

Interactive comment on “A global delta dataset and the environmental variables that predict delta formation” by Rebecca L. Caldwell et al.

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This paper uses a global database to understand the controls on the formation of deltas. This is an important step from the qualitative Galloway classification to more quantitative analysis. The key findings include the log odds relationship between delta likelihood and environmental parameters (Equation 1) and the relative importance of upstream and downstream controls to delta formation. This work is going to be helpful for the people working in ancient, modern and experimental deltas, especially if this database can be accessed by the public. I have several comments below.

General comments:

My main concern is about the role of sea-level change. We know it is important for the

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formation of deltas (Stanley and Warne, 1994, which was cited in this work). I think (1) the range of sea-level change rate of past 26 years might be too limited to influence the delta likelihood; (2) the mapped deltas initiated way before 26 years – most of them formed around 7 ky. So it is worth being more careful when discussing the sea-level change, even though I notice the authors emphasized ‘RECENT’ sea-level change in abstract and conclusion.

Section 2.1 provides good criteria to recognize delta. However, I’m not sure how authors map them. Are they mapped manually or processed by some programs? If it is processed by programs, how reliable is it?

It might be beyond the scope of this study but some sensitivity analysis should be useful when discussing the relative importance of each parameter. The effect in equation 1 (0.000524, 4.77, -0.952, -0.175) shows the Q_w is the least important parameter.

I believe before Galloway ternary classification, people used constructive system and destructive systems, at least for ancient deltas (See William Fisher, 1969, GCAGS). When talking about constructive and destructive forces, it might be good to acknowledge them.

Detailed comments:

Page 8 Line 12 Yes, the range here is fairly limited. The rate of Cenozoic eustatic sea-level change went over three order of magnitude. It might be worth comparing the range of eustatic sea level change rate of past 7000 years (when most of the deltas formed) and the past 26 years data here.

Page 8 Line 20 – Page 9 Line 3 Using numbers instead of ‘high’ and ‘low’ when describing delta density

Page 121 Line 21 A typo ‘.4.77’ before Q_s

Table 1 There is a mistake for the unit of sea-level change rate, should be L/T (mm/s?), instead of ‘m’ Also please check the unit for Q_s and sediment concentration. Sediment

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discharge refers to sediment transport mass per unit time. Unit is commonly Mt/yr??
Unit for sediment concentration is commonly mg/l?? I guess these units will influence
the log odds relationship?

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