Surface and internal multiple attenuation by prediction and subtraction: case studies

Zahia Benaïssa (1), Imene Bouchakour (1), Sakina Karcouche (1), Abdelkader Benaïssa (1), Amar Boudella (1), and Sid Ali Ouadfeul (2)

(1) University of Sciences and Technologie Houari Boumediène, Faculty of Earth Sciences, Geophysics, Algiers, Algeria (zabendz@yahoo.fr), (2) Algerian Petroleum Institute, Geosciences and Mines, avenue du 1er Novembre, 35000 Boumerdes, Algeria

In seismic records, there are coherent noises that we can better attenuate with the technological headway (algorithms and computer equipments). Multiples remain a complicated coherent noise to attenuate, particularly the internal multiples. The techniques based on velocity discrimination or statistical methods showed their limits. For that purpose, a new approach known as SRME/IME (Surface-Related or Internal Multiple Elimination) was elaborated; the multiples are modeled and then adaptively subtracted from seismic data. A model corresponding to multiples is predicted from seismic record that makes it more credible. These last years, this technique showed its efficiency in the industry and the algorithms are more and more improved with the progress of computers power. It is becoming a standard technique.

In this study, two applications were performed in order to attenuate internal multiples which remain problematic in seismic land data preprocessing. The first one is on 2D Algerian onshore seismic data, using the Omega software module called IMP, and the second one on 3D Algerian onshore seismic data, using the Omega software module called XIMP (Extended Interbed Multiple Prediction), designed for marine data but whose corresponding workflow we had adapted for our land data. Both approaches worked well and gave good results.

Key words: Internal multiple - Surface multiple - SRME/IME - Land seismic - Adaptive subtraction.