

Borehole breakout data

Borehole breakouts are stress-induced enlargements of the wellbore cross-section that occur when a well is drilled in rocks in an anisotropic stress field (Bell and Gough 1979; Zoback et al. 1985).

They develop in two opposite zones of the borehole wall along the direction of the minimum horizontal stress (S_{hmin}). We determine breakouts by using ‘four-arm caliper’ tool following the main criteria reported in Plumb & Hickman (1985). We use deep vertical well data (down to 7 km) and discard the data up to 450 m depth. We apply the circular statistics of Mardia (1972) to compute, for each borehole, the mean breakout orientation and its standard deviation (95% confidence interval) weighed by length of breakout intervals. Usually, breakout zones are plotted as a rose diagram, with bars proportional to cumulative breakout lengths. The [World Stress Map project](#) quality ranking system (Heidbach et al. 2010) used to classify the breakout orientation of each well, from A to E, takes into account the number of breakout zones, the total length of breakouts and the variability of the measurements (standard deviation of the orientations, sd).

[WSM guidelines](#), see §4.

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