

Getting the Most out of Core during Fracture Studies

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Assessing natural fractures in core requires a unique mindset. Instead of getting information from a slabbed face, core must be picked up so that all surfaces can be examined since not all fractures penetrate a slab. Information on the relative orientations of different fractures is lost as the articulations between core segments are destroyed, so fracture studies should start before slabbing and sampling, and ideally checked again after slabbing. However, reliable fracture studies can be done using slabbed and sampled core if it is not badly broken, especially if both the slabs and butts are examined. Core from a deviated hole can be oriented using bedding and a wellbore deviation survey. Paleomagnetic core-orientation techniques work where long, intact core intervals are preserved, and comparisons between cores and image logs are invaluable in both orienting a core and in calibrating the log images. Where core is oriented with a survey, the survey must be quality-checked by comparing plots of the scribe rotation to the survey data, and depth correlations must be made by comparing the locations of spin-offs, connection breaks, rubble zones, and scribe skips to abrupt changes in the reported orientation so that the proper orientation data point is applied to each fracture. Many types of coring-induced petal fractures haunt both horizontal and vertical cores, providing information on fracture orientations, and on the in situ stress magnitudes and orientations. Other subtle features such as tri-cone indentations at the top of a core run and core-catcher scars are useful in re-creating a reservoir fracture system if they are recognized and correctly used.