Anthropogenic and Novel Sources
Sources in the Solid Earth, Atmosphere, Cryosphere and Oceans
List of Sources

• Nuclear explosions
• Ambient Noise- Cultural or natural, Continuous can be advantage
• Underground mining failures
• Seismo-acoustic sources
• Hydrofacture
• Weather effects and storms - noise
  • ETS as an imaging source
  • Volcanic eruptions as exotic sources in solid earth, atmosphere, oceans
  • Continuous INSAR or LIDAR?
  • Biological sources
  • Super mechanical oscillators Mechanical Signals - At the surface and underground
  • Active Sources - Cheaper and less impact
  • Surface and underground mining explosions of all kinds - impulsive?
  • Fluids in Fractures
  • Bolides
  • Induced seismicity Planned and unplanned detonations of explosives
  • Urban sources of signals
  • Building detonations and collapses
  • Aircraft and ships
  • Landslides and rock falls
  • Lahars
Science Issues Associated with Sources

• Monitoring of novel sources - impact on people and societies

• Physical understanding of ambient noise - source and variability

• Importance of nonlinear processes in non earthquake sources

• How do we explore existing or future data sets for new and unique sources?
Importance of Seismology to Earth and other sciences

• Political implications of monitoring human activities- seismology and long term data sets are critical

• Seismology contributes to the assessment of environmental impact and can guide near-surface human activities

• Serendipity of new discoveries/new sources
Societal Importance of Science Issues

- Decadal documentation of activities in the earth system and its change

- Seismology has a critical role in resource recovery and waste disposal

- Non earthquake sources offer opportunity for educational activities at all age groups

- Arms control, nonproliferation, treaties and international cooperation
What Do We Need to Move Forward

• Importance of continuous recording, archiving and open access of data (rescuing older data)

• Expansion of infrasound capabilities

• Multi-discipline engagement in problems of common interest

• Development of authoritative catalog of unusual, non-earthquake events
Figures

- Crandall Mine Figure
- North Korean Explosion
- Figure that combines a number of the unusual sources observed by seismology
- Near-surface explosion or industrial accident generating seismic and acoustic
- Ambient noise for monitoring