If the regional stress state is either normal or thrust faulting, then the breakout pattern nodal points are likely to be found at low borehole deviations, resulting in a good determination of the principal stress directions and the stress state ϕ ratio. If the regional stress state is strike-slip or has a large amount of strike-slip faulting in it, then highly deviated boreholes are required to constrain the stress tensor.

We applied our technique to the *Qian and Pedersen* [1991] breakout data, where we showed that removing the constraint of a vertical principal stress direction lowered the total misfit between the best fitting model and the data. The *Qian and Pedersen* [1991] inversion falls outside the 95% confidence limits found on our solution. However, our determination of the horizontal maximum principal stress direction agreed with *Qian and Pedersen*'s [1991] result to within 1.6°. The data also showed an unconstrained ϕ ratio, since the borehole orientations did not vary sufficiently to locate a nodal point in the breakout pattern.

Finally, we inverted a breakout data set from the offshore Santa Maria Basin, California, and determined that the maximum principal stress direction is oriented N148.5°E and plunges 31.5°. The 95% confidence limits on the S_1 azimuth are N143.0°E to N198.1°E. The inversion also yielded a stress state in which none of the principal stresses are vertical. The S_3 direction is the principal stress closest to vertical, making a 31.9° angle away from vertical. This is a highly nonvertical stress for being within 1.2 km of the surface.

Because of the highly variable borehole azimuths and deviations of wells drilled from offshore platforms and because oriented caliper data are generally recorded for such wells, a large quantity of data probably exist that can be inverted by using our technique. If more detailed borehole imaging is available to constrain breakout orientations (e.g., formation microimaging, borehole televiewer), this technique can also be applied with a higher degree of confidence regarding the quality of breakouts used in the analysis.

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