

Interactive comment on “Regularization Destriping of Remote Sensing Imagery” by R. Basnayake et al.

Anonymous Referee #2

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The paper is overall well-written and describes how to deal with an important problem when using remote sensing data, especially for using infrared and visible frequencies for satellite imagery, that of striping. The paper presents a method which is able to diminish and correct the impact of striping.

Despite some minor grammar and orthographic errors, the paper is well-written, explains the problem clearly, presents the method in a clean manner and provides a sufficient amount of details of it. My only real concern with this paper is its suitability for Nonlinear processes in geophysics, as no nonlinear geophysical process is described in all the paper, just a processing technique (interesting as it is).

Some minor comments:

- How is the direction of stripes identified in general?

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- What happens if the stripes contain valid information, i.e., there is an offset and/or a rescaling? Shouldn't they be considered, after readjustment?

- Eq. 9 has more undetermination than just a constant value: any function in the kernel of the operator $D_{xx} + \alpha L D_{yy}$ can be added to a solution and will yield a new solution. In fact, the point is that the matrix A is non-invertible. This is connected with the discussion on condition numbers in Section 2.3, but prior to go directly to discuss any regularization I think this point deserves some comments.

The issue is significant for instance on page 7, when developing the U-curve method, as one important parameter is the minimum non-zero singular value. How do you decide that some value is non-zero for a given numerical precision? A threshold is for sure used, and the point should be clarified, explaining in particular this choice.

Chlorophyll images are not as smooth as claimed, chlorophyll concentration being very intermittent. Even SST present strong frontal zones that break smoothness. Along fronts they are indeed smooth, but not across fronts, so anisotropy is a key ingredient. Some problems may arise with the part of the front that is eventually aligned with the stripe direction. Please comment the issue.

The absolute percentage error on page 10 is not correctly defined, as referring to a value with a conventional origin is meaningless (imagine how this error would change if you take the SST in Kelvin or in Celsius, for instance). It is much more customary to compare errors to the dynamic range of the image (for instance, as measured by the standard deviation of the values).

12 is not a magic number; please be more descriptive about how to choose the threshold in figure 5. And please provide units.

Although it is a bit beyond of the scope of the paper, it will be very convenient to have an in-situ validation dataset for verifying if the destriped images are of higher quality.

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