

## **Geometries Your Geophysicist Never Told You About: Cascading Forelimbs**

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Most conceptual and kinematic models of compressional, fault-related fold models have smooth frontal limbs. Interpreters apply these models regularly where seismic image quality leaves room for interpretation. While many folds are well described by the models, there are a considerable number of folds whose frontal limbs consist of steps of alternating steep beds and nearly flat beds separated by tight hinges. The strata seem to fall down from the anticline like cascading waterfalls, hence the term “cascading folds.” For these structures, interpreting with the right model is important for accurate assessment of fluid contacts, reservoir connectivity generally, and especially for fracture-modeling and secondary recovery.

Cascading folds often occur in frontal limbs of anticlines that are described as detachment folds, fault-propagation folds, or Tri-shear areas. Small reverse faults may cut through the hinges separating the individual steps; as a general rule, the steeper the overall flank, the higher the probability of small scale faulting. The size of the steps ranges from kilometers to decimeters and are typically too small or too steep to be imaged seismically. Thus they are usually overlooked and may be found in many fields that are under production for some time.

This talk will (1) present well-exposed outcrop examples (from the Alps, Zagros, Tien-Shan, and Canadian Rockies) to document the overall and detailed structural relationship, and (2) demonstrate how to evaluate subsurface examples using high-quality dip meter and image log data.