General comments

The objective of this paper is to take benefit of a log-transformation applied on SAR images, allowing changing the multiplicative model of speckle into an additive model.

The authors show that such a transformation brings some interesting properties, such as the variance of log-data which is no longer dependent with the background reflectivity.

I have two concerns with this approach, or at least with the way the approach is presented and detailed:

- I haven't seen the real interest of such a transformation
    - it is evident that the performance of any filter can be estimated and evaluated in the multiplicative domain - it has been done in many papers cited as references
    - yes, the variance varies with the mean radiometry: but this is why the coefficient of variation is commonly used
    - the MSE can be used also without any pre-log-transformation
    - the arguments for using a log-transformation are rather weaks
- The paper is somehow quite long and rather confuse - difficult to see what the authors would like to really assess: the comparisons of filters or the utility to work in the log domain?

Notwithstanding the above, there are several interesting points in the paper:

- The authors highlight the fact that the evaluation of a filter does depend on the subsequent use of the filtered data: a filter can be suited for a given application and not for another one
- There is a valuable effort to reach objectives results and to provide a balanced conclusion between the pros and the cons of their results

Overall, my conclusions are :

- this paper is interesting and is worth being published provided significant changes
    - I find the paper is too long, and some sections should be removed (see below) because recalling some calculations and modelling of SAR data is useless today - I don't know if the letter format might be more suited to this type of paper - I let the authors and the editor decide on this possibility
    - There are a lake of global clarity to understand why
- What I would like to read
    1. a clear description of the approach and why the authors are using the log-transformation (there are already some pieces)
    2. An assessment of the interest to perform this log-transformation: it means that comparisons of filters in the lin- and log-domains shall be performed - otherwise, my first reaction is: "why doing this log-transform? Just to make an easier comparison of these filters while this can be done in the linear domain?"

Particular comments

In the following PXLY refers to Page X and Line Y of this page.

I - Introduction

- P2L10: heteroskedastic : if this term brings an important information here, it should be explained
- P2L29: "are normally preferred": I would write that it is a necessity
- P2L45: There is a criticism of some other papers:
    - Though I find this statement severe (but true), I wonder if this paper really differs from the ones criticized by the authors

II - Related Work in Literature

- P3L38: "to the normal usage" - I would replace by "to the purpose of such filters"
- P4L16: "It is clear that the bias...": to me, there is no real difference between evaluating a ratio or a difference in order to assess the radiometric preservation of a filter.
- P4L25: from a theoretical point of view, these filters are unbiased : any observed deviation is actually due to the limited number of samples
- P4L34: the ENL was introduced before ((at least) Lee by Ulaby, Fung and Moore (Microwave Remote Sensing)

III - Logarithmic Transformation

- Section A could probably be shortened, or even removed
- P9l29-38: I disagree with the statement. To assess the homogeneity conditions, the variance is not used but the coefficient of variation instead (see equations of Lee, Kuan and Frost filters)
    - The estimation of the variance is a problem in itself, independently from the fact that this variance is related to the mean reflectivity. But the relationship between mean and variance makes things more difficult
- P9L52: very important statement - this is actually the justification of the paper
- P10L47: typo errors

IV - Evaluating Speckle Filters on Homogeneous Areas

- Section A: is there any reason why Table IV does not include L=1 (single-look case)?
- P20L56: this is one interesting point - all estimations made in the log-domain can be done in the linear domain as well

V - Evaluating Speckle Filters on Heterogeneous Areas

- P21L56: could you explain what do you mean by "smaller requirements"?

VI - Using MSE to find the most suitable ...

- The comparisons between all filter is interesting but I would have liked to see comparisons between the linear domain and the log domain approaches
- P28L44+
    - It is not because ground-truth is not available that only visual comparisons can be performed
    - Fig. 12 shows a significant difference of mean grey level, that I interpret as a difference of mean: first, the original image shall be presented; second, as far as I know, neither MAP and Lee filters are biased: so why this difference of mean?

VII - Discussions and Conclusion

- P32L32: 3x3 sliding window: obviously, such a small size is barely acceptable as you worked with simulated data for which we can assume that your samples are not correlated. Even in that case, computing your statistical index with only 9 samples leads to a variance of estimation; in case of real SAR images, the number of independent samples falls down to 4 or 5, that is clearly not enough

- P32L47: the http link does not work