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## Removing multiples or using multiples: new challenges for land data

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Most of the approaches to remove multiples – both surface-related as well as internal multiples- have been geared towards the marine application. Especially the so-called data-driven methods, where the seismic data is used as a multiple prediction operator, have been quite successful for the marine case. In the last decade, more effort has been put in translating these methodologies for the land data situation. It appears that the multiple problem for land data can be quite different from the marine case: the clear, almost perfect, mirror at the water surface is being replaced by a fuzzy reflector for the land situation, where besides reflection at the free surface other phenomena play a role, like near surface scattering, internal multiple generation by shallow reflectors and conversion from P-wave to S-wave energy. That is why the surface multiple content in land data appears much lower, or surface multiple energy may not be always recognized as such. Besides this issue, the data quality and acquisition geometries are quite different from the marine case. Therefore, a lot of attention need be paid to carefully pre-processing the land seismic data for use in marine-type algorithms. Despite these issues, both surface-related and internal multiple removal strategies have been applied to land data with success, which will be demonstrated in this paper. Furthermore, the next challenge is to utilize information in land data multiples to learn something about the near surface properties or to fill in missing data. Therefore, some hints will be given of transforming multiples from a source of troubles into a source of information.

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