Educational Resources to support ShakeAlert®, the Earthquake Early Warning System for the West Coast of the United States: Development and Assessment

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Representing the USGS ShakeAlert® Joint Committee for Communication, Education, and Outreach, Educational Resources Working Group Leadership

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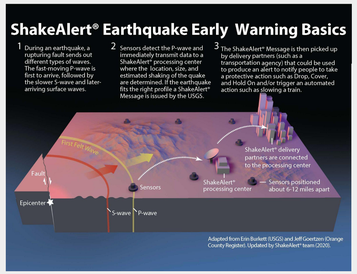
Why ShakeAlert®?

- Over 143 million people live in an earthquake-prone region of the United States. Over 50 million people (or one-third) live in Washington, Oregon, and California, and face much of this earthquake hazard and risk.
- In the United States, the annualized earthquake losses are $6.1 Billion, with 73% of these losses ($4.5 B/yr) occur in the West Coast states (source: FEMA P-366, 2017)



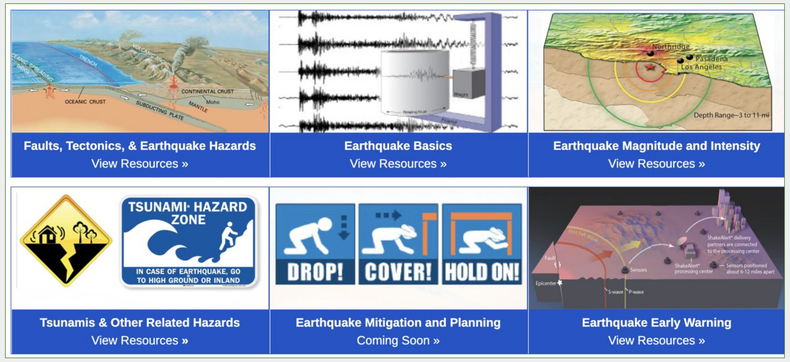
What is ShakeAlert®?

- Earthquake early warning system for the West Coast of the United States, in California, Oregon, and Washington
- Managed and operated by the U.S. Geological Survey, Advanced National Seismic System
- NOT earthquake prediction, but detects significant earthquakes quickly
- A ShakeAlert Message is sent to delivery partners to alert people and automated systems.
- Another tool in the earthquake preparedness toolbox
- Goal: to reduce impact of earthquakes and save lives and property

The ShakeAlert® Earthquake Early Warning system for the West Coast of the United States now delivers public alerts to cell phones and automated systems in California, Oregon, and Washington.

Educational activities and animations are designed to inform and engage learns of all ages from 'strollers to seniors' in a variety of settings, from public spaces and science centers to formal classrooms.

Find Educational Materials: iris.edu/shakealert



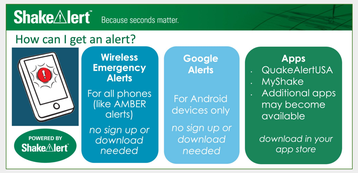
Educational Activities are available for the following topics:

- Why is the West Coast of the U.S. earthquake-prone? (Faults, Tectonics, and Earthquake Hazards)
- What happens during an earthquake? (Earthquake Basics)
- Why does an earthquake have one size (magnitude), but many intensities of felt shaking? (Magnitude & Intensity)
- What are other related natural hazards to earthquakes (tsunamis, volcanoes, landslides, liquefaction, etc.)?
- What should you do to prepare before, during, and after an earthquake? (Mitigation & Planning - Coming Soon!)
- How does Earthquake Early Warning work? (Earthquake Early Warning)

We aim to address earthquake misconceptions along the way, such as: earthquake early warning is NOT earthquake prediction, and that the shaking you feel (intensity) depends on four main factors (only one is magnitude)

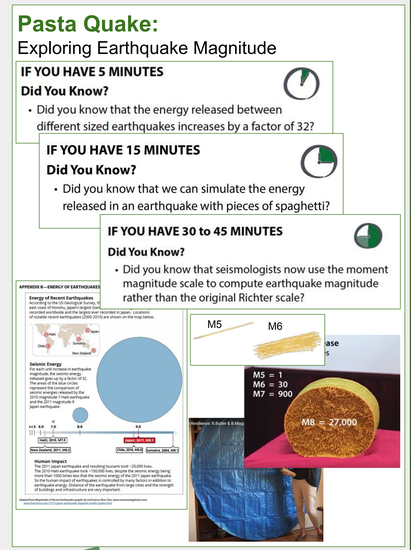
Educational Resource Development & Dissemination

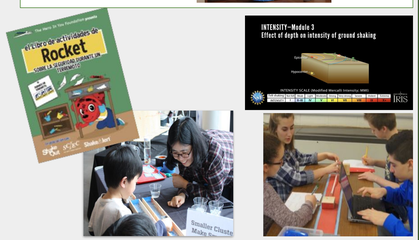
- Adaptable for a range of learning environments
- Use learner-based inquiry
- Engage learners with multiple modalities: hands-on participation, observation, thinking questions, etc.



Activities & Animations

- Short (2-3 minute) animations
- Scaffolded activities
  - 5-, 15-, and 30-45 minute options





Evaluation, Assessment, & Research

- **Formal evaluation** of the "What Is ShakeAlert" video
  - To answer: What do people learn from the animation and about ShakeAlert broadly?
  - OMSI & CU-Boulder leading coordination
  - Currently in IRB review
- **Formative evaluation** of hands-on demonstrations at OMSI - starting with Pasta Quake

- These evaluations will form the basis/template for future research
- ***Coming soon:*** **Research** on conceptions about Magnitude & Intensity

Future Plans

- Fall 2021:
  - Outreach booths for state science teacher association meetings
  - Teacher professional development workshops
  - Development of geodetic-enriched activities
- Development of next 5-year Strategic Plan
- Increased efforts to reach diverse communities, with different racial/ethnic and ableness identities

ShakeAlert System - Rollout Timeline

Phase 1: Oct. 2018
- "Open for Business"
- Communication, Education, and Outreach coordinating state & local efforts
- Held Symposia in the ShakeAlert states to listen to needs of the community

Phase 2: Spring 2019
- Test of public alerting via cell phone app
  - Los Angeles County (800,000+ downloads)
- Social science research on critical needs for ShakeAlert Operations

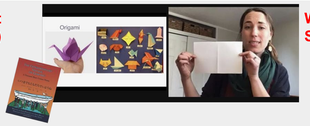
Phase 3: Fall 2019
- **Roll-out of public alerting in California (Oct 2019)**

2020
- Alerting to cell phones in California & to automated systems in California, Oregon, & Washington
- ShakeAlert Messaging Toolkit for consistent messaging and graphics

Spring 2021
- Pre-rollout: Oregon and Washington
  - ShakeAlert Reddit Ask Me Anything
  - WA WEA Demonstration


WA Wireless Emergency Alert (WEA) Watch Party

Oregon Rollout of the ShakeAlert System to cell phones (Mar 2021)
- Science Storytime on Kamome
- WA Teachers Workshop Kickoff



Washington Rollout of the ShakeAlert System to cell phones (May 2021)
- WA Rollout PNSN Outreach Webinar
- Science in the City with Pacific Science Center

Public education efforts ~~~ Education resource development ~~~ Teacher workshops