FULL-ELASTIC REDATUMING OF MULTICOMPONENT SEISMIC DATA (P-55)

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Redatuming is the computational process that transforms seismic surface data to a new data-acquisition plane (datum plane) in the subsurface. This process is essentially based on the elimination of wave-propagation effects between the surface and the new datum in the subsurface. For redatuming of multicomponent seismic data it may appear attractive to make use of the full-elastic Kirchhoff-Helmholtz integral. This integral expresses the particle velocity at any point in the subsurface in terms of the recorded particle velocity (and zero traction) at the earth's surface. The underlying assumption is that the macro model of the subsurface is known. A serious complication for full-elastic applications is that the P- and S-wave propagation velocities should be fully consistent. To overcome this problem, we propose to decompose the multicomponent seismic data into scalar P- and S-wave responses prior to redatuming. The decomposed data sets can then be redatumed independently by scalar algorithms. The sensitivity for errors in the macro model is therefore not more severe than in the acoustic situation. During the presentation, we will illustrate the method with an example, showing independently redatumed PP, PS, SP and SS shot records at a datum plane just above an interesting target zone.

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52nd annual EAEG meeting, Copenhagen