

## Abstract

Seismic noise is a fundamental part of seismic data which cannot be avoided when conducting any seismic survey. It consists of coherent and random noise. Noise removal or filtering is one of the major concerns in the field of seismic processing. In this paper, we introduce an image filtering technique based on a detection-estimation algorithm for Gaussian and random noise removal in seismic data, namely the trilateral filter, based on a statistic called rank-ordered absolute differences. The non-linear and adaptive behaviour of this filter makes it very robust in the presence of random and coherent noise, in addition to its computational simplicity and its ability to automatically identify noise in data. We have modified the strategy of trilateral filtering by adapting the rank-ordered absolute differences formula in order to extract the signal component. We have successfully used this filter for the removal of surface waves and random spiky noise from synthetic and field data. Results are very encouraging and show the superiority of this filter compared with other filters, particularly when used recursively