# 1183041 Model-Based Coherent Noise Attenuation for Complex Dispersive Waves

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The attenuation of source-generated coherent noise energy can be a challenging problem for land data where surface waves often exhibit complex behavior with multiple propagation modes, high lateral variability and relatively short wavelengths. The traditional acquisition and processing strategy for mitigation of coherent noise has combined analog spatial filtering through source and receiver arrays in the field, with multi-channel digital filtering in data processing. The field arrays act as complementary spatial anti-alias filters for data processing algorithms which have difficulty in dealing with aliased events. Limitations of the available processing procedures place constraints on the acquisition design which can potentially both limit flexibility and increase the cost of the acquisition.

We present here a new model-based approach to source-generated coherent noise attenuation: an improved understanding of the near-surface forms the core of an integrated workflow aiming at the near-surface perturbation correction and noise attenuation. The analysis of coherent noise and the extraction of a surface-consistent distribution of noise properties are used first for characterizing the near-surface. Then the noise properties are used for the noise removal, generating a detailed model of the surface wave noise, spatially variable over the survey area, which can be subtracted from data.

Significant advantages of this approach are the ability to deal with large spatial variability of the noise properties, spatial irregularity of the acquisition geometry, and a relaxation of the effective spatial sampling required in the field to handle coherent noise aliasing in a robust way.

The model based noise attenuation does not rely on multichannel filters and can effectively address spatially aliased surface waves, even in laterally varying media. The development of robust aliased noise attenuation has particular relevance for survey design and acquisition economics since it allows some relaxation of the sampling criteria for coherent noise in the field and supports the use of ‘array-less’ point-source and point-receiver acquisition, with elimination of anisotropic array effects in the acquired data.

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