
Fast and Easy Near Surface Correction of an Arabian Peninsula Seismic Line Using the Topographic Datuming Operator

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We apply a methodology for seismic data redatuming in the presence of rugged topography and geophysically complex near-surface using a new prestack operator, the Topographic Datuming Operator (TDO), on synthetic and real data. TDO, unlike static corrections, allows for the movement of reflections laterally to their true locations corresponding to the new datum level. Thus, it mitigates mis-positioning of events and velocity bias introduced by the unphysical time-invariant vertical shifts carried out by static corrections. The application to synthetic data of the proposed methodology demonstrates the ability of TDO to remove the detrimental effects on the data of a rugged topography and a complex overburden similar to those encountered in the Arabian Peninsula. As a result, conventional poststack processing and migration yields a good image of the deeper low relief structures. Using shallow velocities estimated from refracted events, TDO provides a superior continuity to reflections and focusing for real onshore Arabian Peninsula data than that obtained from conventional static corrections. The marginal additional computational cost and the possibility of estimating, after TDO redatuming, stacking velocities that are not affected by a spurious positive bias as in the case of static corrections to a deep datum are the other advantages of the proposed methodology.
