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We present a time reversal method to image vertical faults from pressure measurements on a dense array of seismometers located on the surface of the earth in the neighborhood of the fault. The source of the wave is an earthquake or an active source in a borehole located close to the fault. The main feature that we exploit is that the propagating wave has an amplitude increase along the vertical fault. The goal is to locate the fault when a slowly varying background wavespeed is known. Because the source is near the fault, the direct arrivals are large. In order to image the fault using the wave that reflects from the fault to the receivers, we first remove the direct arrival from the data by synthetically propagating a wave from the source in the background medium. We use the synthetic data in two ways. The first is to subtract the direct arrival from the data measured on the same side of the fault where the source is, to capture only the reflected wave. The second is to approximate a transmitted wave on the side of the fault that does not contain the source. Then we time reverse and back propagate the reflected wave together with the approximate transmitted wave in the background medium to obtain a moving amplitude increase (refocusing) on the fault. (Received February 23, 2007)