Infrasound signals have been reported to accompany mining explosions and may provide a source diagnostic. Critical to the interpretation of the infrasound data is the association with regional seismic observations as well as linkage to source information for interpretation. Coupling issues must be assessed as well as models related to atmospheric propagation and source physics. Ground truth from within two mines (Morenci and Minntac) provide the necessary source constraints. Preliminary results from Morenci (bottom left) and Minntac (bottom right) are illustrated below. Both mining operations regularly generated seismic and infrasound signals. Regional infrasound signals from 7 of 25 ground truth events at Morenci in February 00 were observed. Only explosions above 100,000 lbs were observed but not all large explosions. The frequency content of the infrasound signal was 1-3 Hz. Backazimuth estimates, as demonstrated in the example, were within 5 degrees of the actual. Two time-periods (August and November 00) produced infrasound signals for 5 or 8 Morenci explosions. Backazimuth estimates were within 5 degrees of the actual. The frequency content of infrasound signals from the Minntac explosions extended from 10s to several Hertz. All explosions over 500,000 lbs generated infrasound. In both cases the well known effects of seasonal winds in the infrasound propagation have not been taken into account.

TYPES OF MINING EVENTS
This study focuses on seismic and infrasound signals from three types of mining operations which are illustrated below. Type 1 - Coal overburden casting (Black Thunder) where explosives are designed to expose coal. Type 2 - Rock fragmentation for copper recovery (Morenci) where explosives are designed to break the rock for further processing. Type 3 - Rock fragmentation in hard rock for iron recovery (Minntac). Each mine has a set of distinctive blasting practices that are reflected in regional seismic and infrasound signals illustrated in the poster.