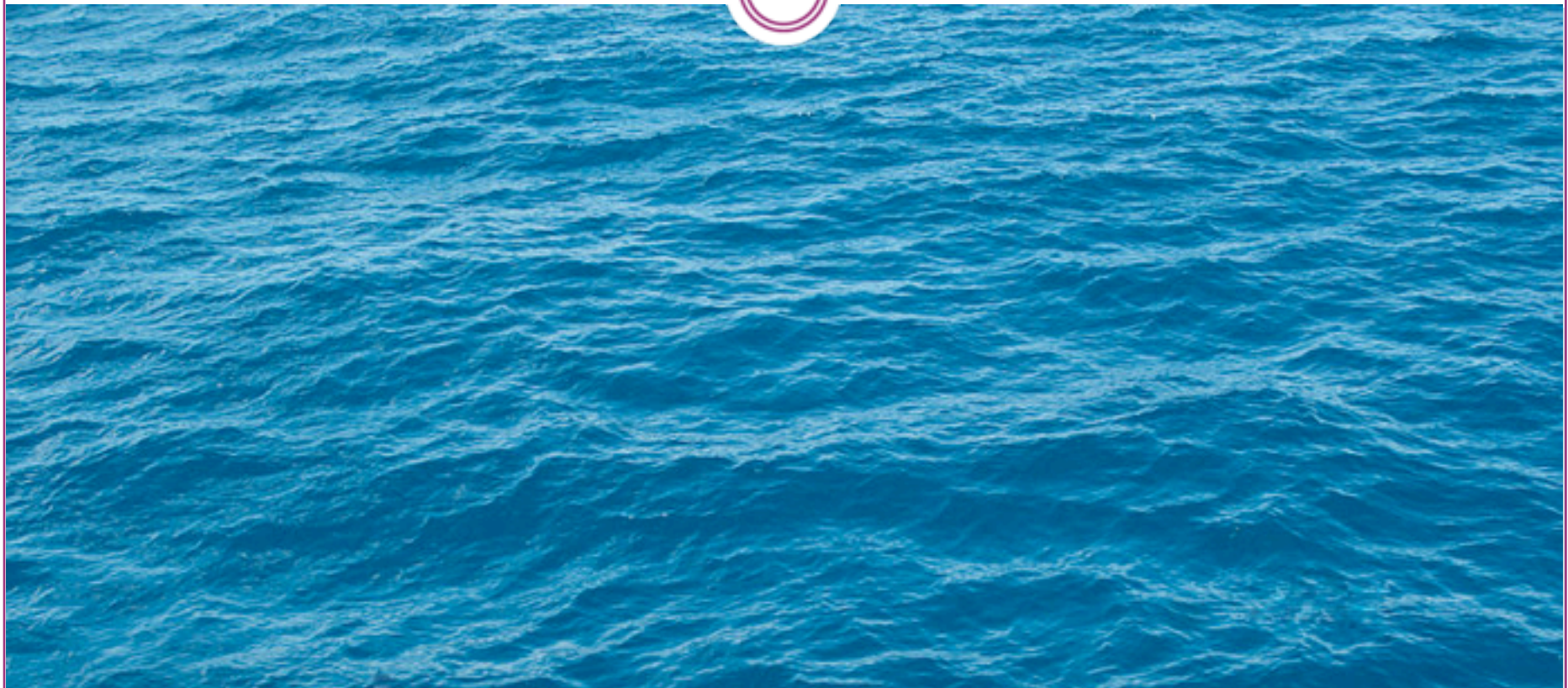


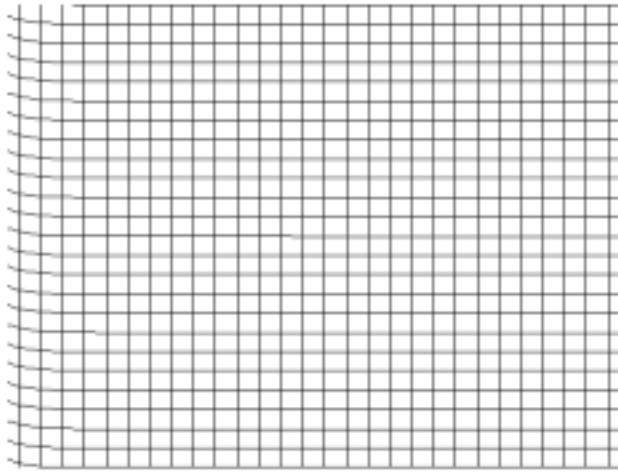
Sound



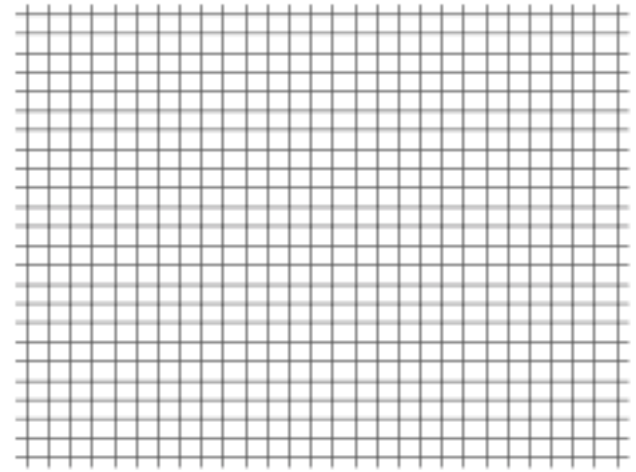
<http://earthref.org/SCC>

Scripps Classroom Connection

What are waves?

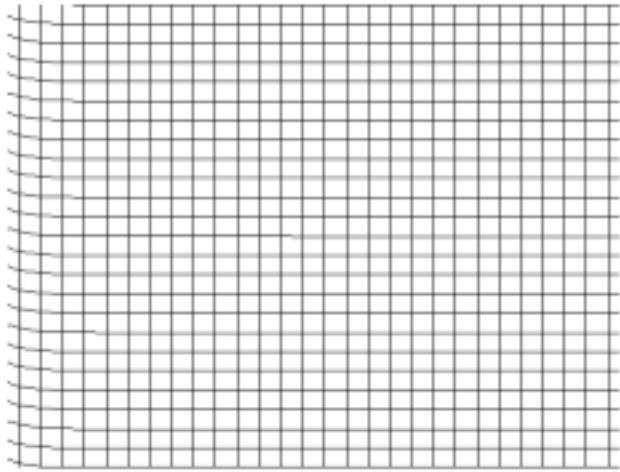


S-Wave (sheer)



P-Wave (pressure)

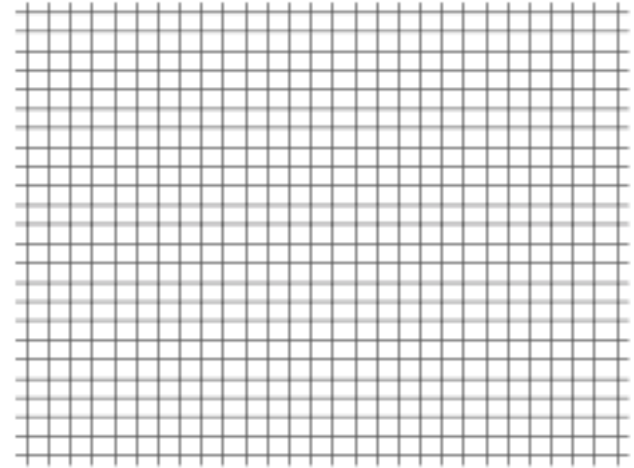
What are waves?



S-Wave (sheer)

P-Wave (pressure)

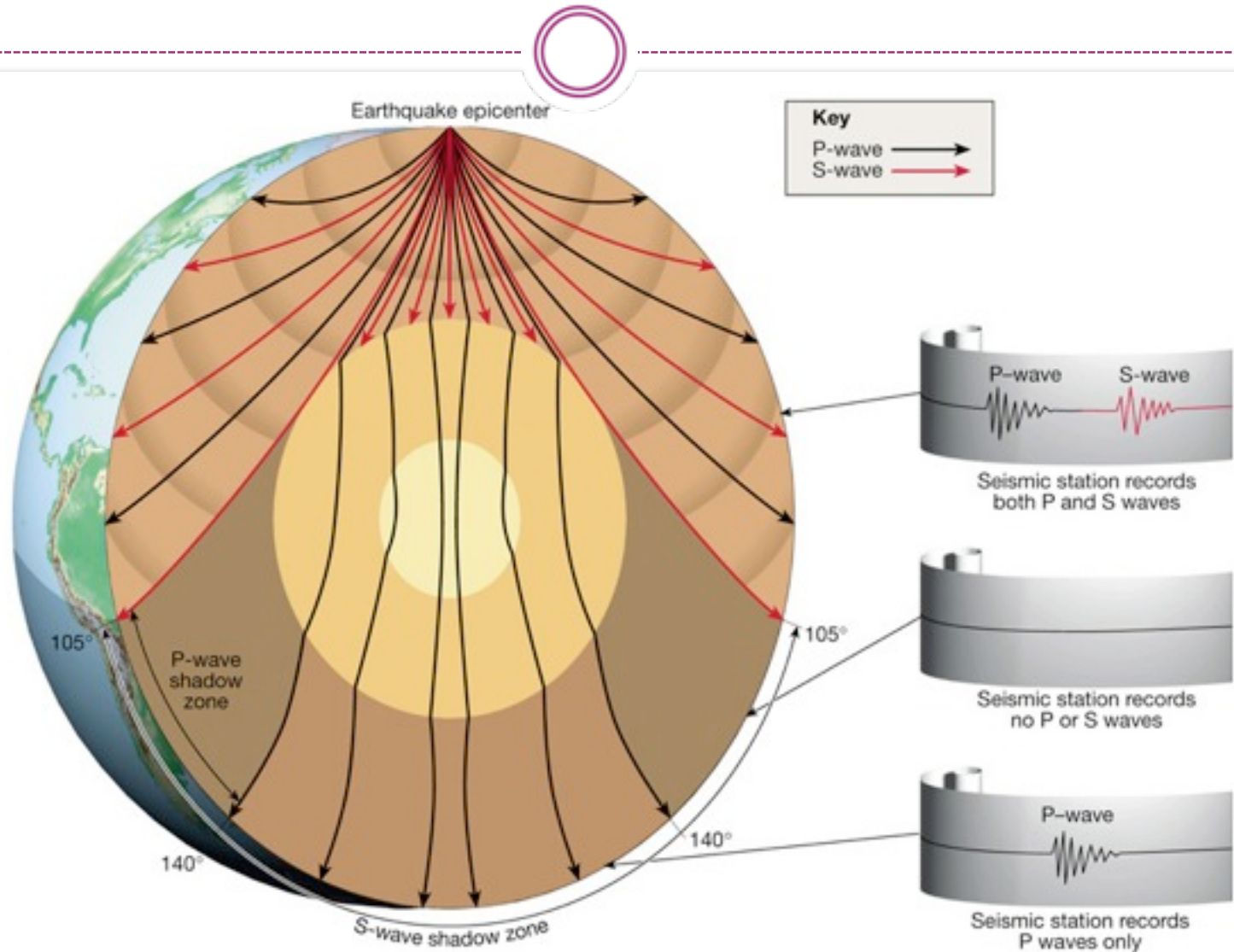
What are waves?



S-Wave (sheer)

P-Wave (pressure)

Waves Cause Earthquakes



What are sound waves?



- What is required for sound to travel?
- So through which does sound travel faster – material with high compressibility or low compressibility?
- Which direction do sound waves travel?

Sound Speed



High Compressibility



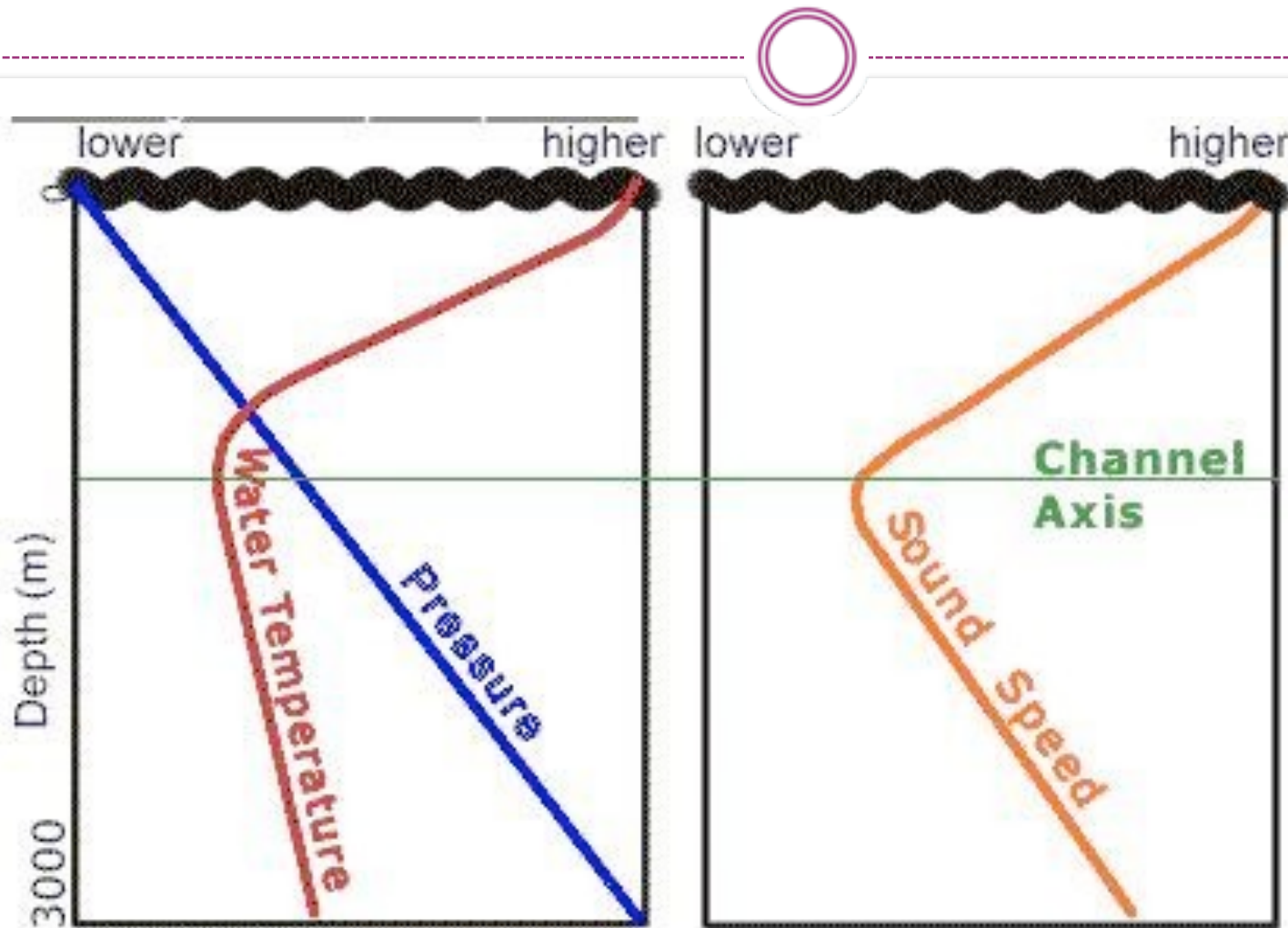
Low Density



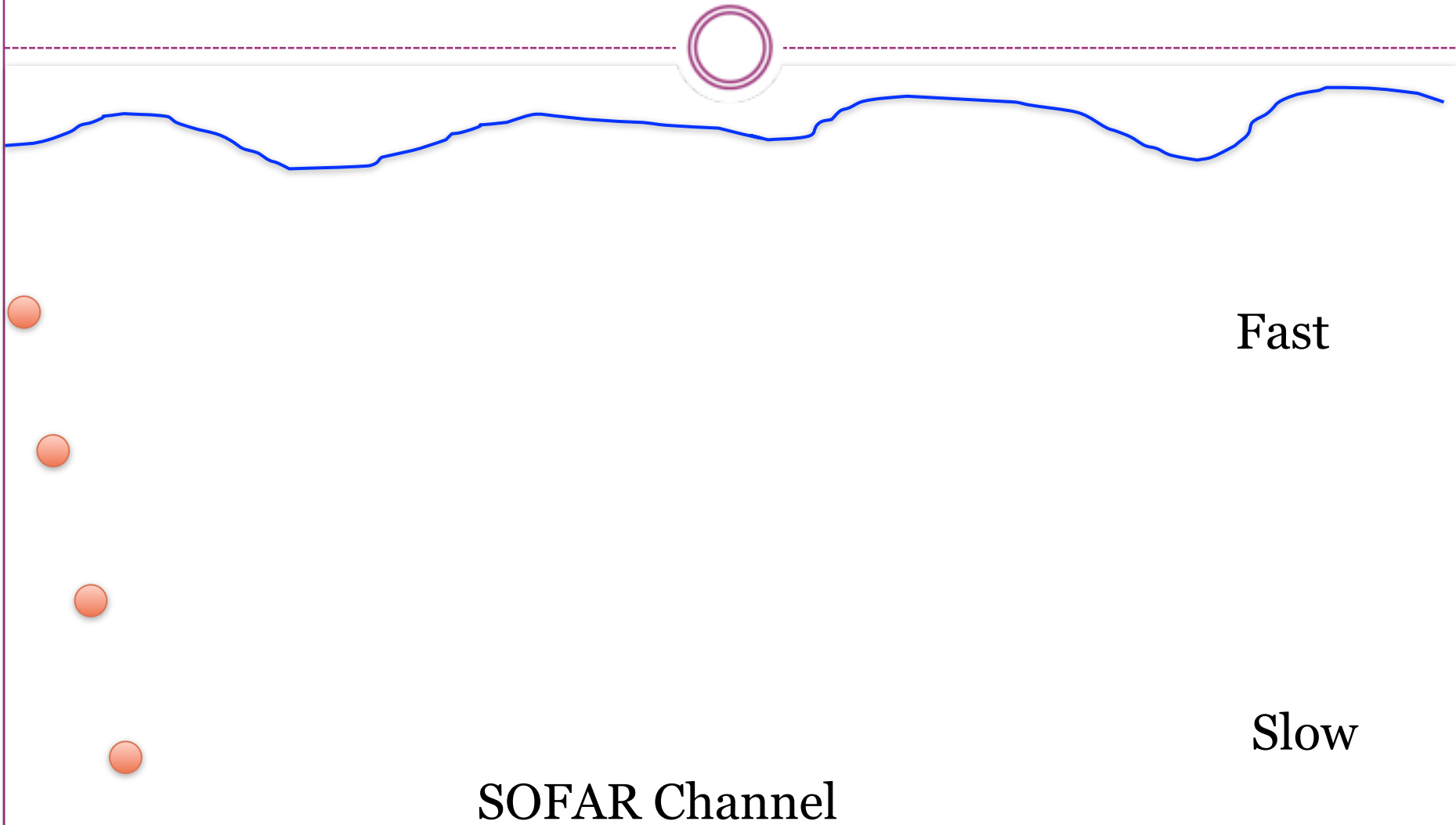
Density = Mass/
Volume

Will sound travel faster through a dense object, or a non-dense object? Try it!

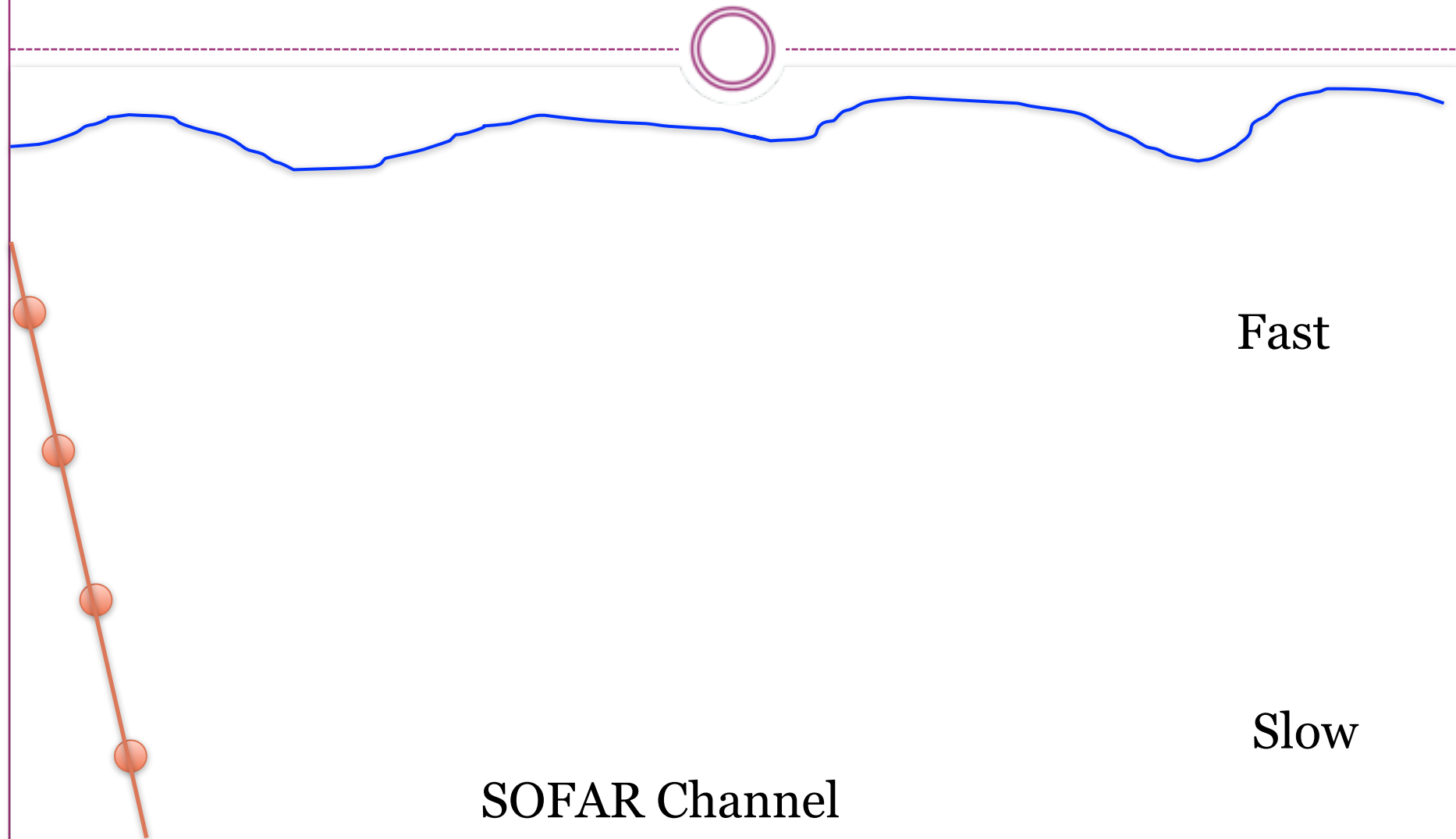
SOFAR Channel



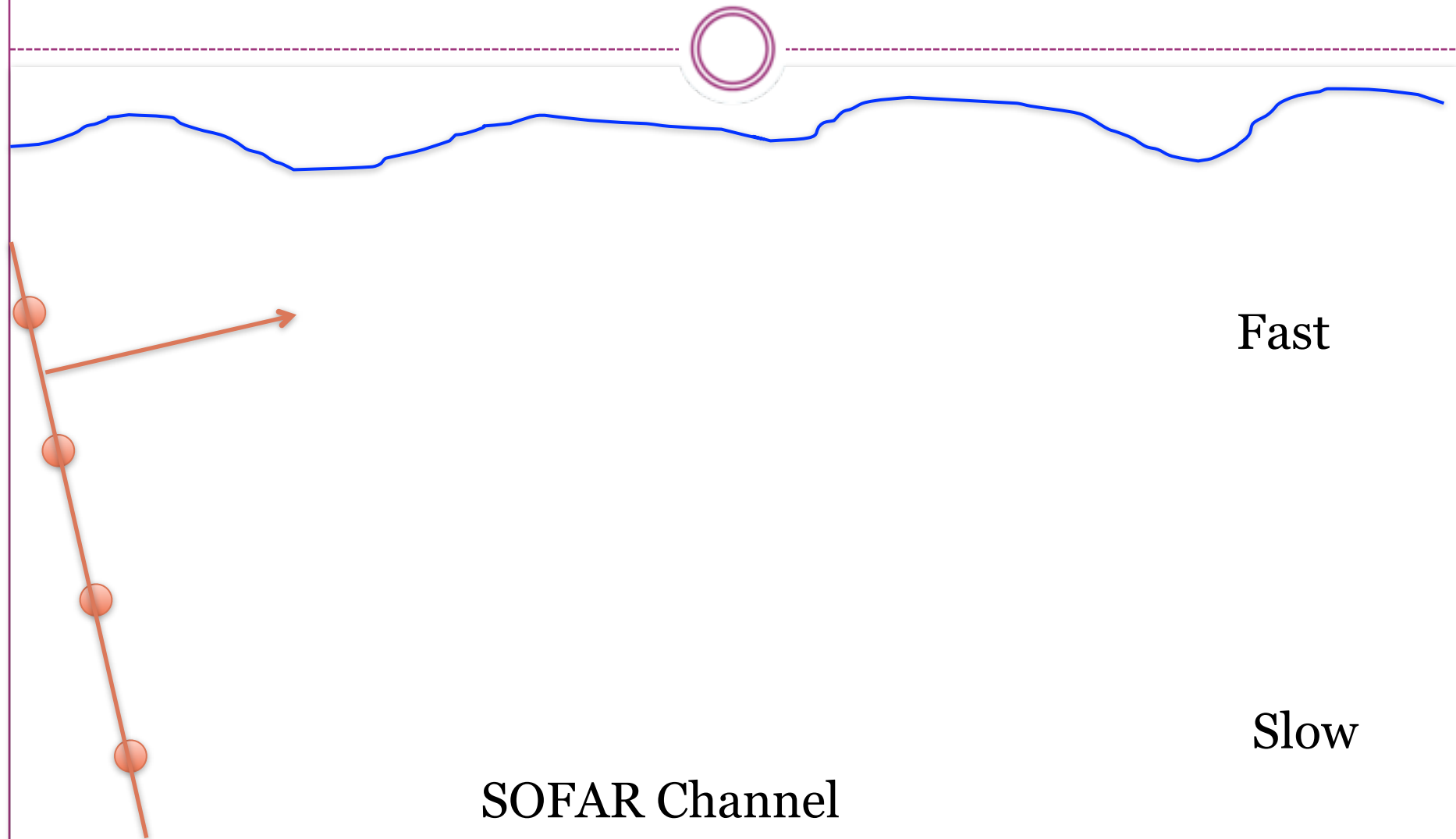
SOFAR Channel (surface)



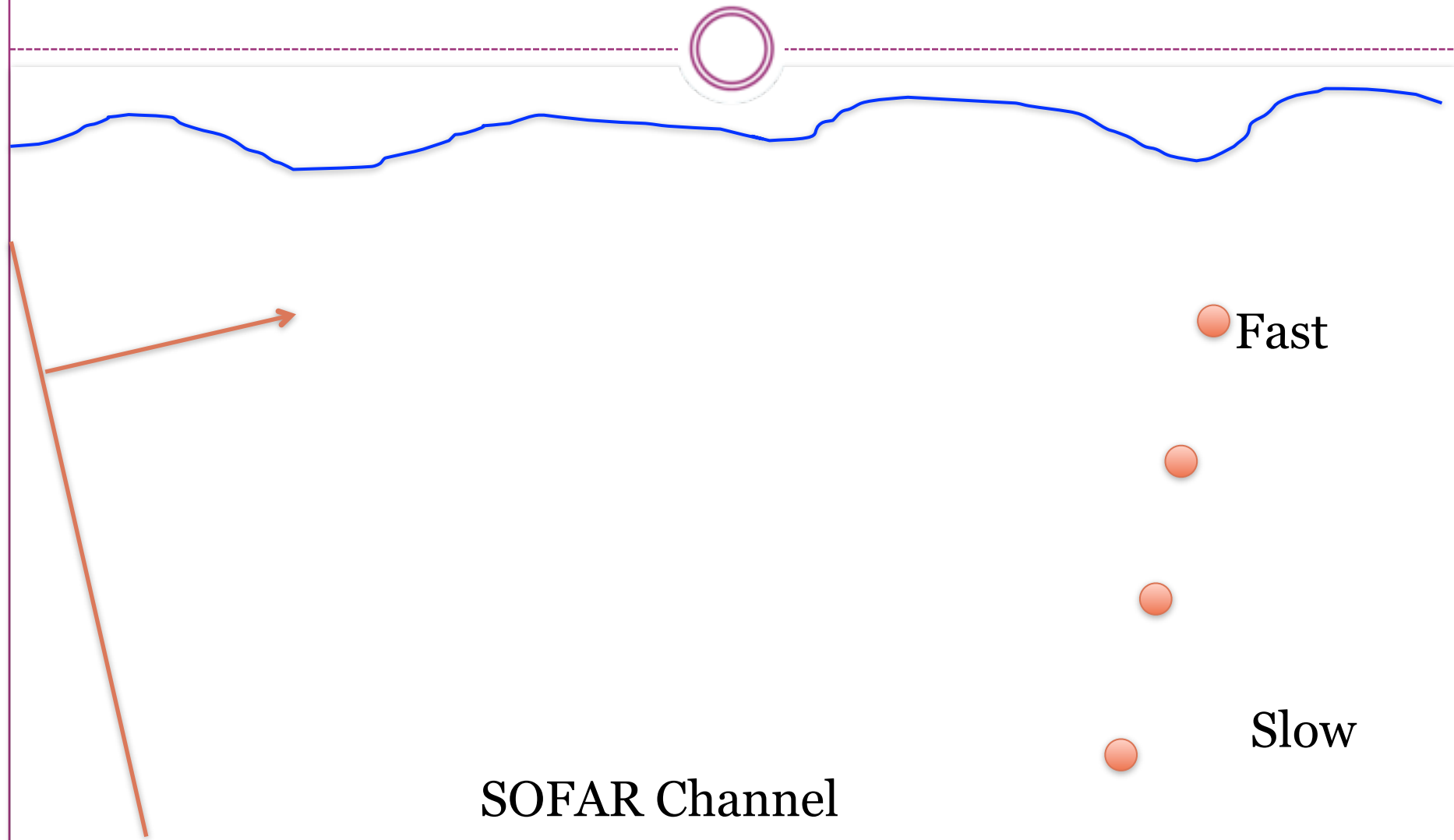
SOFAR Channel (surface)



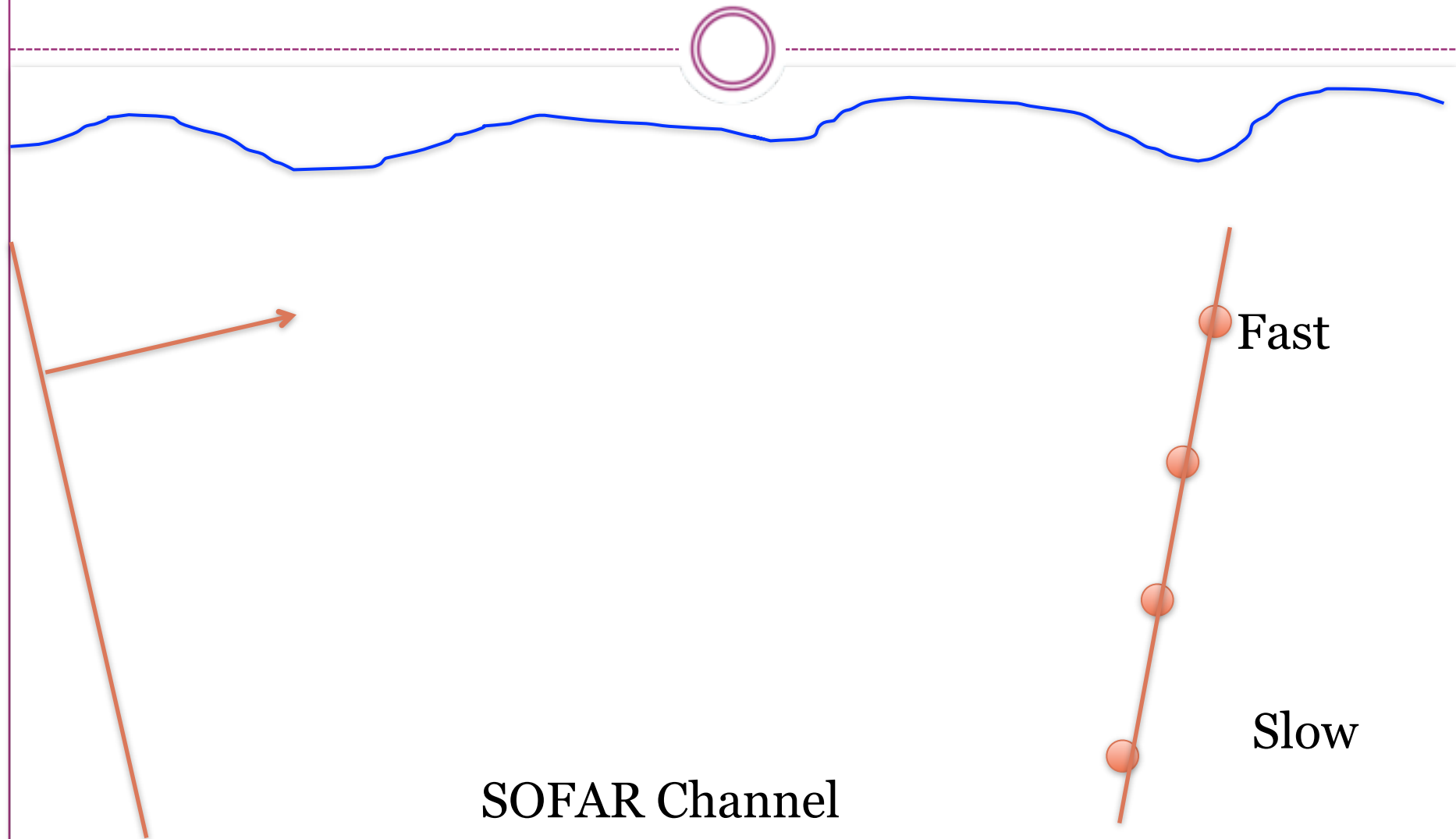
SOFAR Channel (surface)



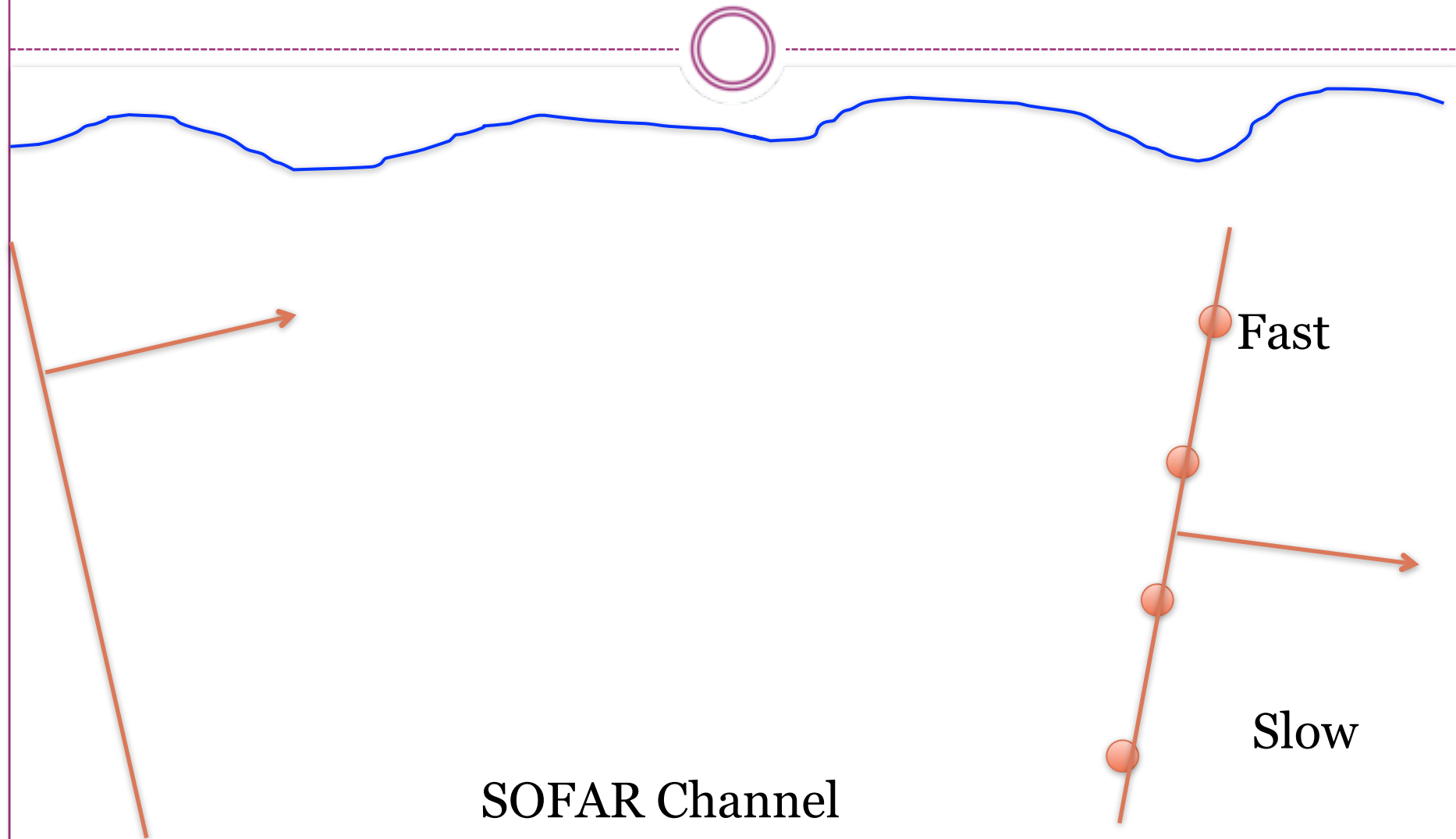
SOFAR Channel (surface)



SOFAR Channel (surface)



SOFAR Channel (surface)

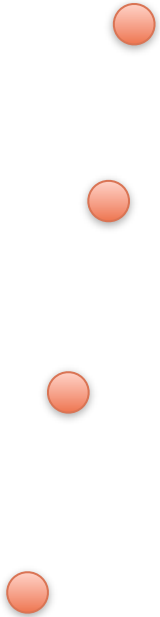


SOFAR Channel (bottom)



SOFAR Channel

Slow



Fast

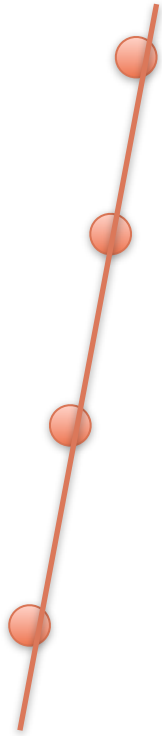


SOFAR Channel (bottom)



SOFAR Channel

Slow



Fast

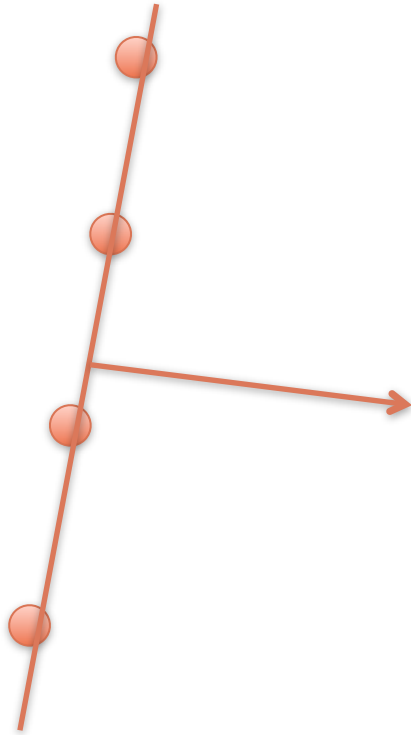


SOFAR Channel (bottom)



SOFAR Channel

Slow



Fast



SOFAR Channel (bottom)

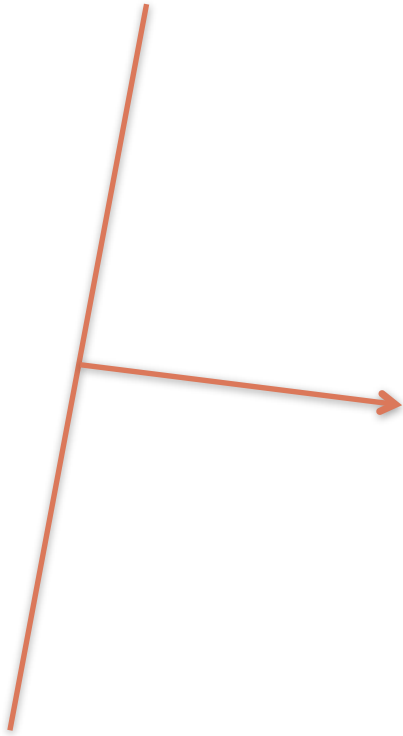


SOFAR Channel

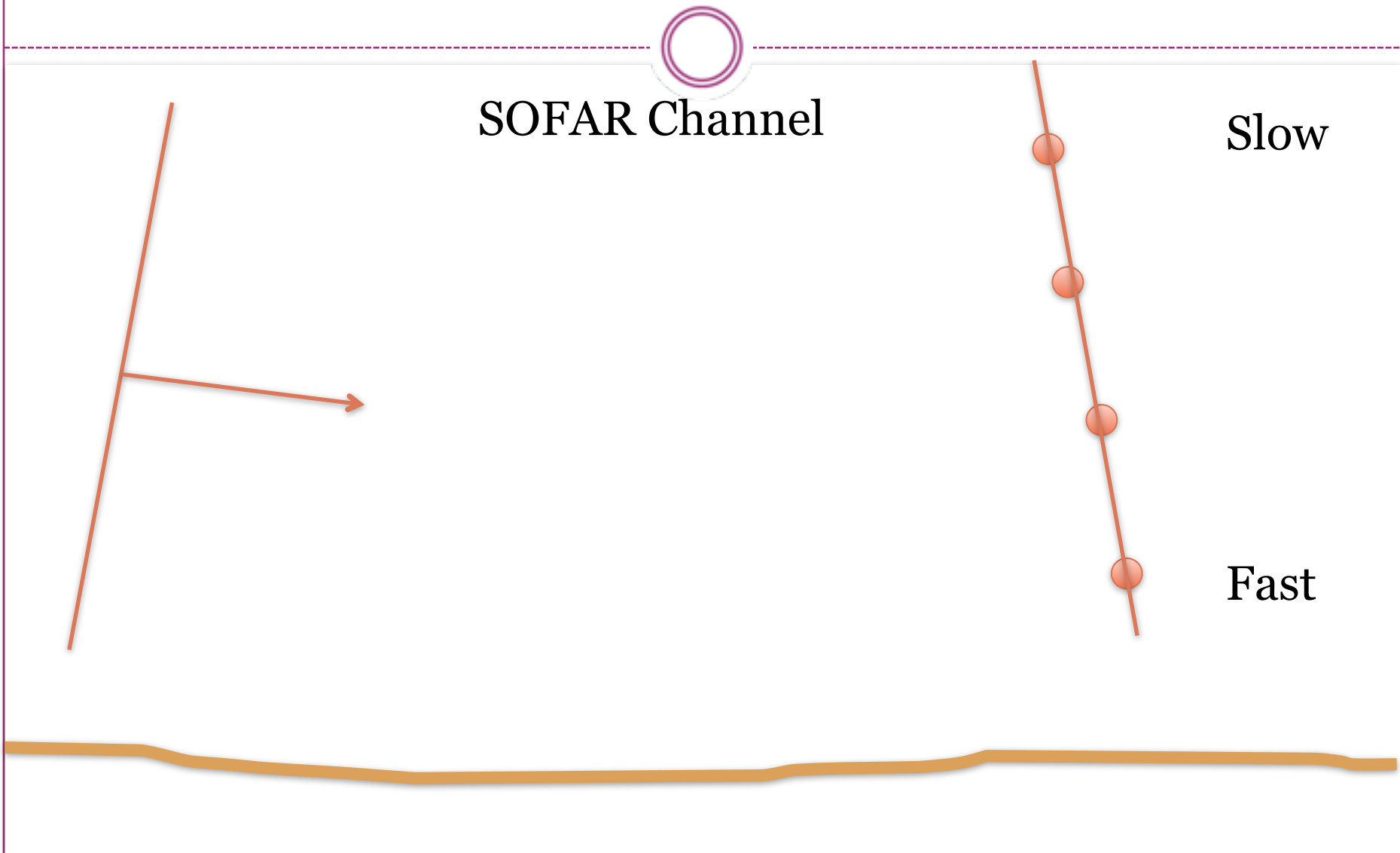
Slow



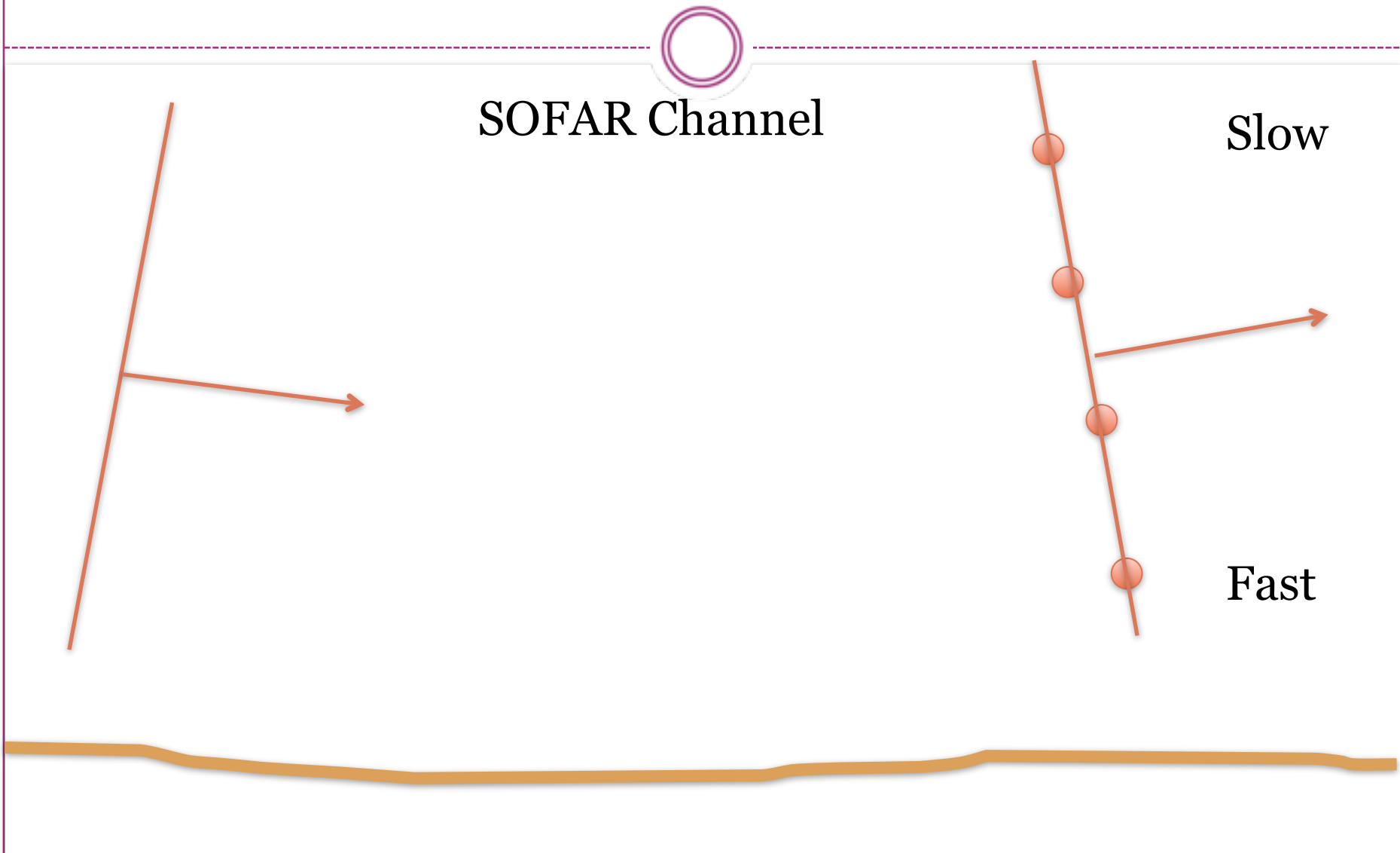
Fast



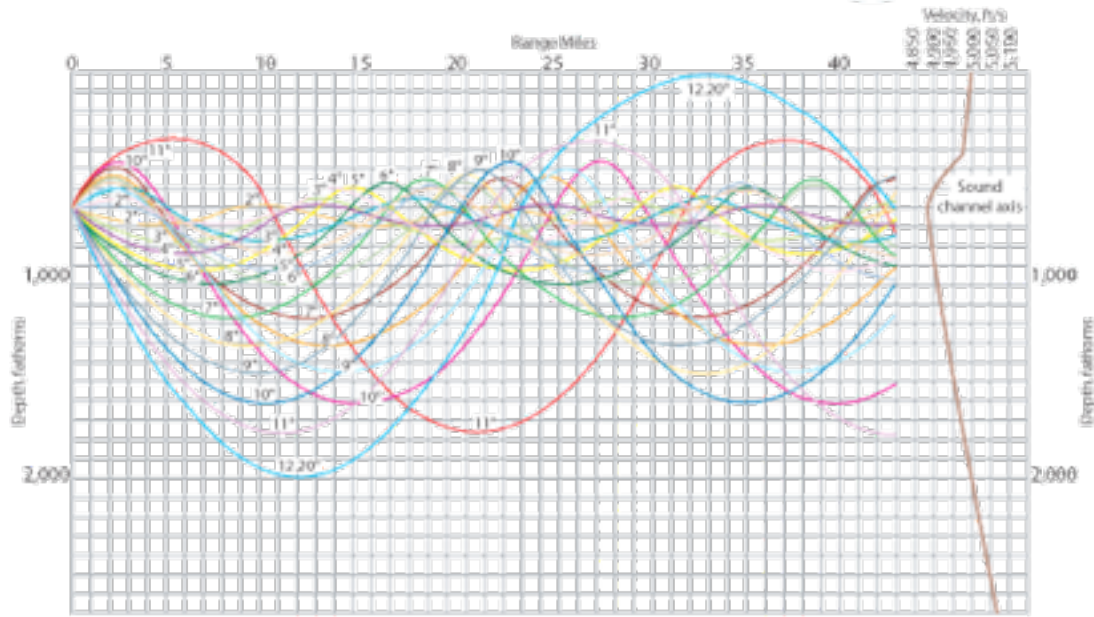
SOFAR Channel (bottom)



SOFAR Channel (bottom)

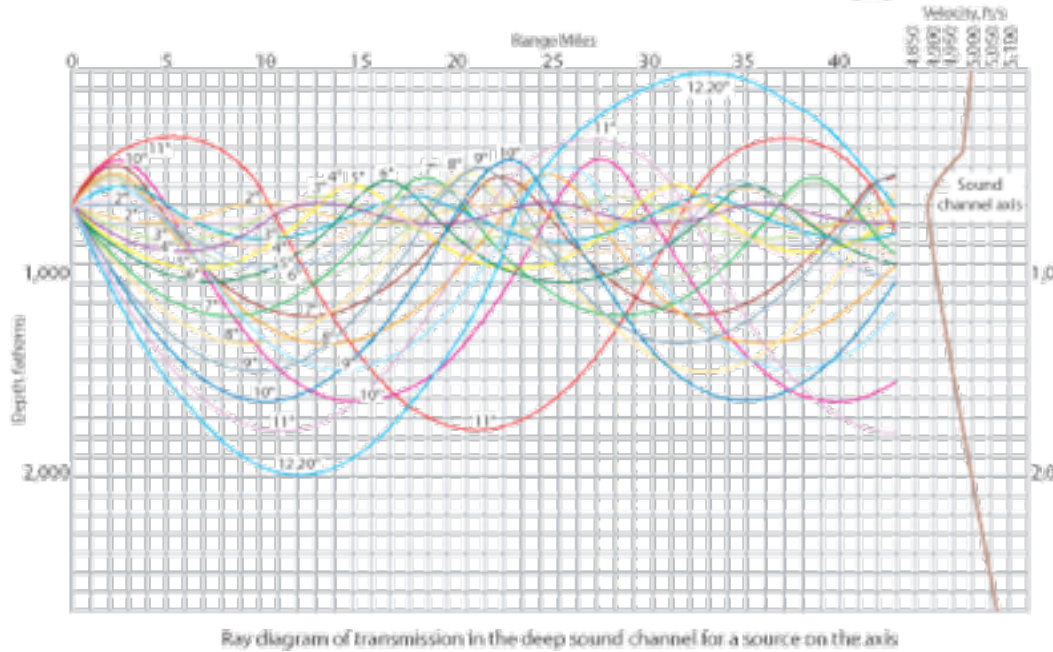


SOFAR Channel



Ray diagram of transmission in the deep sound channel for a source on the axis

SOFAR Channel



SOFAR Channel

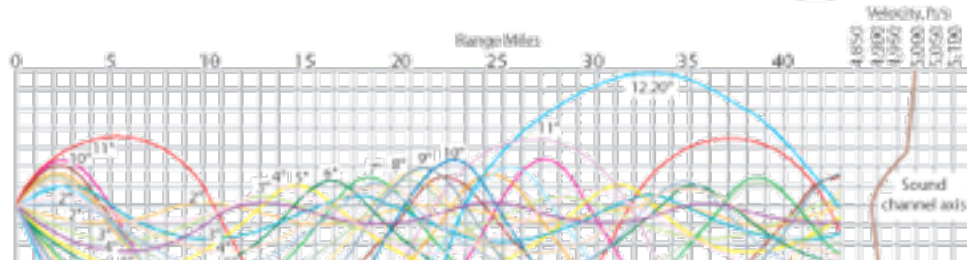
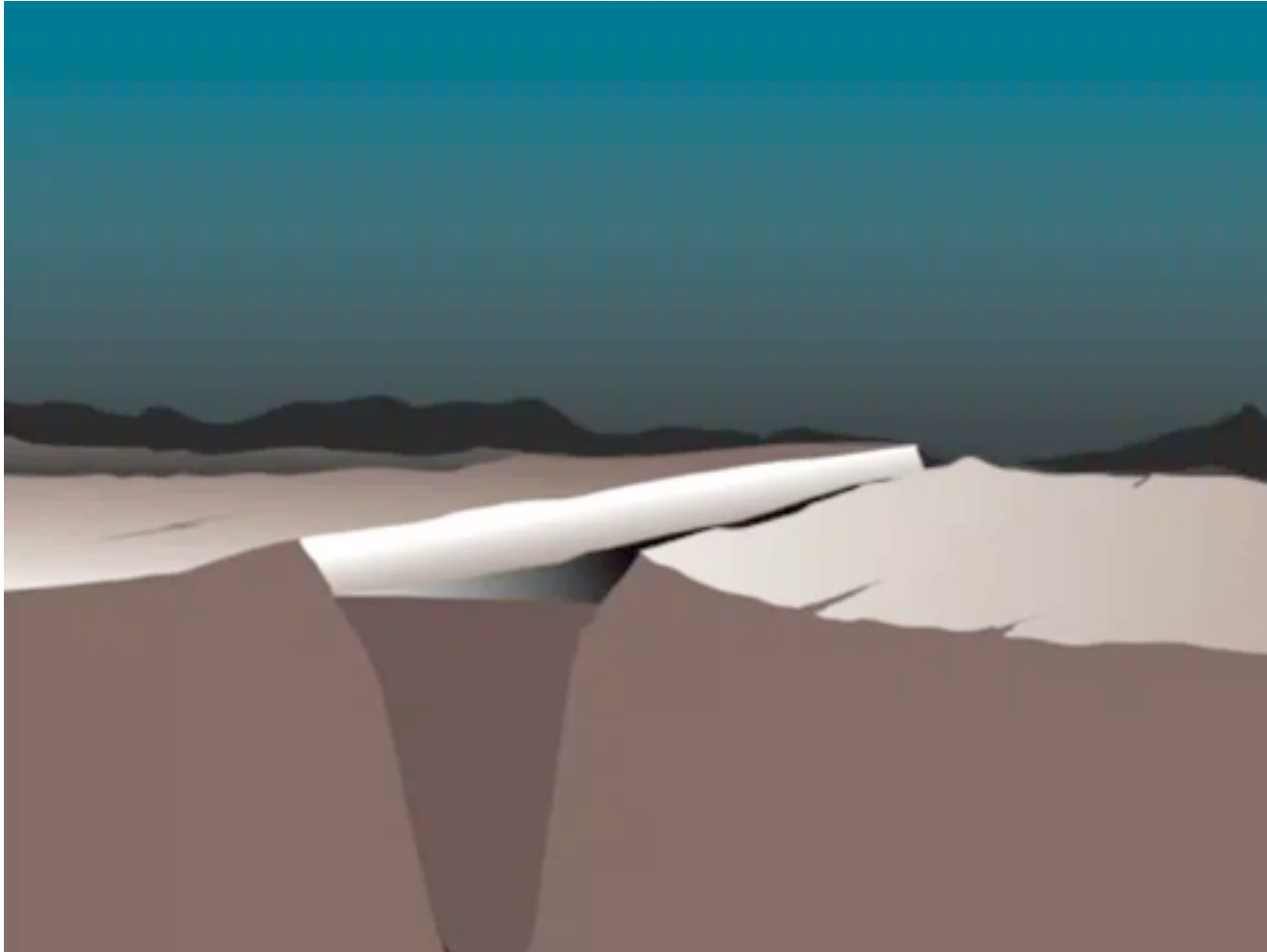


FIGURE 8. The acoustic source is shown to the right.



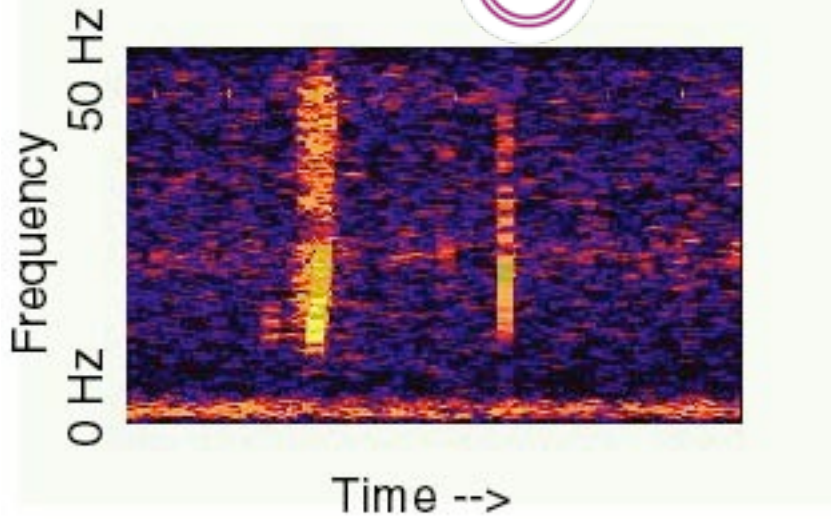
SO FAR... So What?



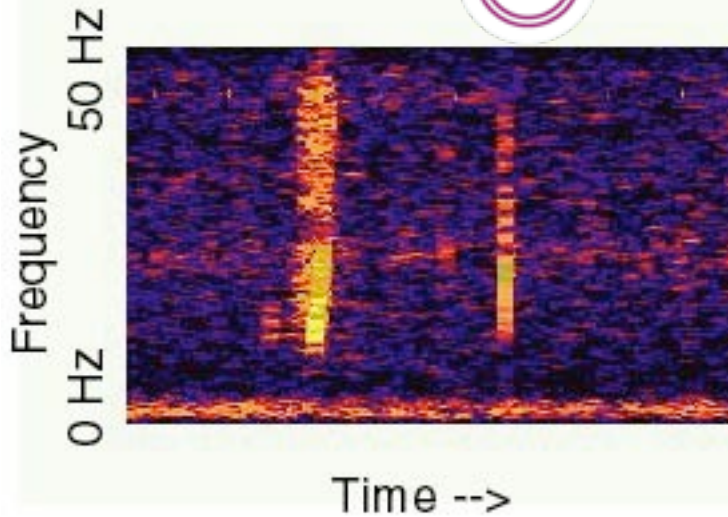
SOFAR... So What?



SO FAR... So What?

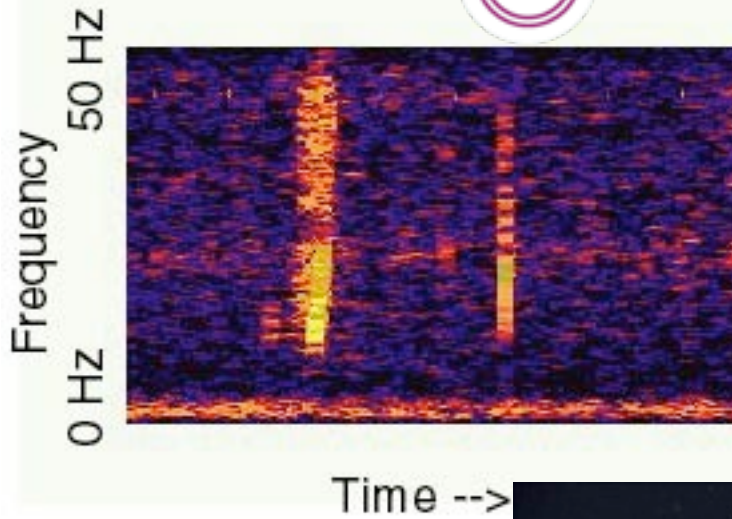


SOFAR... So What?

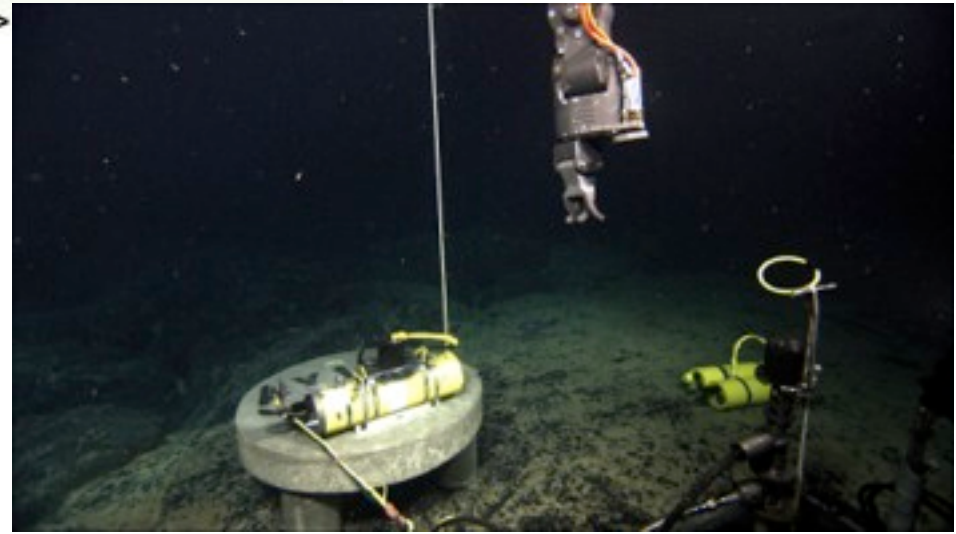
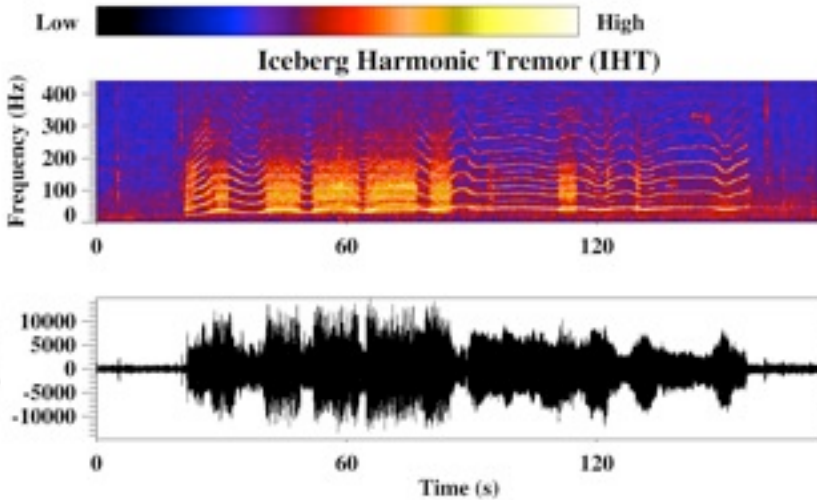


Ice Calving

SOFAR... So What?



Ice Calving





Earthquakes

Iceberg Events

...

Others?



Earthquakes

Iceberg Events

...

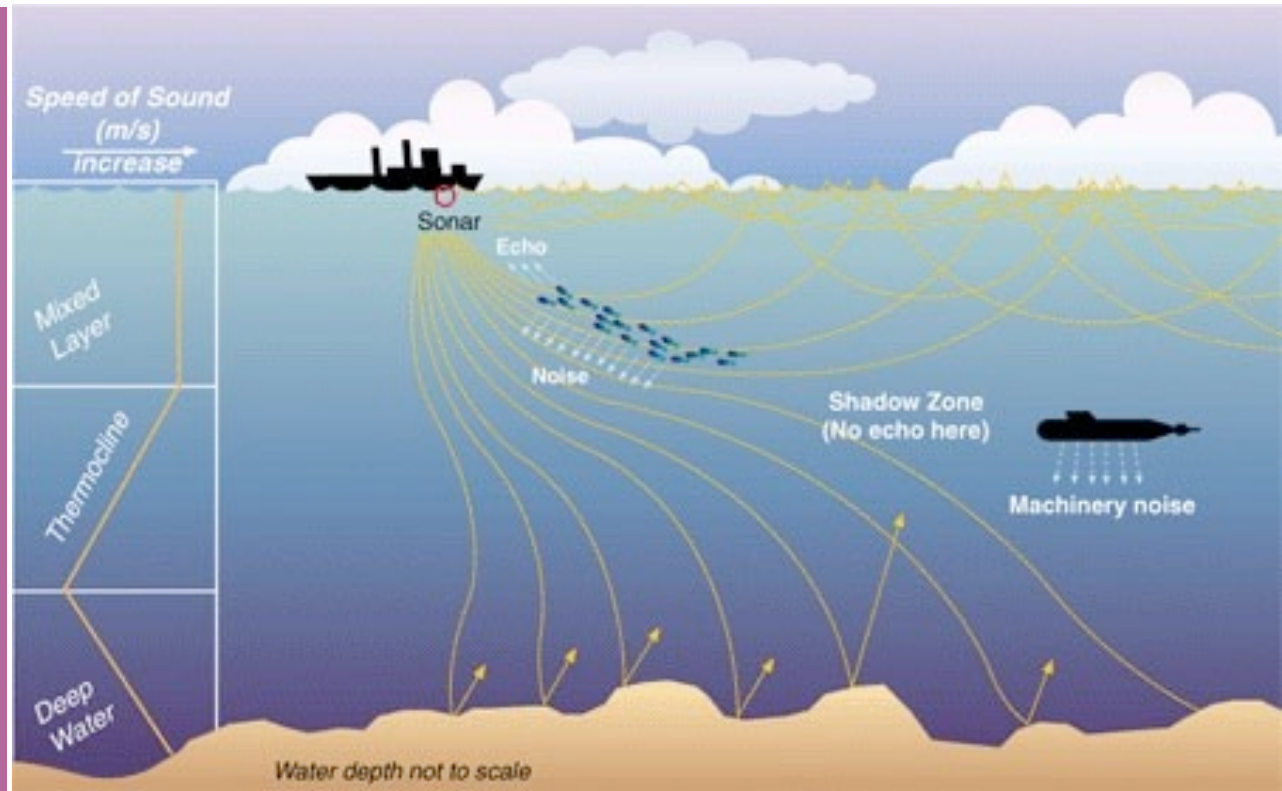
Others?

Earthquakes

Iceberg Events

...

Others?



Summary



Sound waves (p-waves) travel faster through more uncompressible medium

Sound travels slowest in a mid-depth called the SOFAR channel

Sound can travel through the SOFAR channel a long way (due to refraction)

The pitch (frequency) of the sound affects how far it can travel