Earth **Surface**
Dynamics

Discussions

Interactive comment on "Measuring Subaqueous Progradation of the Wax Lake Delta with a Model of Flow Direction Divergence" *by* John B. Shaw et al.

Anonymous Referee #1

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Shaw et al. submitted a study titled "Measuring Subaqueous Progradation of the Wax Lake Delta with a Model of Flow Direction Divergence", focused on the use of streaklines from aerial imagery to derive channel tip locations of the Wax Lake Delta. Their main conclusion is that flow convergence occurs at a distance ∼130m downstream of the channel tip.

General comments The study is reasonably well written and organized. My major concern is one of the study's significance. The authors have devised a method to find flow divergence and convergence. The distance between flow divergence and the channel tip (growth rate) is brought as the main contribution of this study. I personally

do not understand the significance. Is there anything here we can learn about process? It is good to see a comparison with Delft3D, but again the authors do not interpret their results. Why is flow diverging/converging? What are the morphodynamics that lead to this behavior? Do the authors expect the same behavior for other deltas? Why (not)?

A second, derived, conclusion of this study is about delta aerial growth, which the authors extract from channel tip locations. In this section there is also no interpretation or discussion about process understanding that can be derived from this data. Does this view of delta area change we way we think of delta morphodynamics, in general or specifically of the Wax Lake Delta?

Overall, I have to conclude that the study does not address a relevant scientific question, and that a shift towards process understanding would require a significant departure from the presented manuscript.

Specific comments P2/3: Section 2 reads like an unorganized mix of different topics ranging from river mouth bars to flow patterns to hydrological connectivity and streak lines. I would ask for better organization and preferably subheadings.

P3L7: remove "strong". Both Leonardi and Nardin modeled relatively low energy marine environments.

P3L18: I strongly suspect streaklines do not track depth-averaged flow, but rather that this case study was performed in a setting where surface flow directions are a good approximation of the depth-averaged flow.

P3L19: how can Shaw et al (2016b) claim reasonable accuracy if validation was done months after the remote sensing images were obtained. I would rephrase this to read more like: "despite limitations in the validation, Shaw et al found reasonable agreement between streaklines and morphology..." or similar.

P5L11: what is Dcr?

Fig 1: difficult to read. Perhaps here or in figure 2 explain the structure of the diver-

gent/convergent streak lines.

P5L26: what is a "7% uncertainty for a delta"?

P6L6: the median delta-l for the modelled deltas are within the range of the grid size of the model. Is delta-l even significantly different from a zero mean?

P8L23: with steady boundary conditions Delft3D produced a "significant distribution in delta-l" so winds/tides are unlikely to be a major concern. The authors then follow with a statement that Delft3D variability was less than half the Wax Lake delta variability. So winds/tides could a significant factor?

P10: Why is this a better characterization of delta growth? There are still deltaic deposits beyond the channel tips.

C3