Abstract

Noise attenuation is a major seismic data processing concern. In seismic data, noise can appear as random, coherent and/or impulsive. Recently, many different techniques, ranging from relatively simple processes to extremely complex ones, have been used for noise attenuation. Image filtering techniques are relatively new methods in seismic exploration. We introduced the anisotropic non-linear diffusion filter which is an effective way to de-noise images. Since a seismic section can be considered as an image of a two-variable function, we implemented the anisotropic non-linear diffusion filter to reduce both random and Gaussian noises. This filter is shown to be effective in removing noise while preserving edges and hence reducing resolution loss in seismic data. The anisotropic non-linear diffusion filter, with Tukey's function to guide the diffusivity, was applied to synthetic and real seismic data. The results show a signal-to-noise ratio increase with reflector continuity in addition to better recovery of reflector amplitudes even when dealing with complex subsurface geological structures