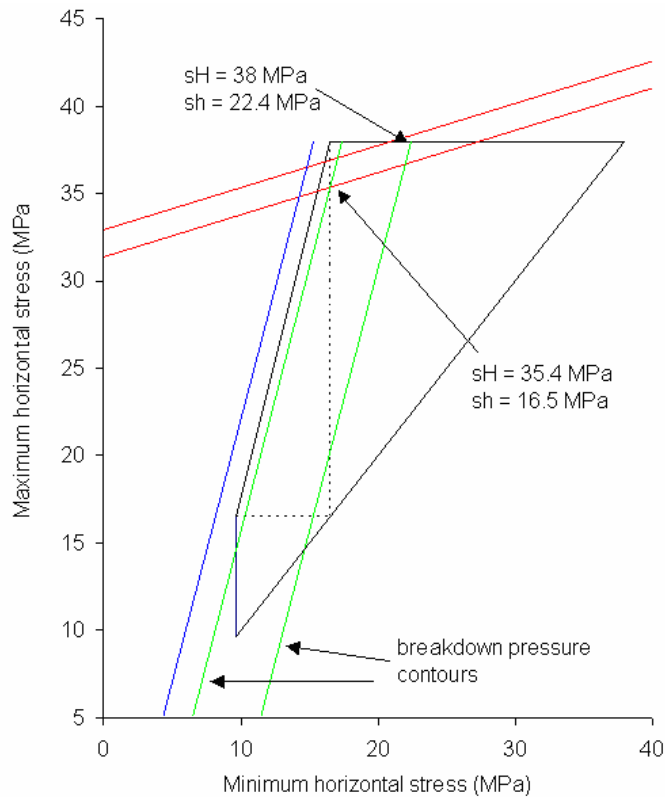


Reservoir stress characterization under uncertainties

Knowledge of in-situ stress magnitudes and directions is critical to minimise mechanical failure of wells during drilling, to maximise the effectiveness of hydraulic fracture by appropriate treatment design and to minimise sand production during production from the reservoir. Characterisation of in-situ stresses, particularly the horizontal stresses, is still heavily dependent on breakdown or leak-off test technique whereas the vertical stress is almost invariably determined from density log. Apart from other uncertainties, there is an obvious scope for argument whether this approach adequately accounts for Poisson's and tectonic behaviour of underground rock to maintain stress equilibrium. In reality, the range of disparity in theories used for in-situ stress characterisation is wider. Also extremely pressurised wellbores may respond in various ways, such as tensile fracture, compressive shear, fracture reopening, borehole ballooning, etc., and thus the use of appropriate theory through appropriate identification of response mode is crucial to enhance the certainty in in-situ stress characterisation. The project aims to integrate information from various sources (breakdown test data, drilling data, density data, seismic data, etc.) in conjunction with various theories in order to reduce the uncertain space.



Stress Polygon to model uncertainty range in characterized stresses.