The factors which affect the target amplitudes in the multicomponent data may be divided into two groups: one related to the surface (or near-surface) and the other related to the subsurface. The surface-related group includes geometry spreading, source and receiver distortions due to interactions with the near-surface, etc. These effects may be corrected by a modified surface-consistent procedure for multicomponent seismic data. The subsurface-related group includes attenuation, scattering, anisotropy, and other undesirable wavefield properties in the overburden. These complications may be corrected by an overburden-correction scheme derived from a simplified subsurface model with the target sandwiched between the overburden and a halfspace.

A four-component seismic survey with three horizontal wells drilled nearby is selected to illustrate the techniques. The field data show that the amplitude corrections are essential for preserving and recovering the target information. Amplitude anomalies (dim spots) can be identified in the stack sections after the corrections, and can be correlated with the local fracture swarms encountered by the horizontal wells.