

Rock Physics guided Earth model building and Sub-salt angle gather tomography for imaging and pore pressure

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ABSTRACT

Earth models are primarily based on gather flattening criteria or well velocities. Uncertainty in tomography solution increases in presence of anisotropy or subsalt where incidence angles are small. The latter is a major problem for subsalt pore pressure prediction and well planning. The subsalt challenge has been a major push for newer acquisition with longer offset to get more illumination and angle below salt. However in Gulf of Suez the low angle problem is even more severe as the operational difficulties severely limit the maximum offsets possible in acquisition. In this study we constrain the subsalt tomography using geology in conjunction with thermal history modelling and rock physics principles. This is referred to as rock physics guided velocity modelling for migration and pore pressure prediction. A novel feature of this technology is to use predicted pore pressure as a guide and constrain to improve the reliability of the Earth Model. We use angle gathers which enable us to shift the source and receiver below salt which helps us overcome the ray limitations of the Kirchhoff ray tracing based tomography. We are able to produce a velocity which improves the imaging and is more consistent with rock physics and geology.