Seismic Simulation and Imaging of Complex Geologic Models Considering Rough Topographic Relief

[1]Soares Filho,D.M., [1]Rosalba, J.F., [1]Almeida, M.A, [1]Chaves, R.D., [1]Aguiar, L.A.M., [2]Rocha, A.C.A.; [1]PETROBRAS/CENPES, RJ, Brazil; [2]BRASPETRO.

Complex geology, due to folding and faulting, implying in strong lateral velocity variations and the rough topographic relief are the principal constraints that may be faced in order to obtain a reliable subsurface seismic image in such areas. Several preliminary investigations to support acquisition parameters and data processing are necessary before any new seismic acquisition program. In this sense we have accomplished full elastic seismic simulation and processing considering a very realistic velocity model based on geologist's information. For modeling we have used finite difference schemes based on second order approximations where the parameters are introduced as geometric averages calculated along the grid lines. We have also used a ray-tracing type technique to identify the main features on the full elastic seismograms and to estimate the seismic coverage at the target top interface. For imaging we have applied our RTM scheme to perform post and prestack depth migrations considering smoothed versions of true velocity model and some imaging conditions. As a result of this work, we could investigate some acquisition parameters which may be responsible for a really great impact on seismic data quality. We have also verified that there is a clear dependency between seismic image quality and the processing approaches to handle the problems related to the velocity field in the uppermost layers as well as the rough topographic relief.

ACKNOWLEDGMENTS
We would like to thank BRASPETRO, TOTAL e ANDINA for permission to publish this work.