SPE-194067-MS

Challenges and Solutions for Accurate Wellbore Placement in the Barents Sea

Alexander Mitkus; Stefan Maus; Marc Willerth; Andrew Reetz; Ray Tommy Oskarsen; Morten Haug Emilsen; Amir Gergerechi

Abstract

As development of the Barents Sea continues with new plays such as the Castberg, accurate specification of the local magnetic field is important to reliably infer the orientation of the bottomhole assembly (BHA) in horizontal drilling. Since magnetic fields at high latitudes vary spatially and temporally, one requires both spatial models and a way to capture temporal changes. Large temporal changes in the magnetic field can severly distort measured azimuths and therefore must be corrected for.

This study, based on a report written for Petroleumstilsynet (Maus et al., 2017), shows that in regions of the Barents Sea within 50 km of a magnetic observatory, either the nearest observatory, interpolated infield referencing (IIFR), or the disturbance function (DF) method may be used for corrections in wellbore surveying to meet accuracy requirements. IIFR and DF will give better error reduction but are slightly more complicated to implement. At distances between 50 km and 250 km, the disturbance field (DF) method best meets accuracy requirements. In remote regions beyond 250 km, a local observatory must be deployed to meet the highest accuracy specifications, but the DF will still far outperform the other interpolated methods at such large distances from an existing observatory.

Despite having focused on the Barents Sea region, this comparison of the accuracy of different spatial and temporal magnetic field mitigation methods for wellbore surveying is applicable to high latitude northern and southern regions across the globe.