

Summary of *Fan-deltas and braid deltas: Varieties of coarse-grained deltas*

In this paper McPherson *et al.* describe what they consider is an issue of classification concerning deltas originating from alluvial fans, and those originating from braided streams. At the time of publication, fan-deltas are described as an alluvial fan prograding directly into a body of standing water. Though this was the definition for many years, the term fan-delta had become broad, and many times referred to those deltas originating from a braided stream, and with no alluvial fan influence. Including the braided stream environment within the definition of a fan-delta causes numerous problems. This broad definition of the term removes the association of an alluvial fan to a highland depositional area and the association of an alluvial fan to a rather small depositional area as alluvial fans and braided streams do not share these characteristics. This classification also combines one potentially poor hydrocarbon reservoir rock with another, typically better, potential hydrocarbon reservoir. The lithology of alluvial and braided stream fan deltas are not very similar either. Particularly in the sub-aerial zone, alluvial fans exhibit massive clast supported conglomerates with an appreciable amount of matrix and a large amount of both vertical and lateral variability. Braided stream deposits are typically devoid of matrix, with deeper channelized flow leading to cross stratification and normal grading, and typically high lateral continuity because of longer transport distances. Because of these many differences, and important academic and economic consequences, I believe the authors are justified in proposing the term of "braid delta" to classify these structures, and to narrow the definition of fan-delta back to what it was originally.

The academic and economic impact of grouping both types of deltas together is what I find to be the most important part of reclassifying these two depositional environments. Recognizing that an alluvial fan typically indicates an active faulting area while a braided stream

does not mean that grouping both fan-deltas and braid deltas together gives you a situation with vastly different paleotectonic settings inside the same classification. This could easily lead to a confusing situation in the discussion of fan-deltas and paleotectonics. Even more impactful, is the fact that both these environments could be hydrocarbon reservoirs. With both of them located stratigraphically up from typical hydrocarbon sources, liquids could migrate into these rocks, but with one environment displaying the potential for a much better reservoir than the other. By creating a new classification for braided streams, which are typically the better hydrocarbon host, this would limit the amount of work that would be needed to determine which fan-deltas would be probable reservoirs.

Overall, I think the authors make a good point for dividing the fan-delta classification in two. By splitting this category they remove what could be quite a bit of confusion between alluvial fan related environments and braided stream environment, two places that don't share many characteristics. Assuming that braided deltas are of significant economic interest over fan-deltas makes distinguishing between the two important in an industrial sense as well.

References

McPherson, J. G., Shanmugam, G., & Moiola, R. J. (1987). Fan-deltas and braid deltas:

Varieties of coarse-grained deltas. *Geological Society of America Bulletin*, 99(3), 331.

doi:10.1130/0016-7606(1987)992.0.co;2