Nuclear Test Detection

An Overview

Jacob Bates

UC Merced

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Research Question

How do Detection Systems Differentiate Nuclear Tests from Other Natural Geologic or Atmospheric Events?

Overview

Test Types (Locations)

- Atmospheric
- Underwater
- Underground

Detection Methods

- Infrasonic/Hydroacoustic
- Seismic
- ~~Radionuclide~~

Infrasonic Detection

Infrasound

- Travels Much Longer Distances due to Longer Wavelength
- Produced by Many Natural and Technological Processes
  - Volcanoes
  - Tides
  - Rocket Launches

Atmospheric/Underwater Tests

- Produce Substantially More Intense Infrasound than Anything
- Detected by a Global Network of Listening Stations

Seismic Detection

Underground Tests

- Must be Detected Seismically
- A M6.5 Earthquake Produces about 2,000 Kilotons of Yield, most Tests are less than 200 Kilotons
- Relies on Detecting Irregularities rather than Spikes
- Currently Capable of Detecting Tests around 1 Kiloton

Kiloton Equivalent of the Output of 10^6 kg of TNT, or 4.184×10^{12} J

Simple Answer

- For Atmospheric and Underwater Tests, it's Easy
- For Underground Tests, it Takes More Work

Questions?