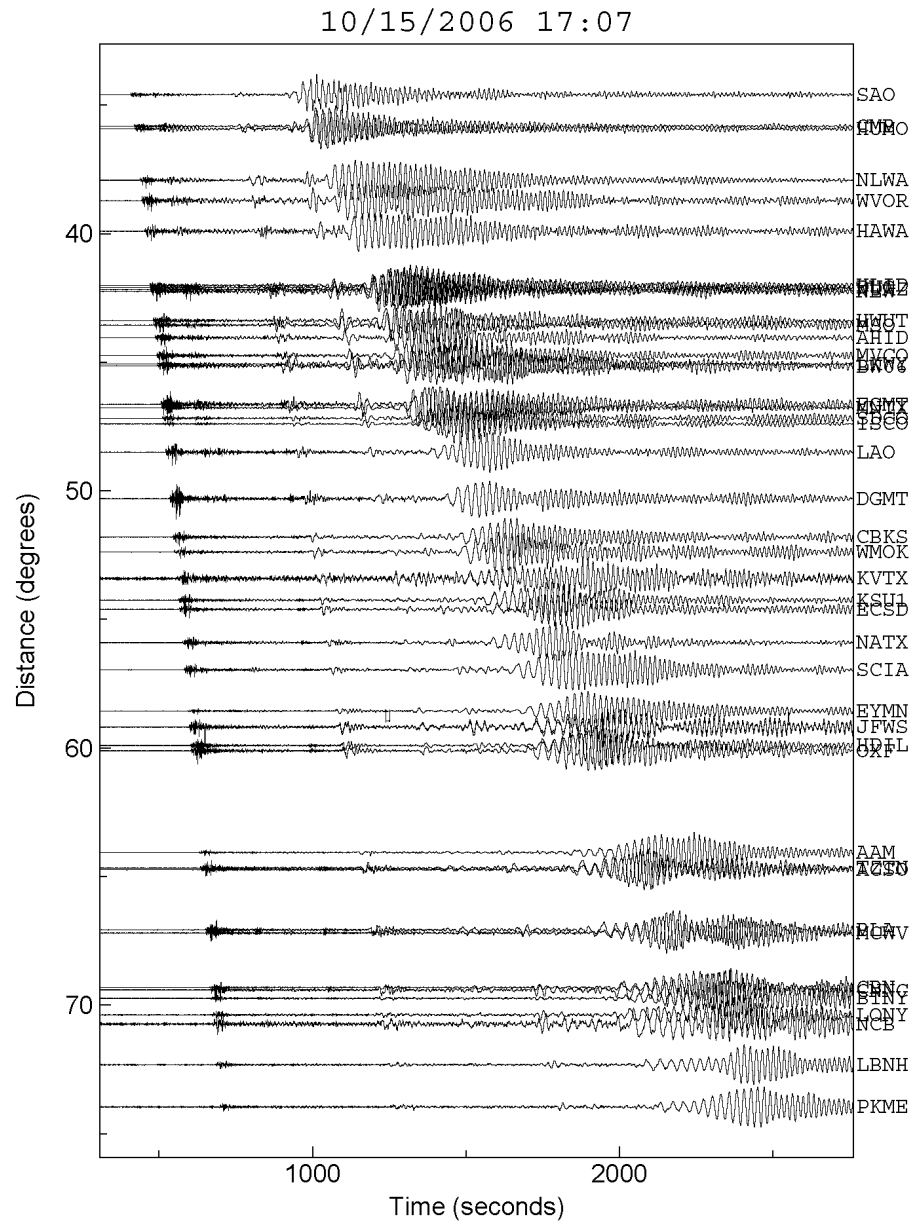
アメリカ地質調査所の観測網



Gulf of Mexico (M6.0)



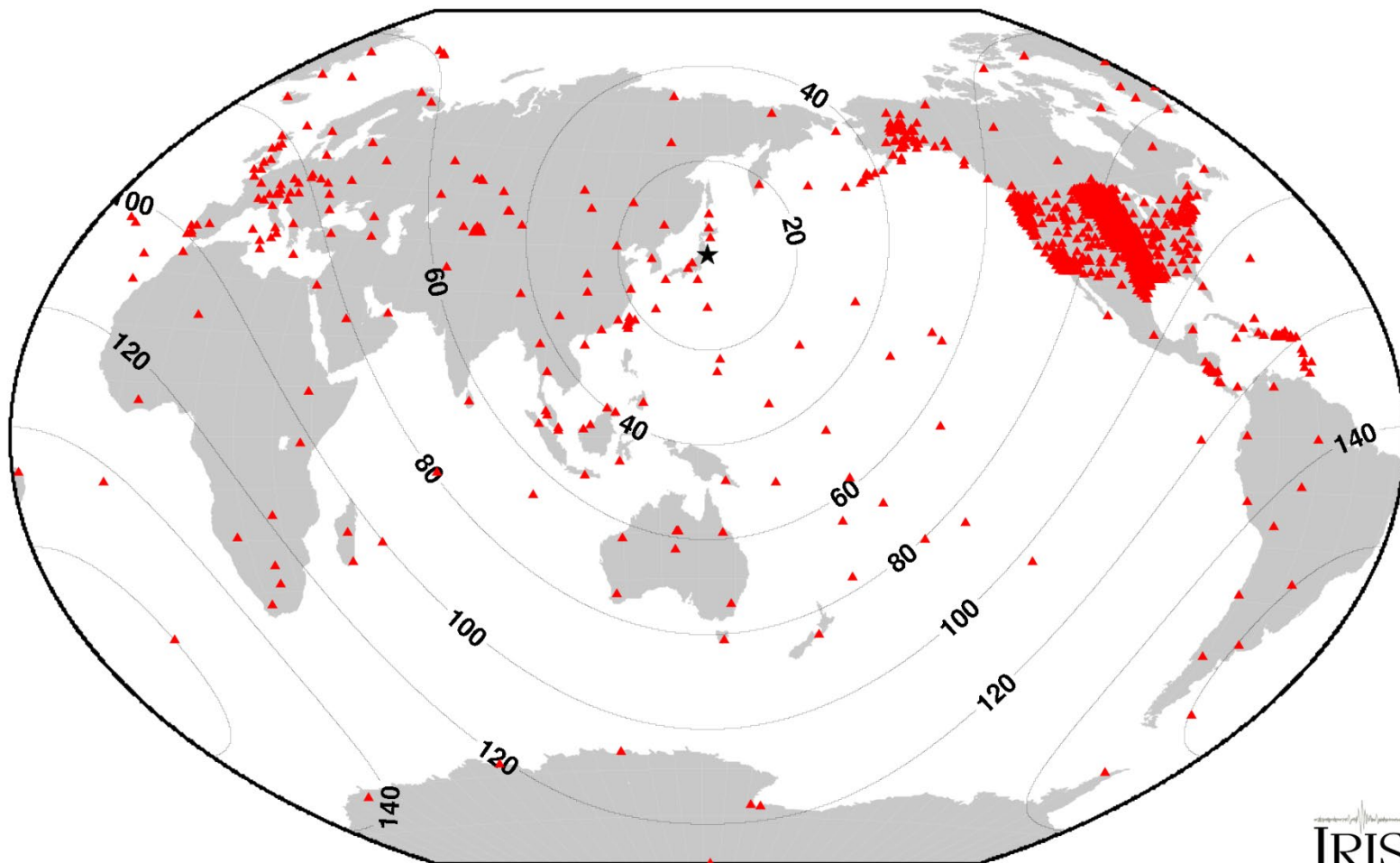
Hawaii (M6.7)



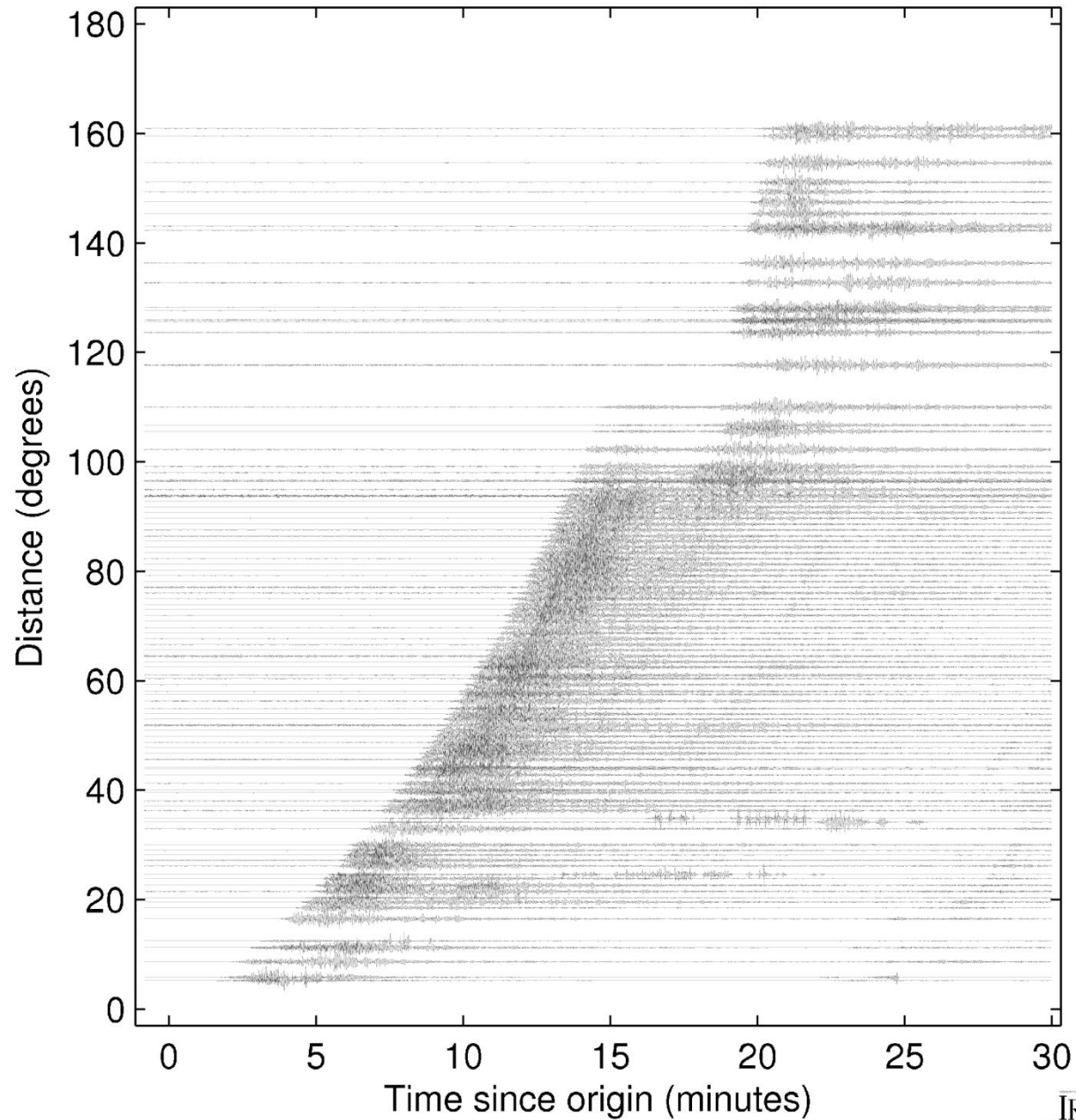
2011年3月11日 東北地方太平洋沖地震

Broadband stations

2011/03/11 05:46:23 M8.9 Z=24.4km Lat=38.3215 Lon=142.3693
NEAR EAST COAST OF HONSHU, JAPAN

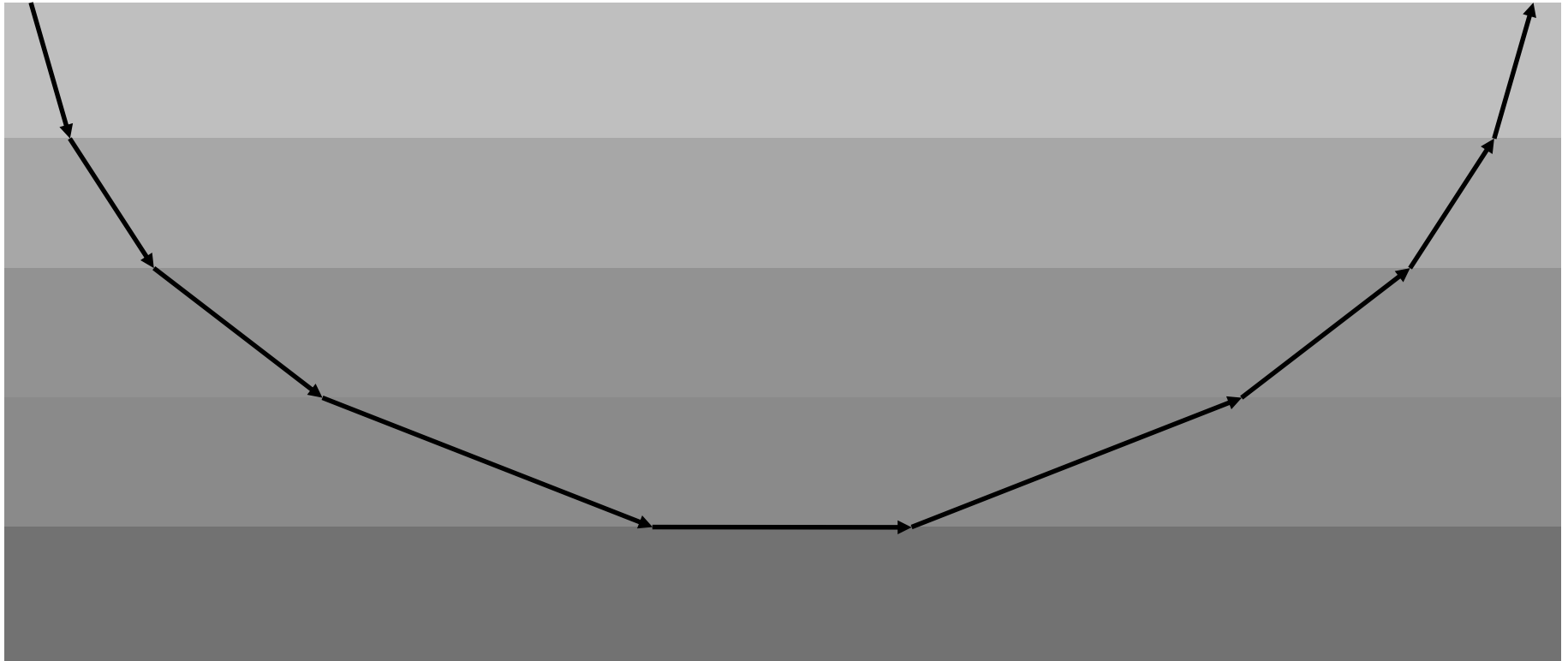


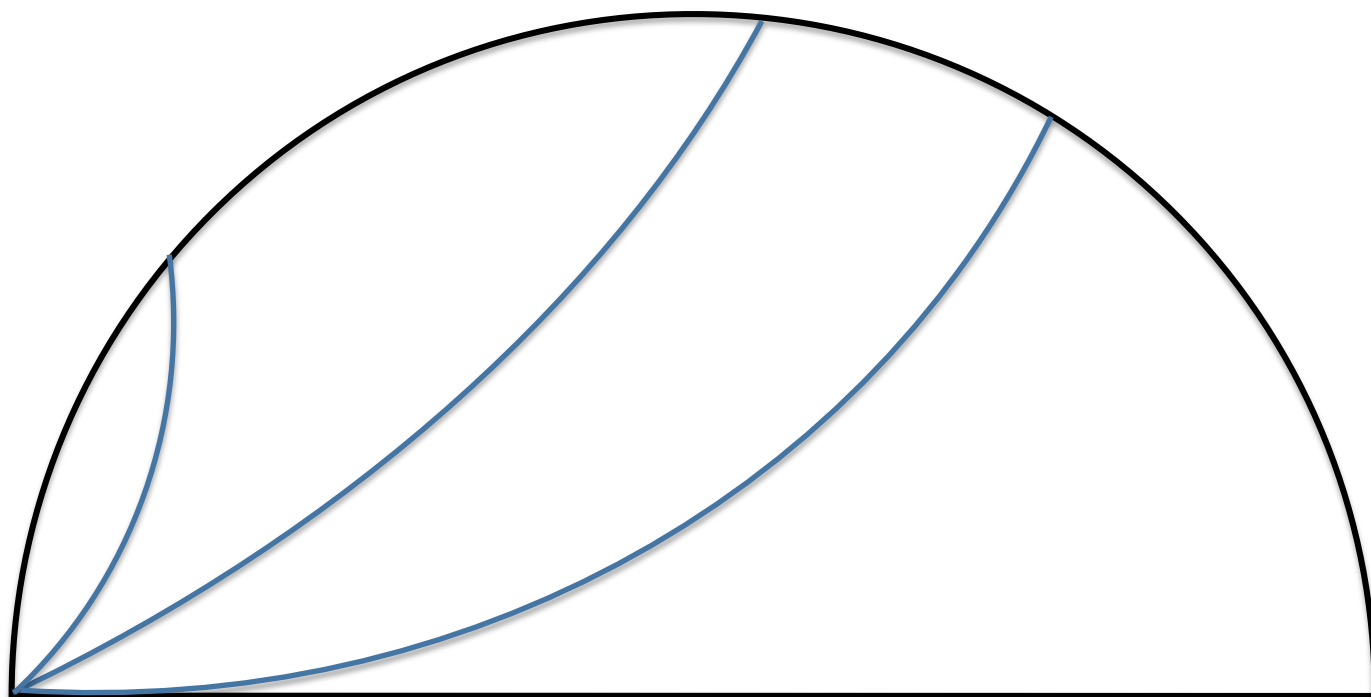
Combed and aligned on origin 0.3 – 1.0 Hz BHZ
NEAR EAST COAST OF HONSHU, JAPAN
2011/03/11 05:46:23 M8.9 Z=24.4km Lat=38.3215 Lon=142.3693



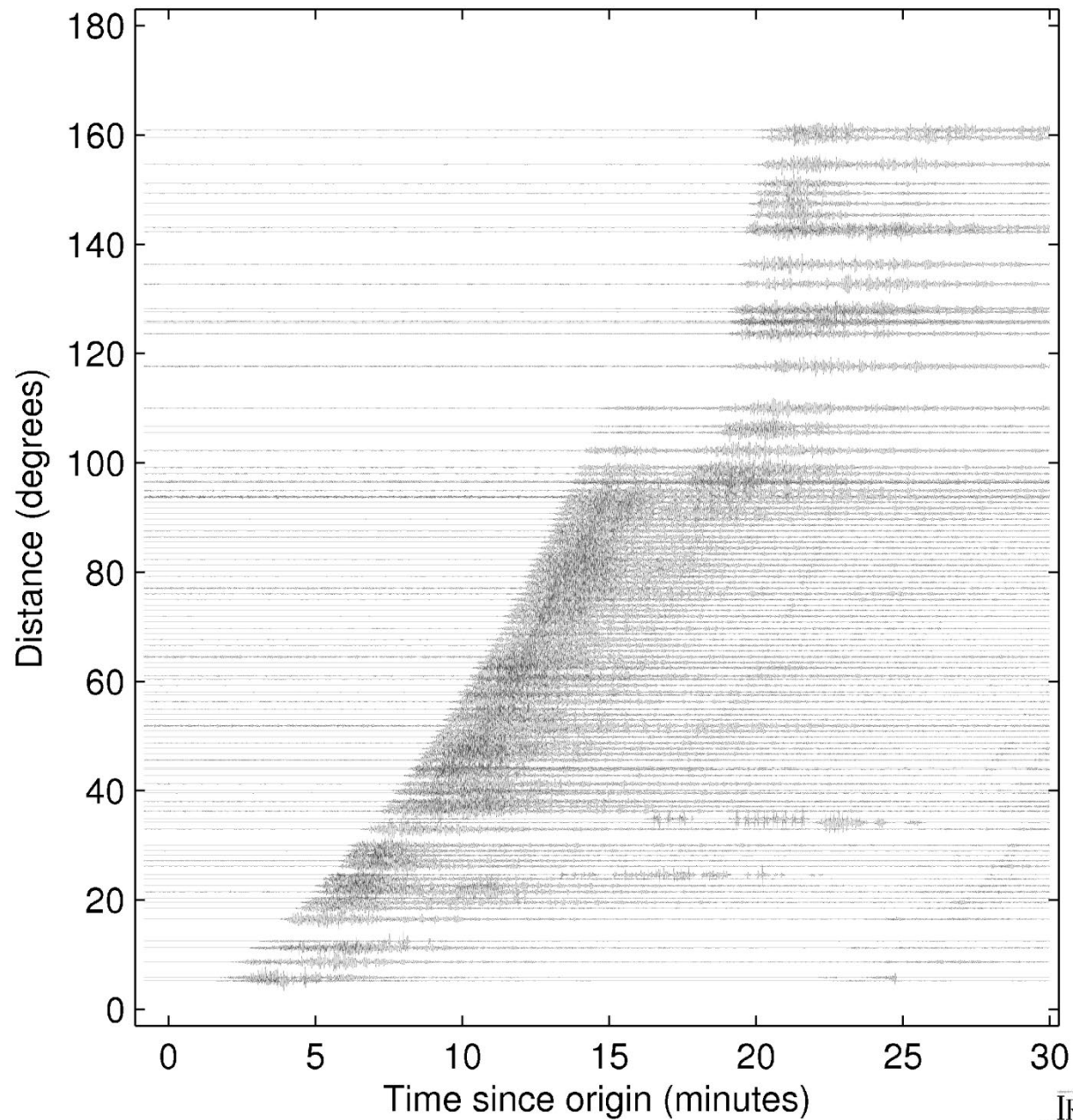
地震波の伝播

深いほど速度が速ければ、入射した波はいずれ戻ってくる

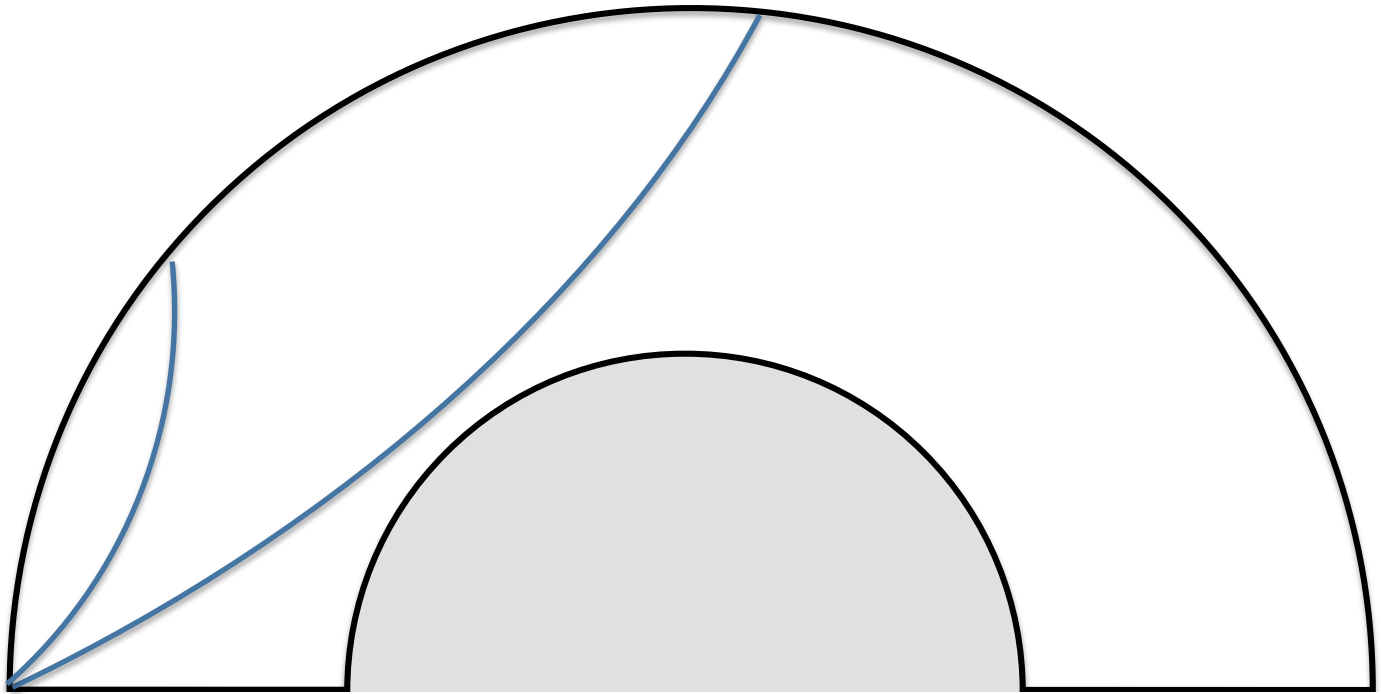




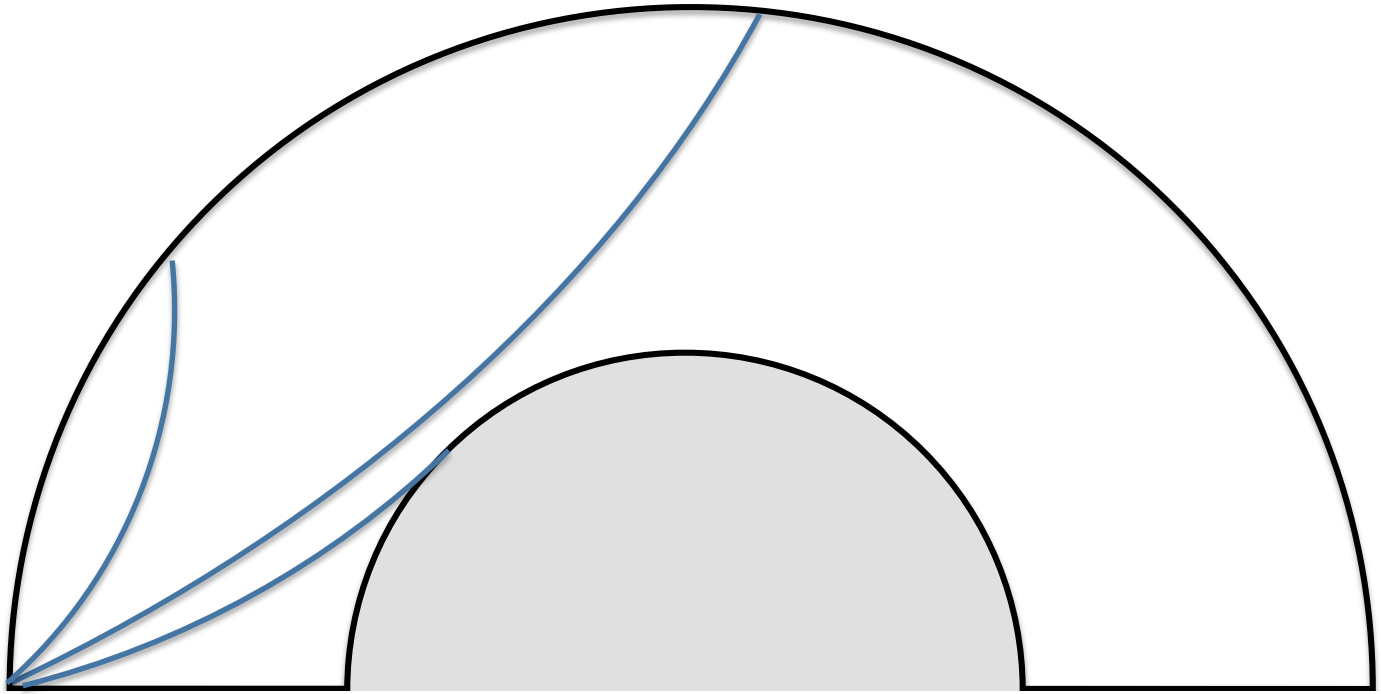
Combed and aligned on origin 0.3 – 1.0 Hz BHZ
NEAR EAST COAST OF HONSHU, JAPAN
2011/03/11 05:46:23 M8.9 Z=24.4km Lat=38.3215 Lon=142.3693



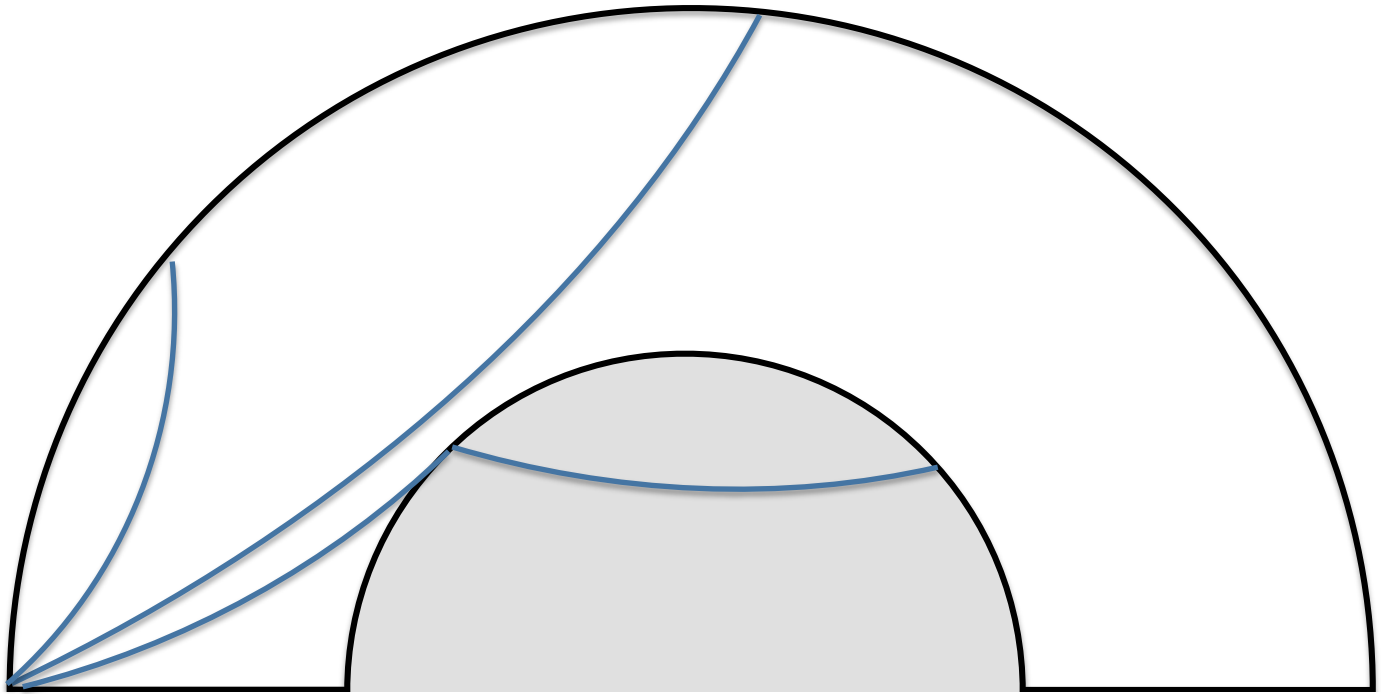
もし深い方が遅くなっていると



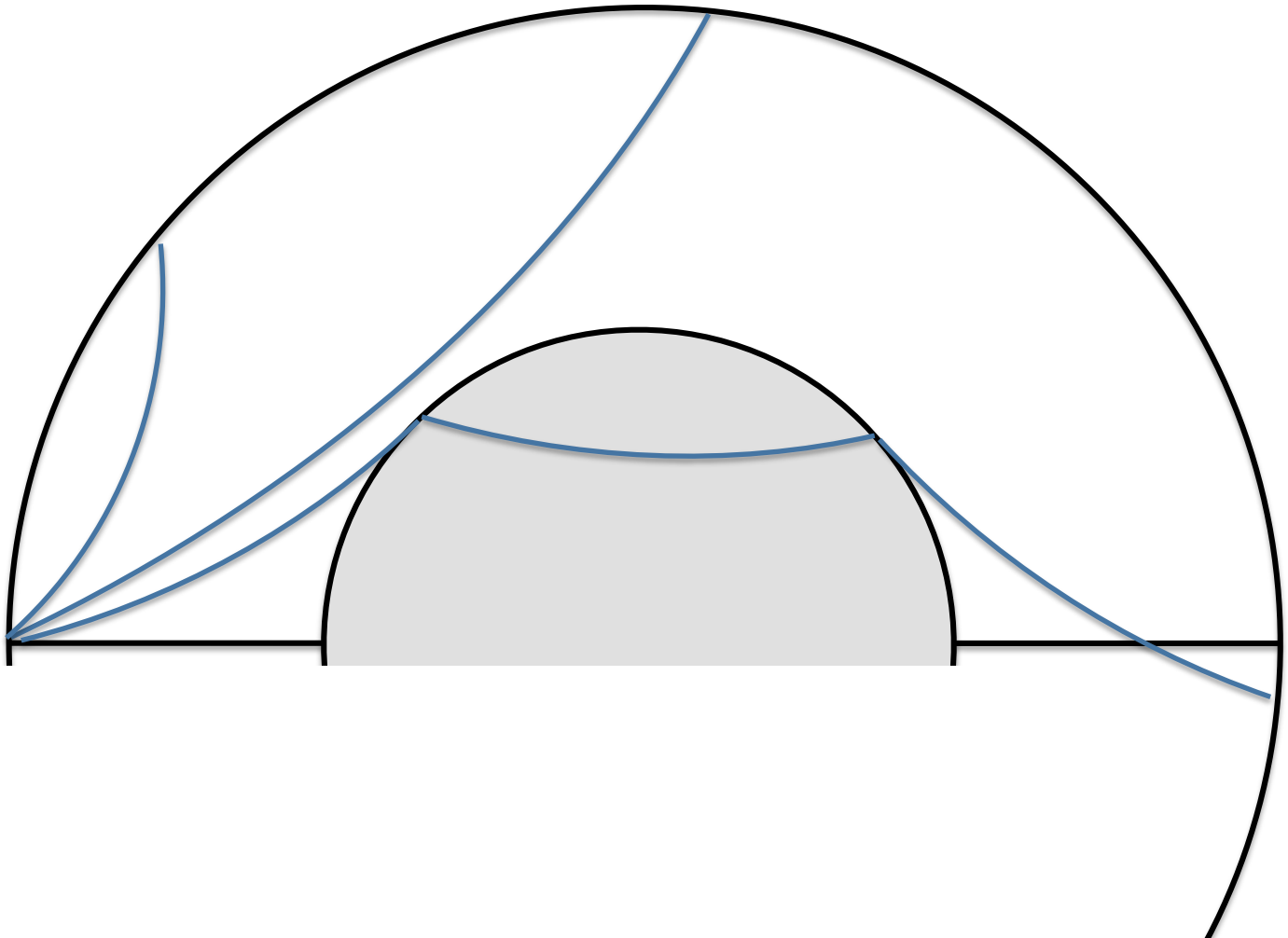
もし深い方が遅くなっていると



もし深い方が遅くなっていると

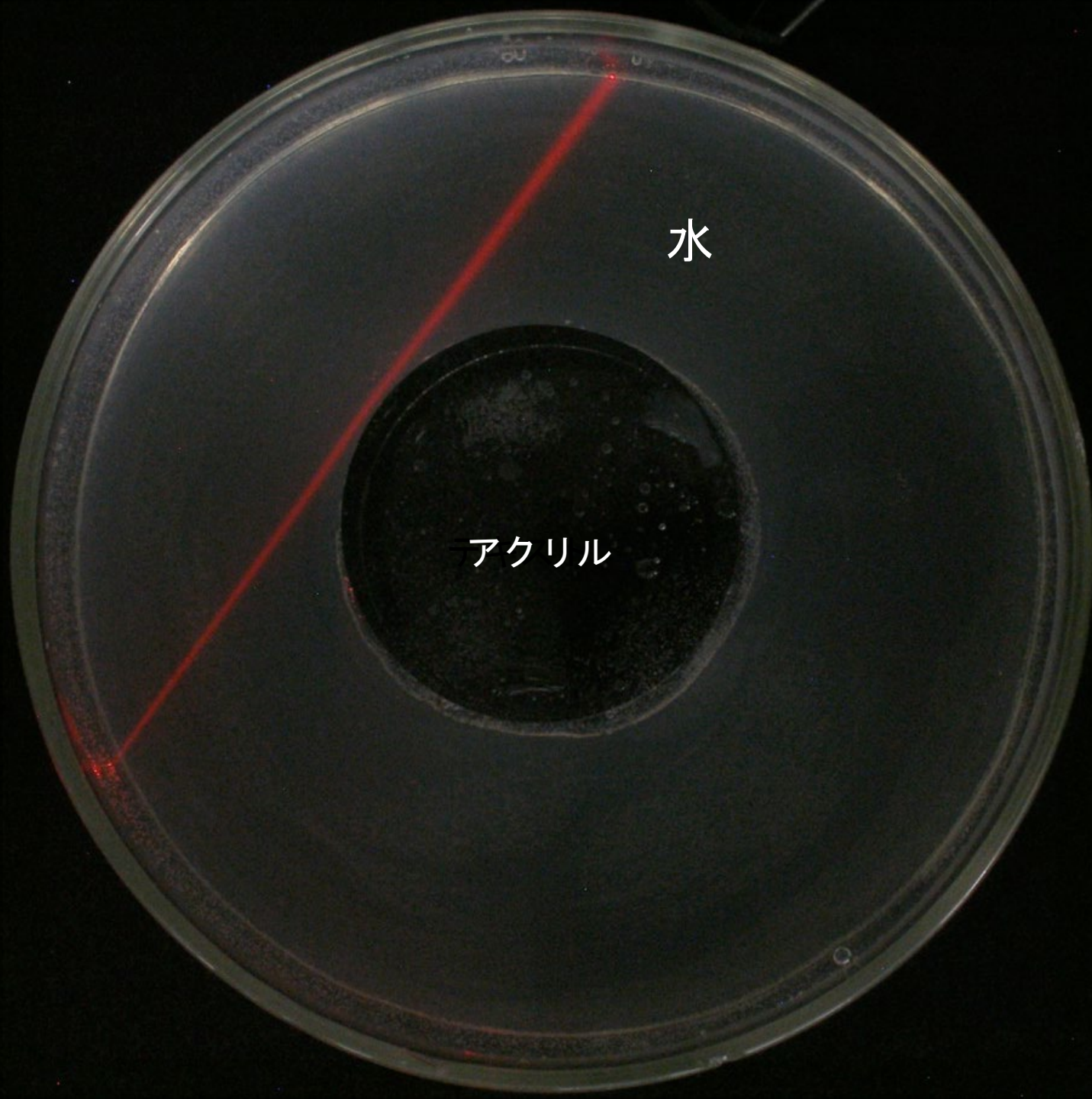


もし深い方が遅くなっていると



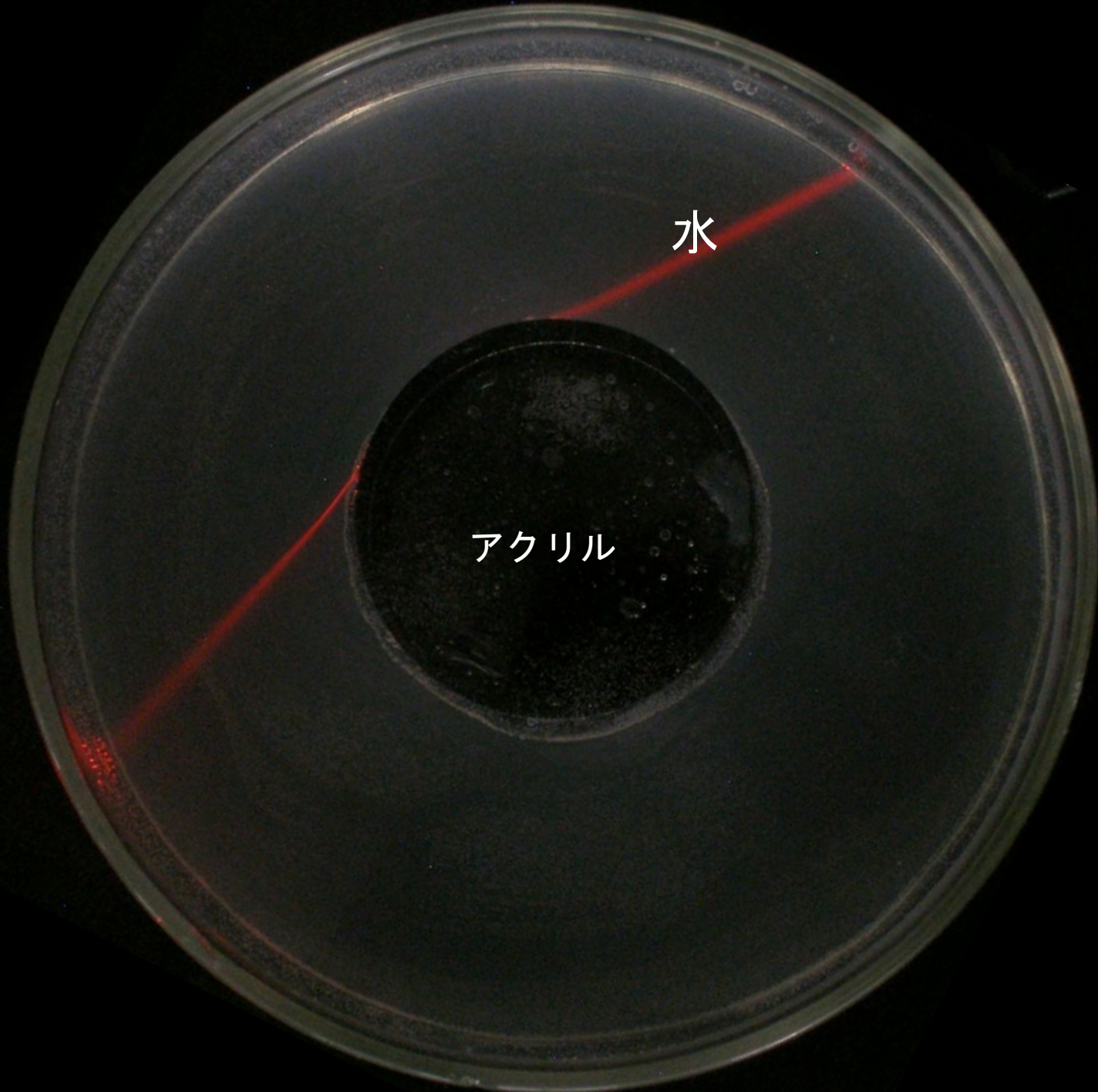
水

アクリル

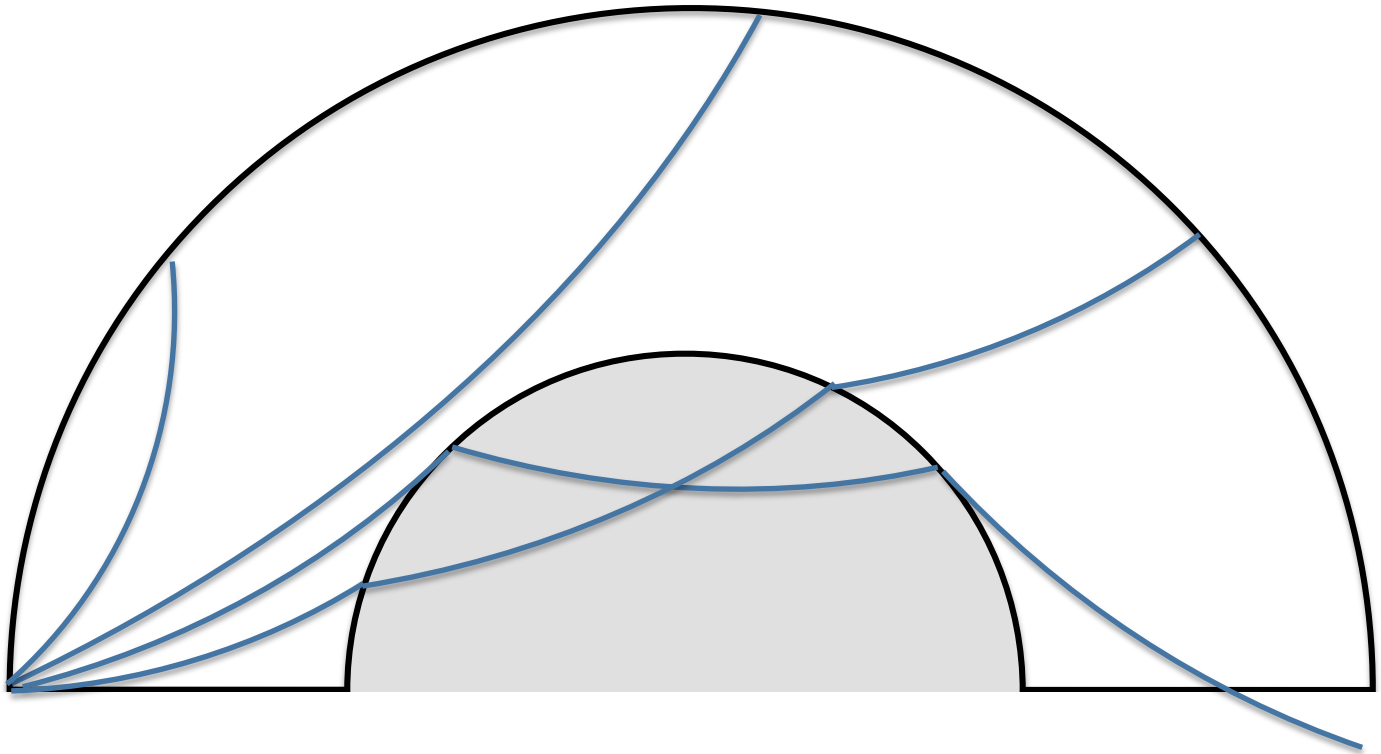


水

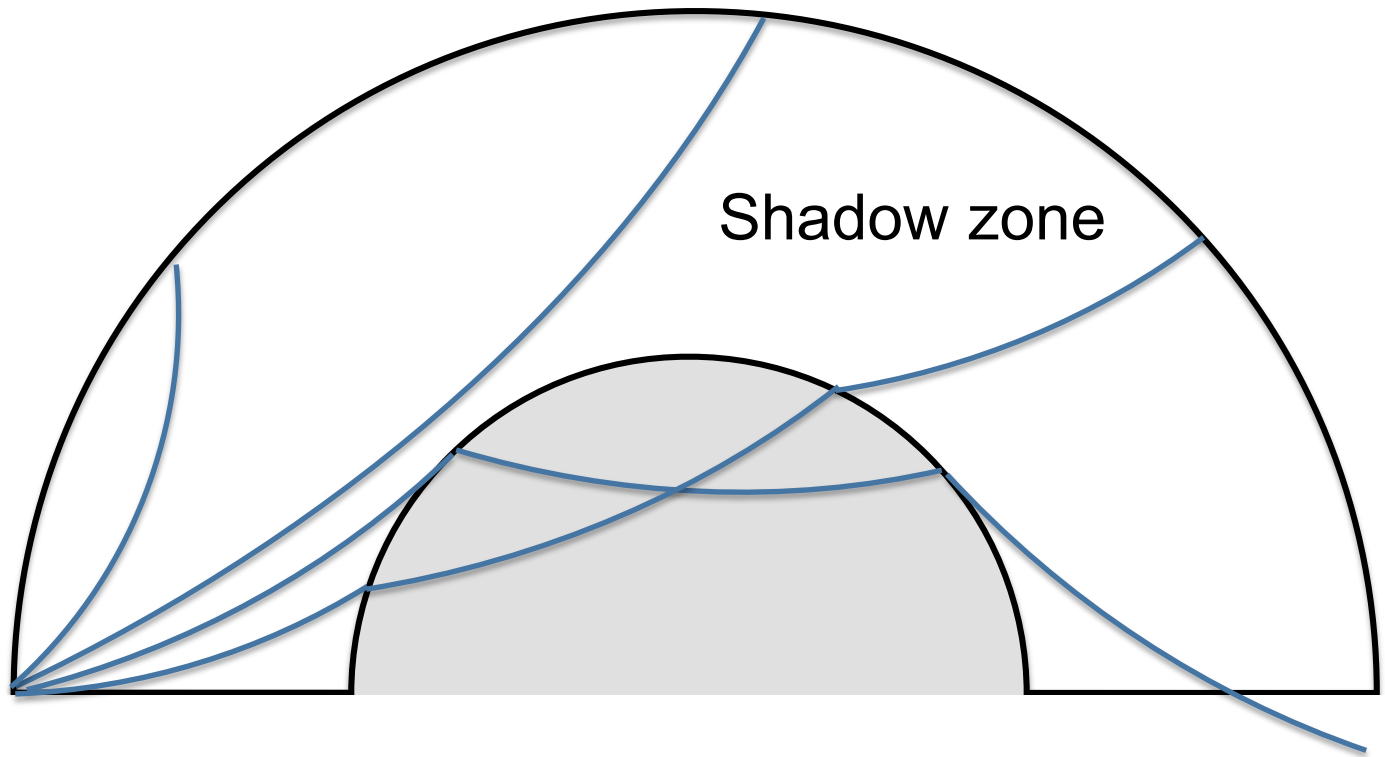
アクリル



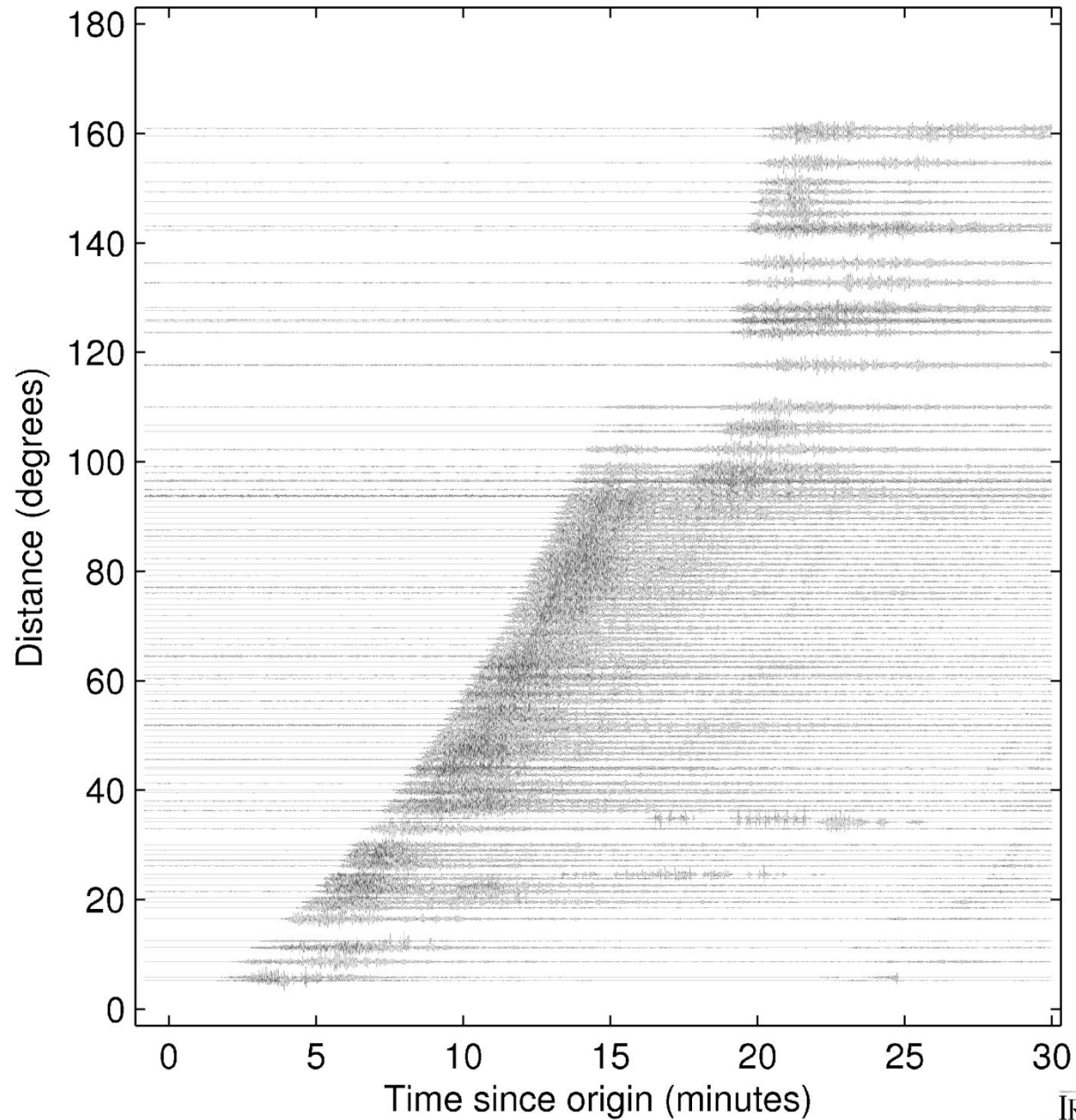
もし深い方が遅くなっていると



もし深い方が遅くなっていると



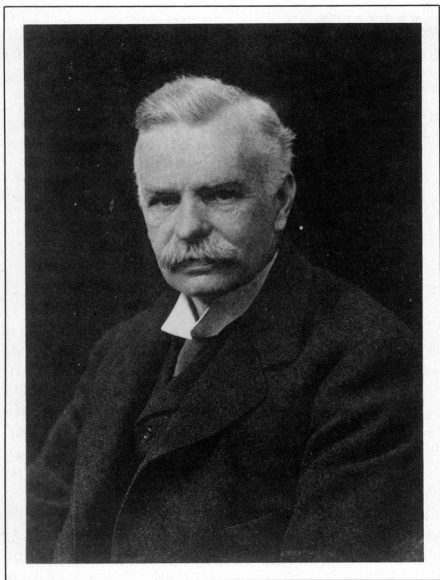
Combed and aligned on origin 0.3 – 1.0 Hz BHZ
NEAR EAST COAST OF HONSHU, JAPAN
2011/03/11 05:46:23 M8.9 Z=24.4km Lat=38.3215 Lon=142.3693



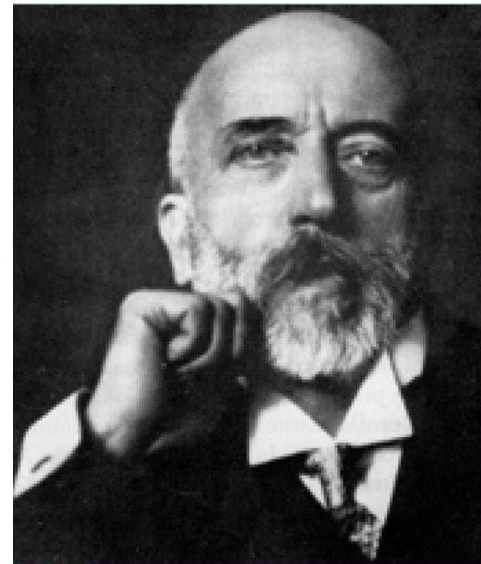
地球内部構造の解明

1906 オルダム Oldham コアの発見

1909 モホロヴィチッチ Mohorovicic モホ面の発見



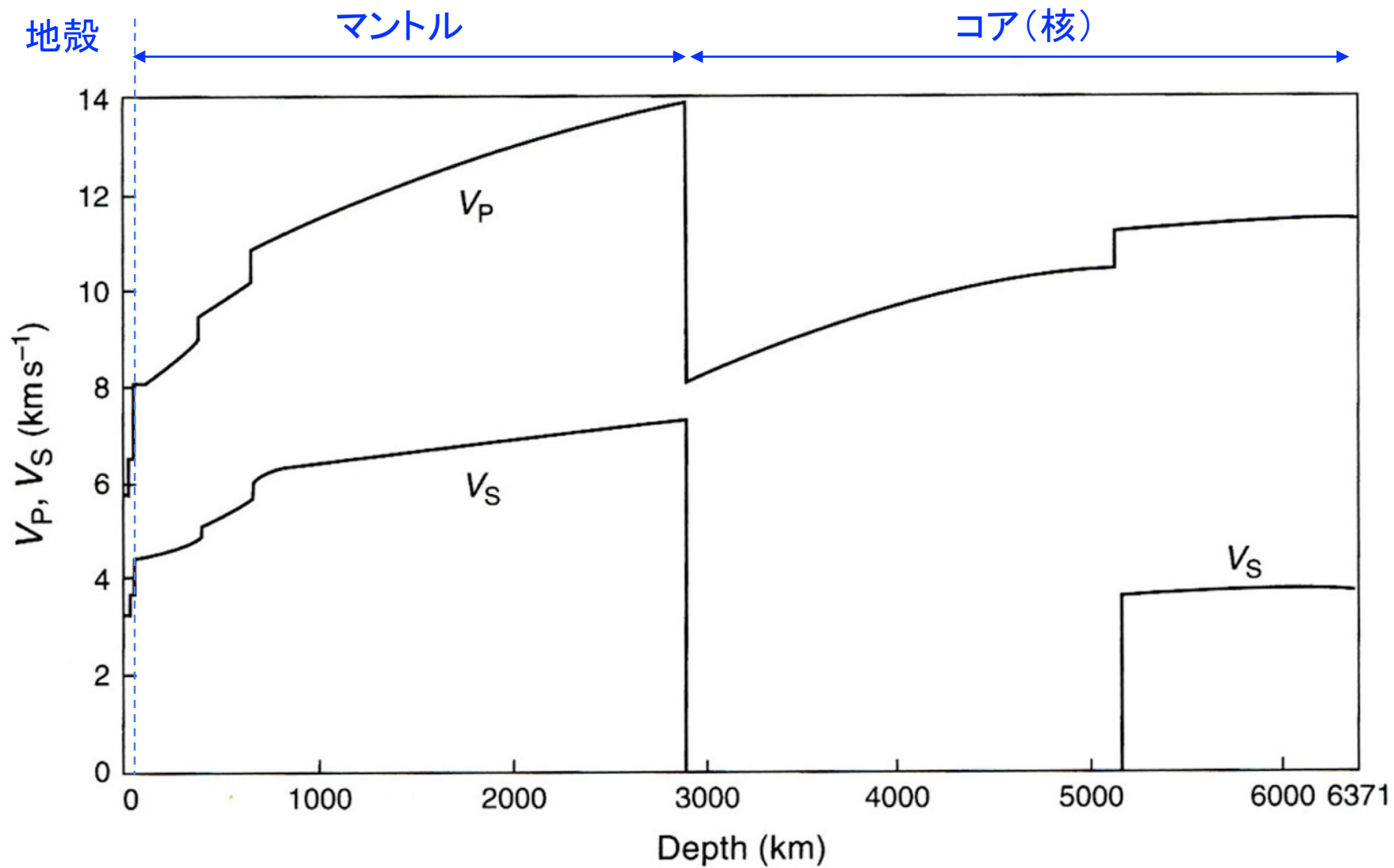
Richard Oldham
(1858-1936)



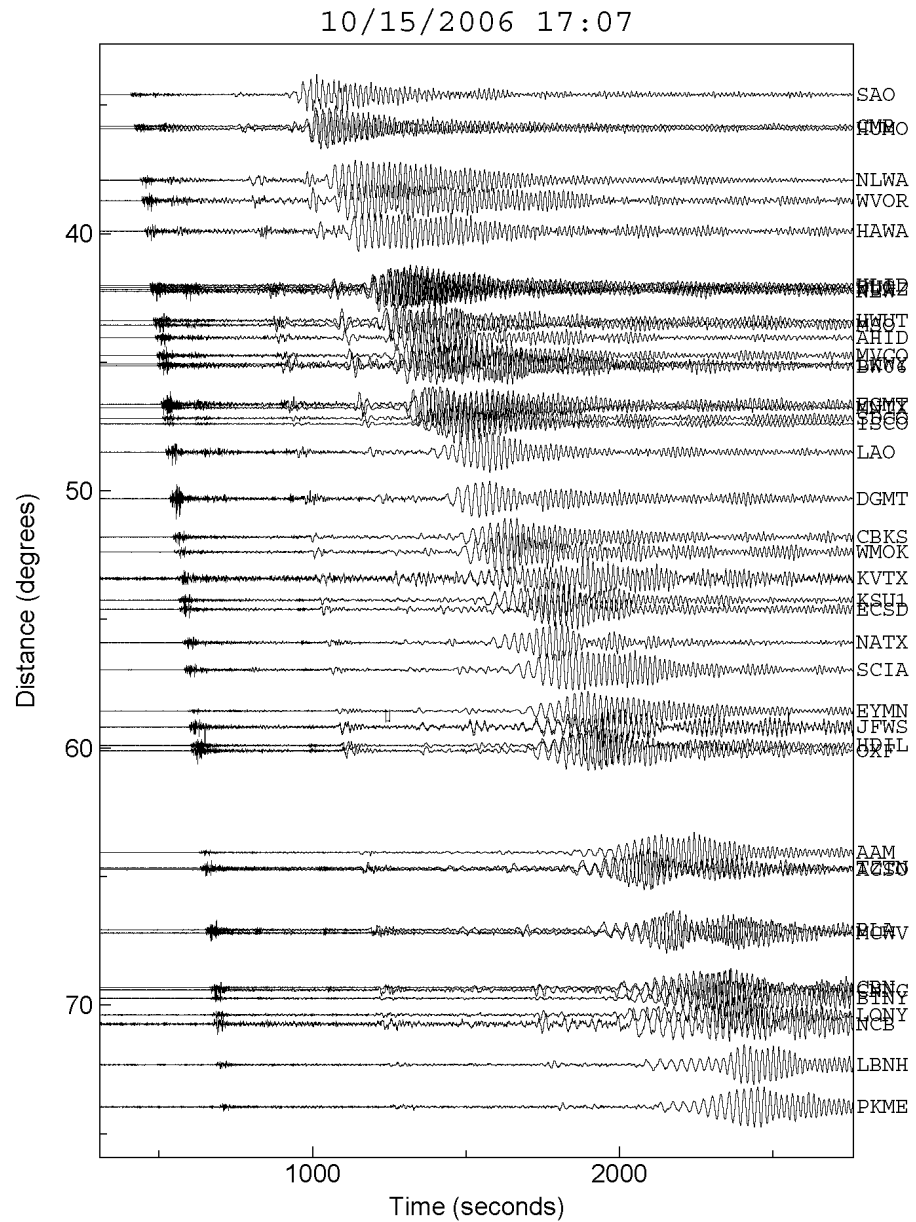
Andrija Mohorovicic
(1857-1936)

球対称地球モデル

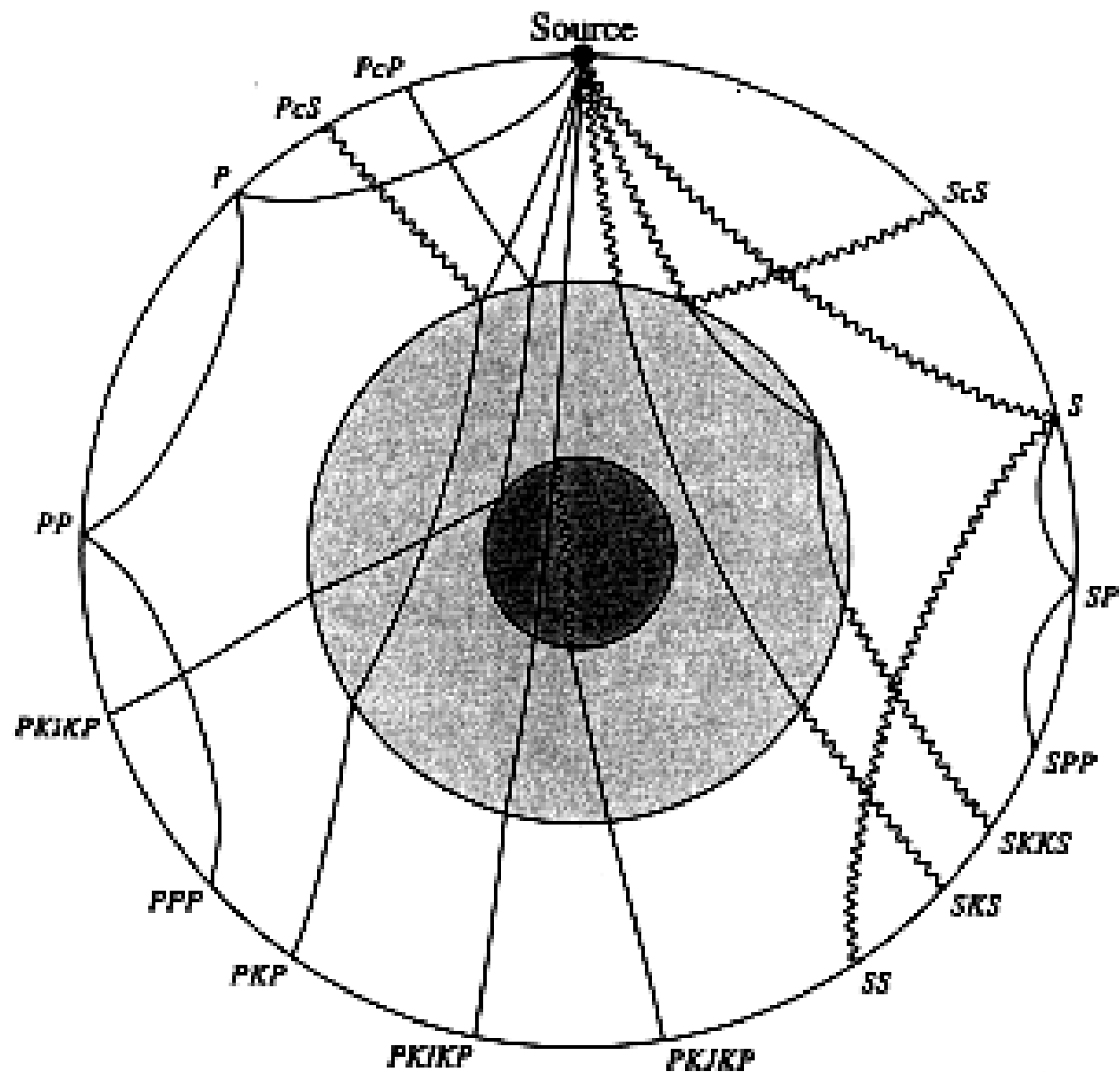
IASP91



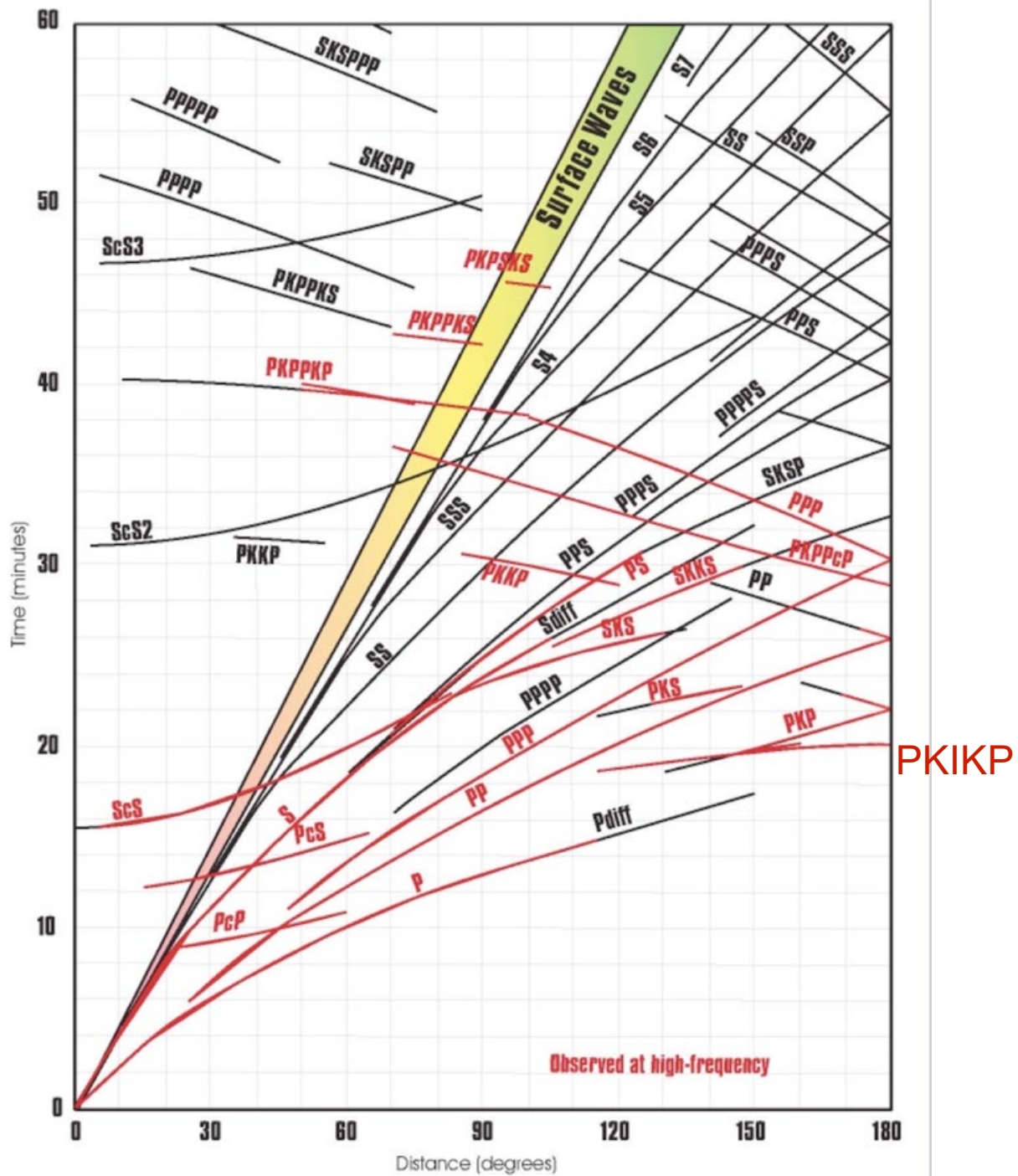
Hawaii (M6.7)



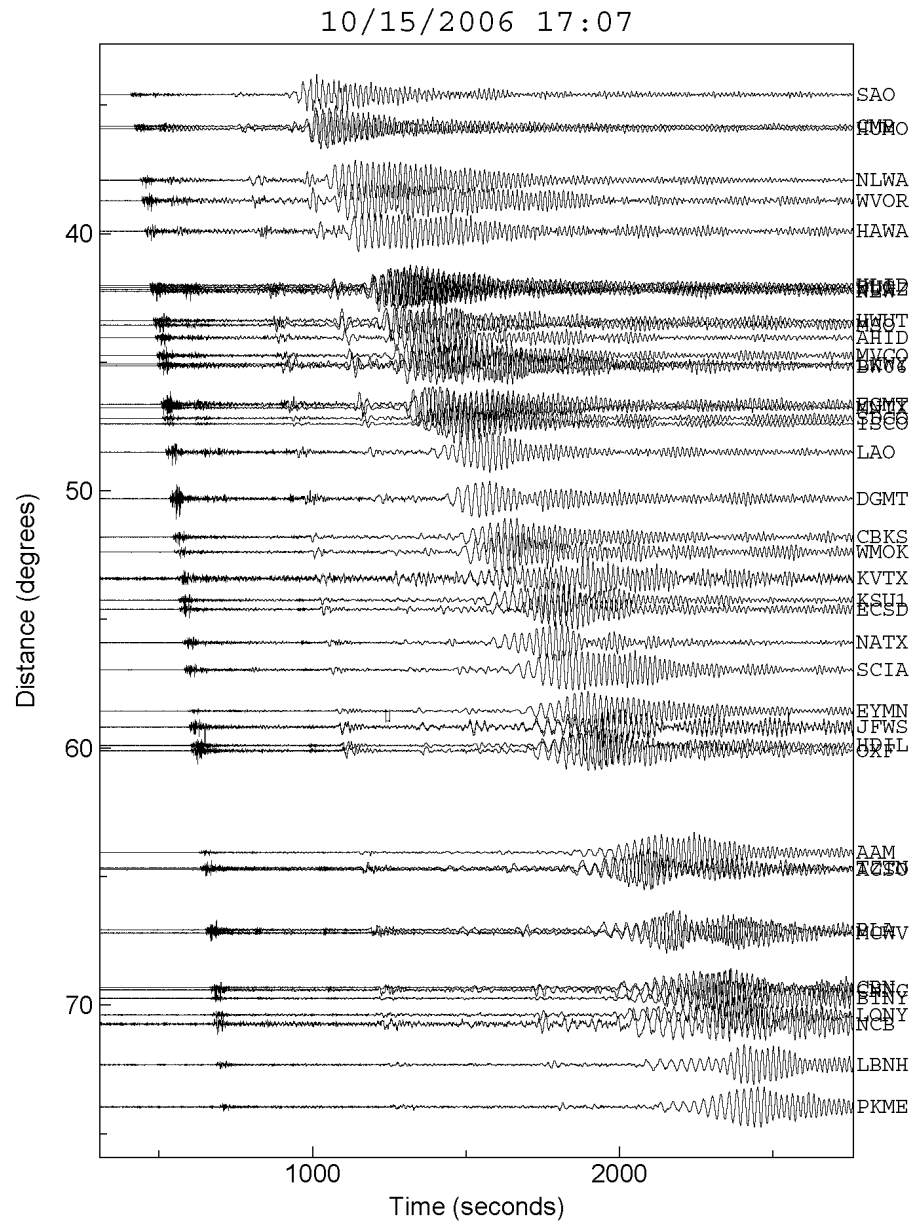
フェイズ Phase の名前のつけ方



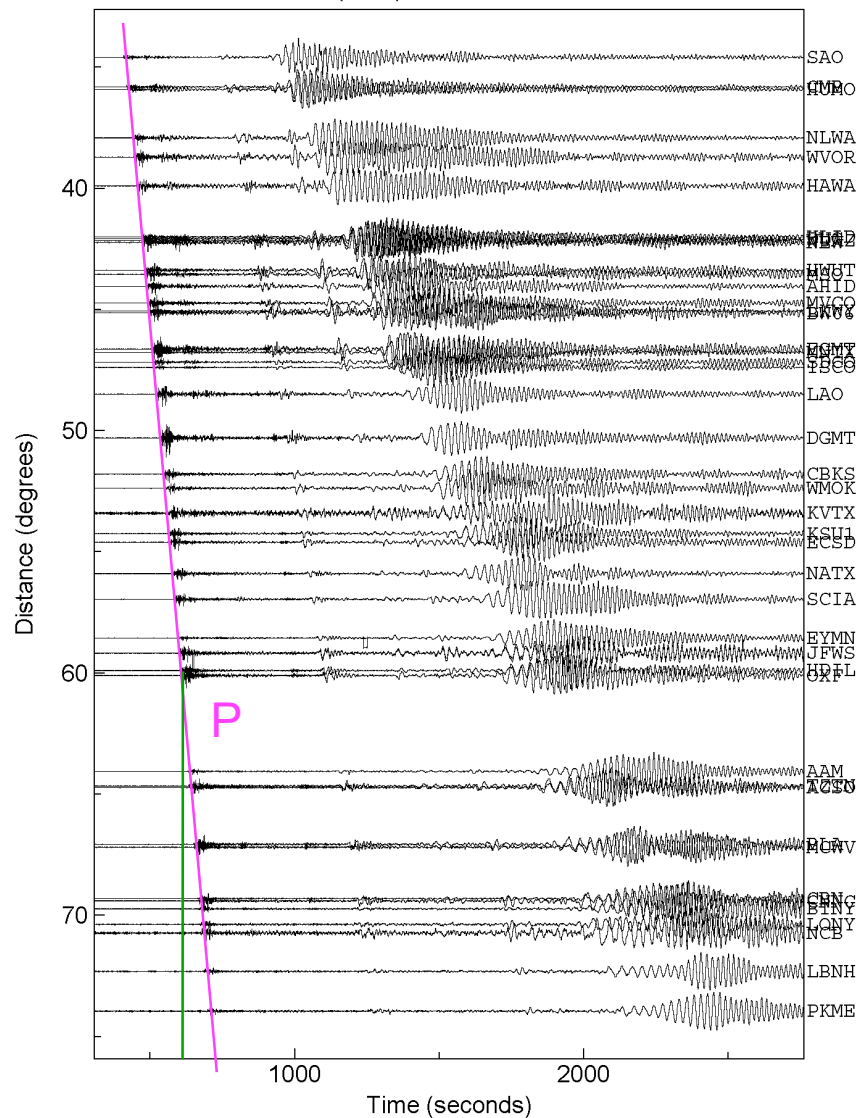
IASP91に基づいた 理論走時



Hawaii (M6.7)



10/15/2006 17:07



607.2 sec. = 10.1 min.

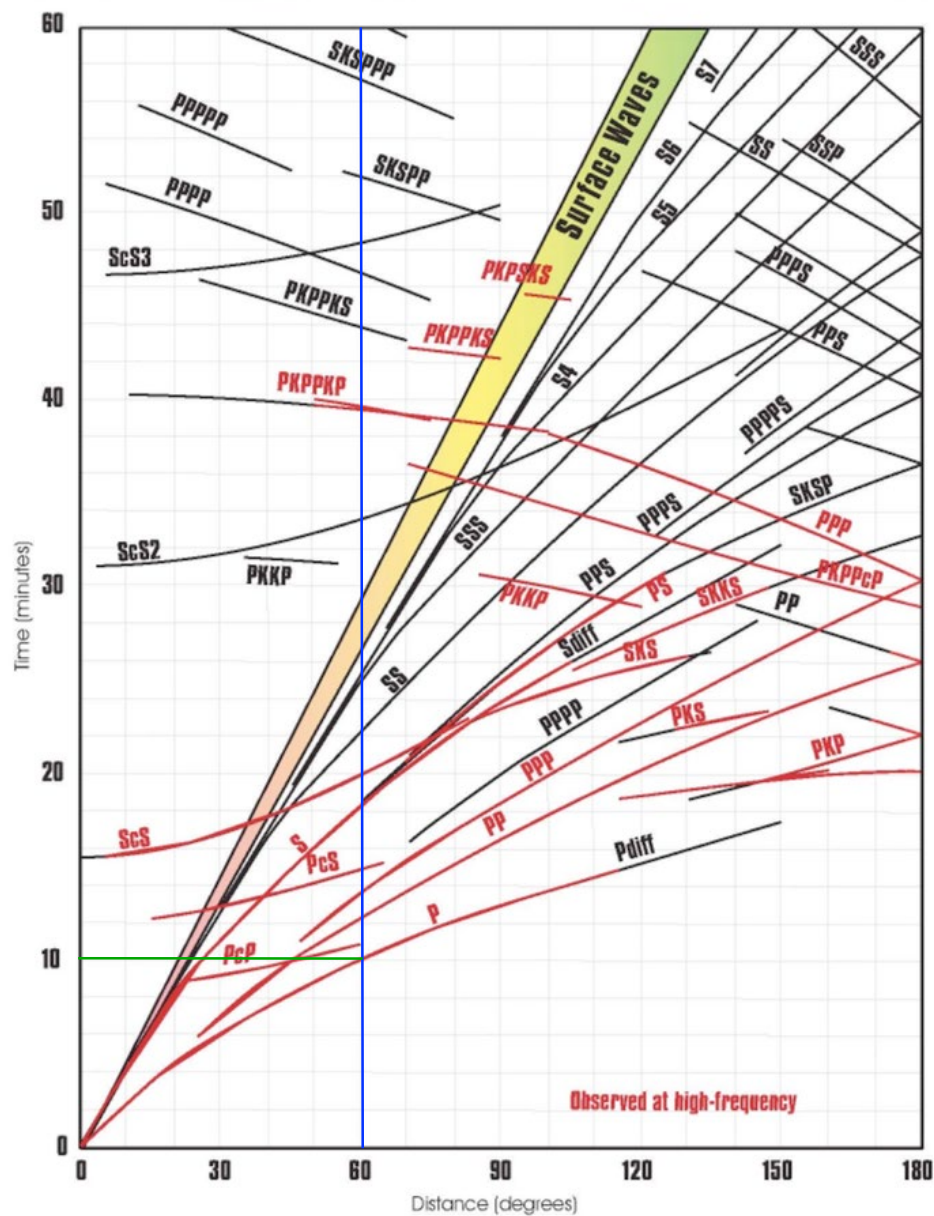
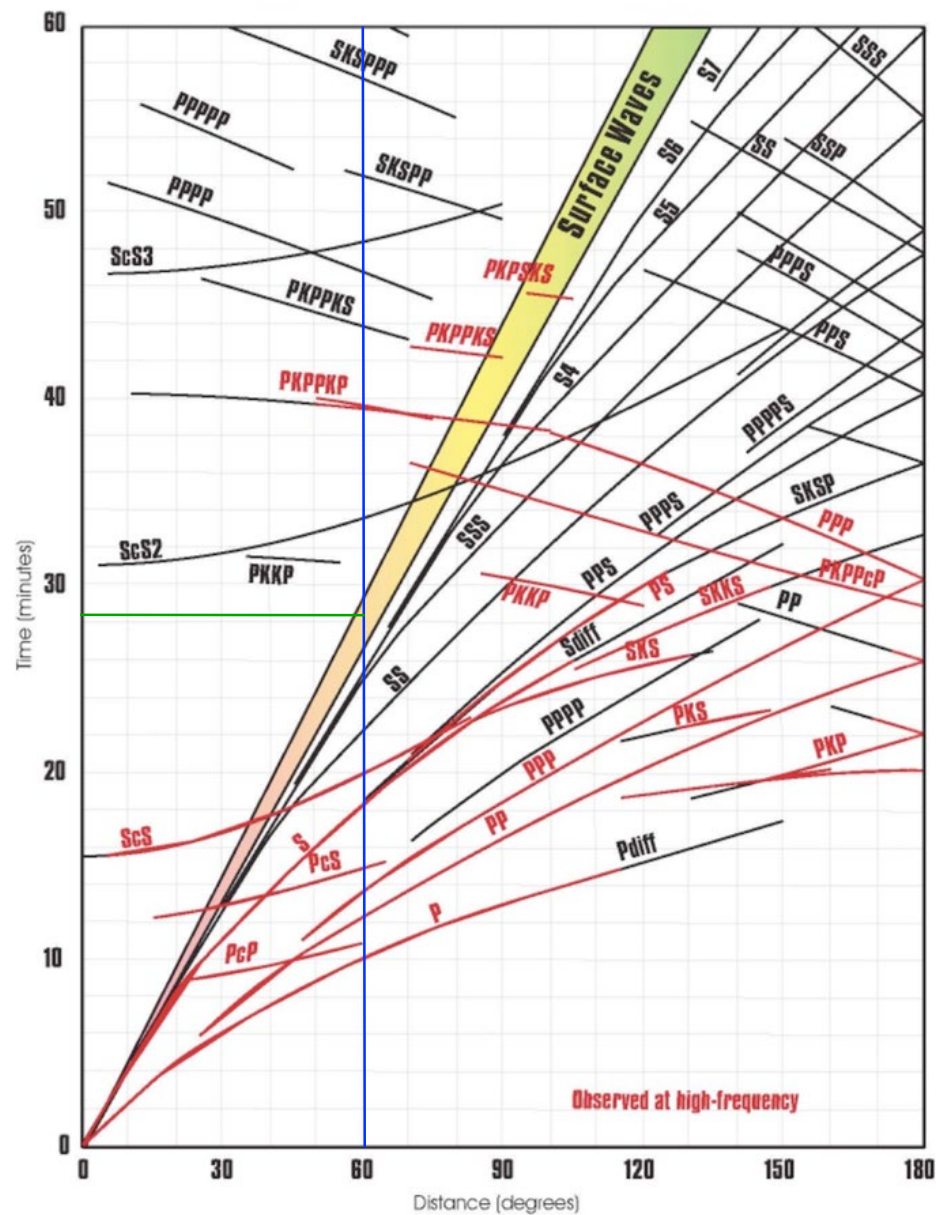
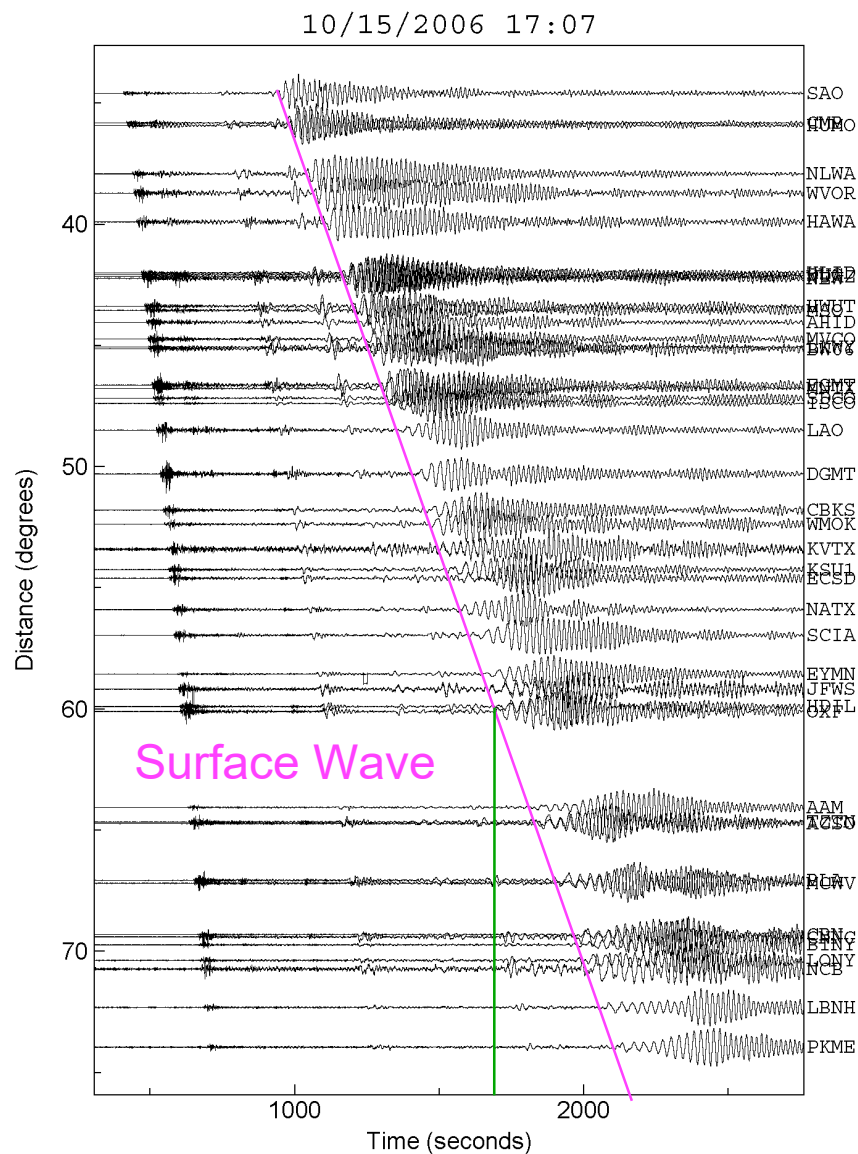


Figure 1 is a graph showing the time (minutes) versus distance (degrees) for various seismic wave phases. The y-axis represents Time (minutes) from 0 to 60, and the x-axis represents Distance (degrees) from 0 to 180. A vertical blue line is drawn at 60 degrees, and a horizontal green line is drawn at 18 minutes. A yellow-green shaded region labeled "Surface Waves" is prominent, extending from the origin towards the top right. Numerous black lines represent different seismic phases, including P, S, PKP, SKS, and various higher-order modes like PKPPKS, SKSP, and PPS. Red lines represent phases observed at high-frequency, including PKP, SKS, and PKPPcP. The graph illustrates how seismic wave travel times change with distance and how different phases become dominant at different distances and times.

Figure 1 is a graph showing the time (minutes) versus distance (degrees) for various seismic wave phases. The y-axis represents Time (minutes) from 0 to 60, and the x-axis represents Distance (degrees) from 0 to 180. A vertical blue line is drawn at 60 degrees, and a horizontal green line is drawn at 22 minutes. A yellow-green shaded region labeled "Surface Waves" is prominent. Numerous black lines represent different wave phases, including P, S, PKP, SKS, and various higher-order modes like PKPPKS, PKPPKP, etc. Red lines represent phases observed at high-frequency, labeled "Observed at high-frequency".

Figure 1 is a seismic waveform plot showing distance (degrees) on the y-axis (40 to 70) versus time (seconds) on the x-axis (0 to 2000). The plot displays multiple seismic waveforms for various stations. A vertical green line marks the SSS (Seismic Signal Start) at approximately 1500 seconds. A magenta line indicates the arrival time of the seismic signal for each station, showing that the signal arrives later at greater distances.

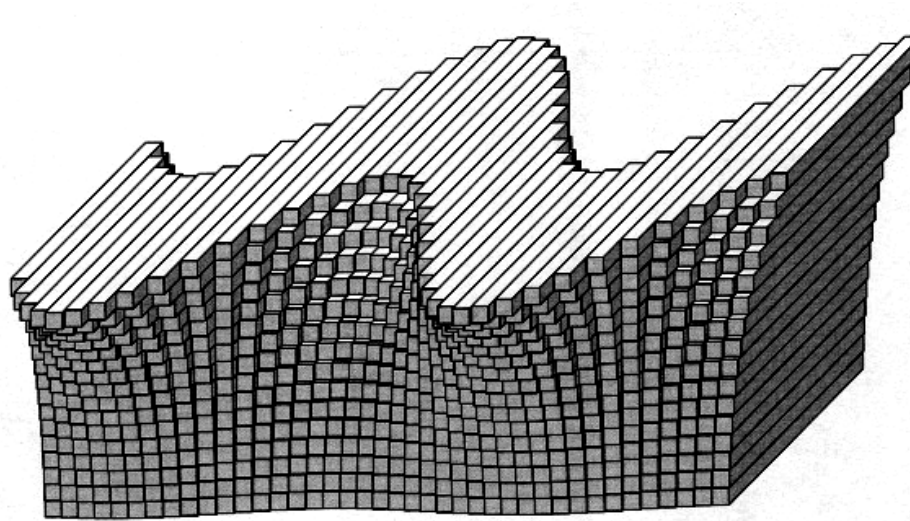
[illegible]



表面波

Surface wave

Love wave



Rayleigh wave

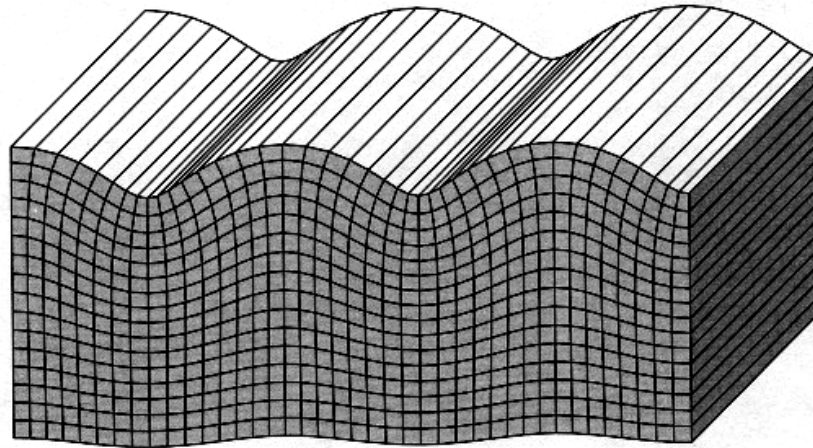


Fig. 8.4. Fundamental Love (top) and Rayleigh (bottom) surface wave displacements for horizontal propagation across the page. Love waves are purely transverse motion, whereas Rayleigh waves contain both vertical and radial motion. In both cases, the wave amplitude decays strongly with depth.

Mozambique (M7.0)

