Fluvial Fans - Towards New Predictive and Reservoir Models

Mark Hansford[1]

[1]Colorado School of Mines, Sedimentology, Golden, CO USA
hansford@mymail.mines.edu

ABSTRACT

Weissmann et al. (2010) proposed that fluvial fans may form the bulk of the continental fluvial records. It follows that most fluvial reservoirs are likely to occur within fluvial fan deposits. In contrast, the existing predictive and reservoir models consider tributary fluvial systems. Thus our current models may not apply to the majority of the fluvial sedimentary record. If fluvial fans do form the bulk of the fluvial records, we need a paradigm shift in our understanding of river systems and how they build the sedimentary record.

Such paradigm shift requires new stratigraphic models that connect quantitative data on modern fan morphology with stratigraphic data from the sedimentary record. Stratigraphic models are a key component of exploration predictions and reservoir modeling. This project proposes a global analyses of modern fluvial fans using satellite imagery, followed by comparison to ancient sedimentary record. Special attention is on the link of fluvial fan occurrences to climate conditions, as climate is an essential control on fluvial facies and architecture, and this climate link is currently a key issue of the debate on fluvial fans. We propose to collect quantitative data from the satellite imagery on scaling relationships between fans, lobes and their formative channels, and assess their link to river hydrology and climate conditions. We will then test if the fan-lobe-channel hierarchy can be established in the stratigraphic record, with the overall aim to move towards fluvial fan predictive and reservoir models that honor both modern and ancient data and utilize quantitative scaling relationships.