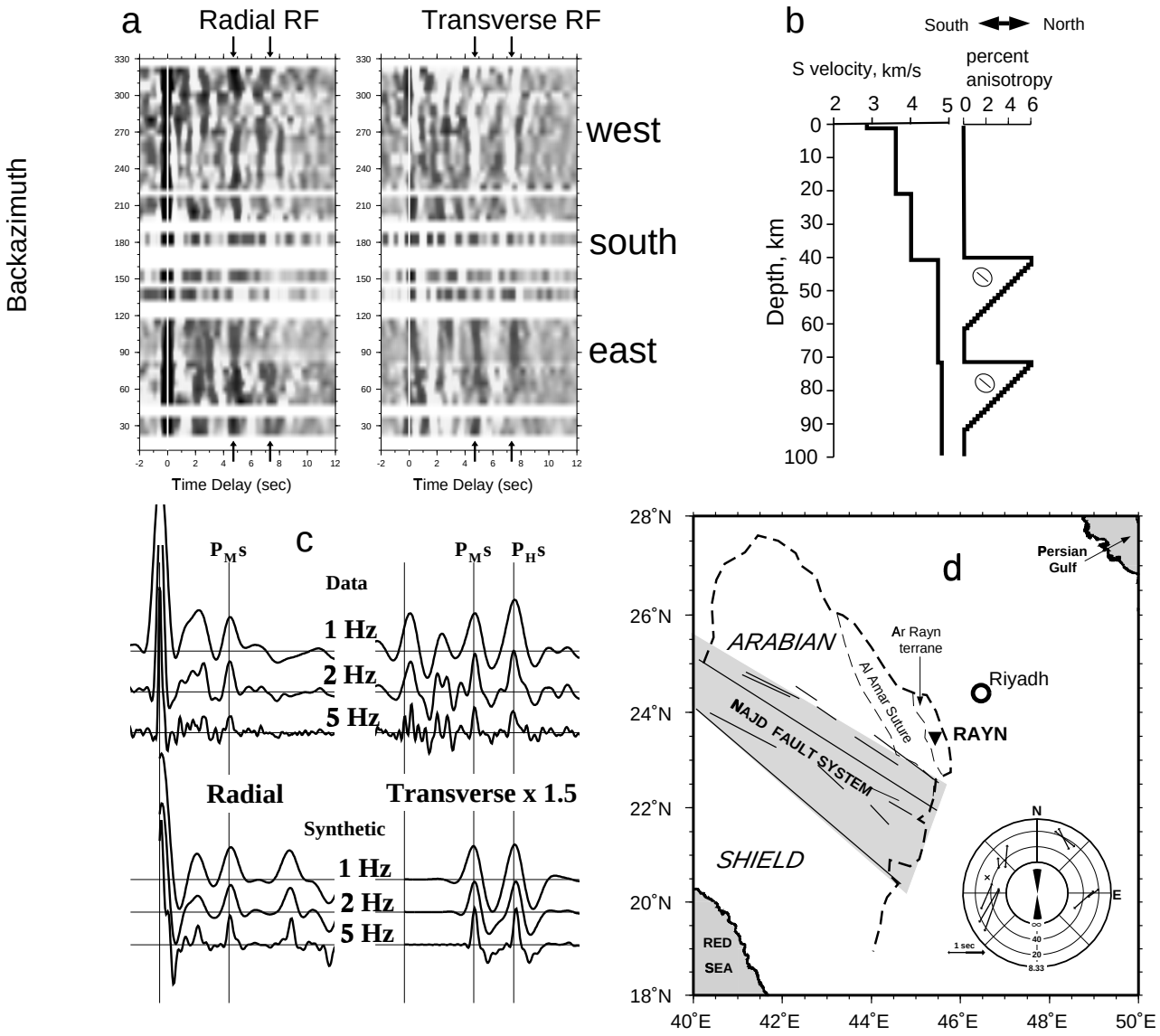


Figure 5 Example of function analisys for upper-mantle discontinuity structure. a) Receiver functions (RFs) computed for RAYN (Ar-Rayn, Saudi Arabia) presented as a function of backazimuth. Upward motion is dark, downward motion is light. Data used include direct P, PKP and P*diff* phases observed between spring of 1997 and summer of 1999. RF spectra are limited at 1 Hz. Phases PMs and PHs are identified by arrows. Note the polarity changes in the transverse RFs between eastern and western directions. b) Vertical profile of S wave velocity and anisotropy for the best-fitting model. WIthin both anisotropic regions the symmetry axis is oriented N-S, and tilted ~50° from the vertical. c) data (RFs stacked in backazimuth range 75° -107°) and reflectivity synthetics (baz 90°, phase velocity 20 s/km) computed in best-fitting model. d) Indicators of anisotropy (inset) in regional tectonic framework. Shear-wave splitting observations are plotted as a function of backazimuth and phase velocity. The arrows are aligned with the fast direction and scaled with the splitting delay. The center of the polar plot shows the range of possible orientations for anisotropic fast-axis strike within two upper-mantle zones identified through RF analysis. Note disagreement between anisotropy orientations inferred from RFs and SKS phases arriving from the East. This signifies either lateral heterogeneity or vertical stratification of rock texture in the uppermost mantle.