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Borehole breakout analysis from borehole image logs in the Ulleung Basin, East Sea: preliminary results for interpretation of *in situ* stress state

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In 2010, the Gas Hydrate Research and Development Organization (GHDO) of Korea acquired Logging-While-Drilling (LWD) data from thirteen sites in the Ulleung Basin, East Sea (KIGAM, 2012). The results of fracture analysis using LWD image data were published in the literatures (Kim et al., 2013, 2015). Fractures were identified in the chimney sites of the Ulleung Basin, East Sea. In this study, borehole breakouts from LWD image data were identified and analyzed using GMI Imager software. The borehole breakouts were only identified in the specified intervals at three LWD sites (UBGH2-3, UGH2-8, and UBGH2-10). The mean of borehole breakout azimuth for three sites is the range from 95.47 to 106.22 degree. The mean of borehole breakout width is the range from 38.36 to 70.64 degree. The borehole breakouts occur discontinuously along the borehole wall in the direction of the minimum horizontal stress. They show two vertical bands separated by 180° in breakout zone. But the borehole breakouts are not frequently and clearly identified throughout the hole at three sites. This is why the depths of borehole breakouts investigated are only limited in the intervals of unconsolidated sediments characterized by elastic property of marine soil. In other words, it is because the breakout does not create more in sediment than rock. In addition, it may be due to weak present-day *in situ* stress in this area. However we can roughly estimate present-day *in situ* stress orientation (maximum horizontal stress direction of NE-SW) from borehole breakouts analysis.

References:

- [1] KIGAM (2012) UBGH2 Expedition Report, 666p.
- [2] Kim G.Y. et al. (2013) Marine and Petroleum Geology 47: 182-194
- [3] Kim G.Y. et al. (2015) Marine Georesources and Geotechnology 33: 579-585

