



## **Analysis of fractures and breakouts from image logs of wellbore**

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Fractures and borehole breakouts from image data acquired from Logging-While-Drilling (LWD) was identified and analyzed using GMI Imager software. Fractures on LWD resistivity image data clearly appear as sinusoids. On the images, conductive fracture appears as dark-colored images, and resistive fracture show light-colored images. Generally borehole breakouts appear along the borehole wall in the direction of the minimum horizontal stress. In other word, borehole breakouts in a vertical hole form in a direction perpendicular to the maximum horizontal principal stress.

In this study, we analyzed borehole breakouts on the LWD image data (borehole radius and density data) acquired from Site U1378, IODP Exp. 334 off Costa Rica. We estimated present-day in situ stress orientation from borehole breakouts. Breakout orientation of slope sediments at Site U1378 indicates that maximum horizontal principal stress direction is oriented northwest-southeast. This direction is probably related with plate movement in this area. Faults observed from core samples reflect well the direction of maximum horizontal principal stress. We also investigated dip and direction of fractures on the LWD resistivity image data from two sites in the Ulleung Basin, East Sea. Dip angles at two sites are  $42^{\circ}$  and  $62.5^{\circ}$  in average, respectively. Dip direction shows preferred orientation northerly. From fracture analysis, the maximum horizontal stress direction may be NW-SE direction. This pattern likely reflects well regional stress regime in this area.