Underwater Acoustic Propagation Modeling Webinar Outline
or
"How to ask intelligent questions about acoustic modeling"

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I. Before you fly, you need to walk: Review of wavelength, frequency, the Fourier transform, and other basic acoustic concepts.

II. Simple does not always mean bad: Basic analytic models
- -Spherical spreading model.
- -Introduction to dB notation and transmission loss.
- -Combined spherical/cylindrical spreading.
- -"Practical spreading" and power laws.

III. Turning down the volume: Water attenuation
- -How and why it is frequency dependent?

IV. Mud is the key to propagation: Bottom attenuation and reflection coefficient.

V. Returning to analytic models: Damped cylindrical spreading model (DCSM).

VI. Garbage in, Garbage out: What information do you need for more detailed models, and how do you get it?
- -Water and source depth
- -Bathymetric profiles
- -Bottom composition
- -Sound speed profile, including ducting conditions.
- -Surface roughness/ice cover.

VII. How to sound intelligent when interviewing a modeler: Choosing a more complex propagation model
- -Ray tracing
- -Normal mode
- -Parabolic Equation
- -What circumstances are best for each model?
- -What is the difference between "N x2D" and "3D"?

VIII: Beyond spherical cows: more advanced source modeling in space and time
- -Omnidirectional sources
- -Directional sources
- -Distributed sources
- -Examples of source models for seismic airgun arrays.

DOSITS Links:

Science of Sound/Sound Measurement/How is sound measured?
https://dosits.org/science/measurement/how-is-sound-measured/

Science of Sound/Sound Measurement/What units are used to measure sound?
https://dosits.org/science/measurement/what-units-are-used-to-measure-sound/

Science of Sound/Sound/How do you characterize sounds?
https://dosits.org/science/sound/characterize-sounds/

Science of Sound/Advanced Topics in Sound/What is intensity?
https://dosits.org/science/advanced-topics/what-is-intensity/

Science of Sound/Advanced Topics in Sound/Introduction to Decibels
https://dosits.org/science/advanced-topics/introduction-to-decibels/

Science of Sound/Sound/How do you characterize sounds?/Frequency
https://dosits.org/science/sound/characterize-sounds/frequency/

Science of Sound/Sound/How do you characterize sounds?/Wavelength
https://dosits.org/science/sound/characterize-sounds/wavelength/

Science of Sound/Sound Measurement/How are sounds viewed and analyzed?
https://dosits.org/science/measurement/how-are-sounds-viewed-and-analyzed/

Science of Sound/Sound Movement/Why does sound get weaker as it travels?/Sound Spreading
https://dosits.org/science/movement/why-does-sound-get-weaker-as-it-travels/sound-spreading/

Science of Sound/Advanced Topics in Sound/Cylindrical vs. Spherical Spreading
https://dosits.org/science/advanced-topics/cylindrical-vs-spherical-spreading/

Science of Sound/Advanced Topics in Sound/Propagation from a sound source array in the near field and far field
https://dosits.org/science/advanced-topics/near-far-field-propagation/

Science of Sound/Sound Movement/How does sound propagate from air into water?
https://dosits.org/science/movement/how-does-sound-propagate-from-air-into-water/

Science of Sound/Advanced Topics in Sound/How does sound move? Wave Propagation and Huygens' Principle
https://dosits.org/science/advanced-topics/how-does-sound-move-wave-propagation-and-huygens-principle/

Science of Sound/Advanced Topics in Sound/How does sound travel in shallow water?
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