Nonlinear Processes
in Geophysics
Discussions

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Interactive comment on "Toward the assimilation of images" *by* F.-X. Le Dimet et al.

J. Ma (Referee)

jma@hit.edu.cn

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Data assimilation is the science of coupling information coming from different sources: model, statistics and observations. Data assimilation has been successfully applied to meteorology and oceanography. It was also used for fields such as agronomy, economy, medicine, and oil/gas reservoir description in exploration geophysics (see attached references). Variational method proposed by Le Dimet and Talagrand in 1986 plays important role in the field of data assimilation. In last decade, the researchers pay attentions to the use of quantitative information rather than qualitative analysis from the observed image sequences. In this paper, the authors made a nice review on the variational data assimilation with the use of quantitative image information, and described several possibilities for such assimilation and identify associated difficulties. The paper is well organized and written.

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Eq. (26) can be defined as "scale-dependent hard thresholding". The thresholding rules in 1 and 3 in the same page are actually the special cases of Eq. (26). The motivation of the thresholding is to extract the edge structures of images. The edge structures and motion vectors are extracted simultaneously by the curvelet transform, in the reference "J. Ma, A. Antoniadis, F.-X. Le Dimet, Curvelets-based multiscale detection and tracking for geophysical fluids, IEEE Transactions on Geoscience and Remote Sensing, 2006, 44 (12), 3626-3638". The description could be added in the final version.

The paper is recommended to be published.

1. P. Chen, Full-wave seismic data assimilation: theoretical background and recent Advances, Pure and Applied Geophysics, 168(10):1527-1552.

2. Y. Dong, Y. Gu, D. Oliver, Sequential assimilation of 4D seismic data for reservoir description using the ensemble Kalman filter, J. Petroleum Science and Engineering, 2006, 53, 83-99.

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