

Finding an Earthquake's Epicenter

Background

The point within the earth where rock first breaks or moves in an earthquake is called the focus. The surface area above the focus is called the epicenter. Seismologists have several ways of determining the location of an earthquake's epicenter. One approach is to map the destructive results of an earthquake. The greater the earthquake damage an area suffers, the closer the area is to the earthquake's epicenter. One way to measure earthquake damage is with the modified Mercalli scale.

Purpose

To find the epicenter of an earthquake using the Mercalli scale

Materials

Pencil

Procedure

1. Use the modified Mercalli scale in Figure 15-1 to rate the severity of the earthquake in each location listed in Data Table 15-1. Write the Roman numeral rating for each location in Column 3 of the data table.
2. From the data in Data Table 15-1, draw lines on the map in Data Table 15-2 that separate areas, or zones, with different earthquake severity ratings.

Modified Mercalli Scale

I	Not felt except by very few people under special conditions. Detected mostly by instruments.	VIII	Damage is slight in specially designed structures, considerable in ordinary buildings, great in poorly built structures. Heavy furniture is overturned.
II	Felt by a few people, especially those on upper floors of buildings. Suspended objects may swing.	IX	Damage is considerable in specially designed structures. Buildings shift from their foundations and partly collapse. Underground pipes are broken.
III	Felt noticeably indoors. Standing automobiles may rock slightly.	X	Some well-built wooden structures are destroyed. Most masonry structures are destroyed. The ground is badly cracked. Considerable landslides occur on steep slopes.
IV	Felt by many people indoors, by a few outdoors. At night, some are awakened. Dishes, windows, and doors rattle.	XI	Few, if any, masonry structures remain standing. Rails are bent. Broad fissures appear in the ground.
V	Felt by nearly everyone. Many are awakened. Some dishes and windows are broken. Unstable objects are overturned.	XII	Virtually total destruction. Waves are seen on the ground surface. Objects are thrown in the air.
VI	Felt by everyone. Many people become frightened and run outdoors. Some heavy furniture is moved. Some plaster falls.		
VII	Most people are in alarm and run outside. Damage is negligible in buildings of good construction, considerable in buildings of poor construction.		

Figure 15-1

Modified Mercalli Scale

Data and Observations

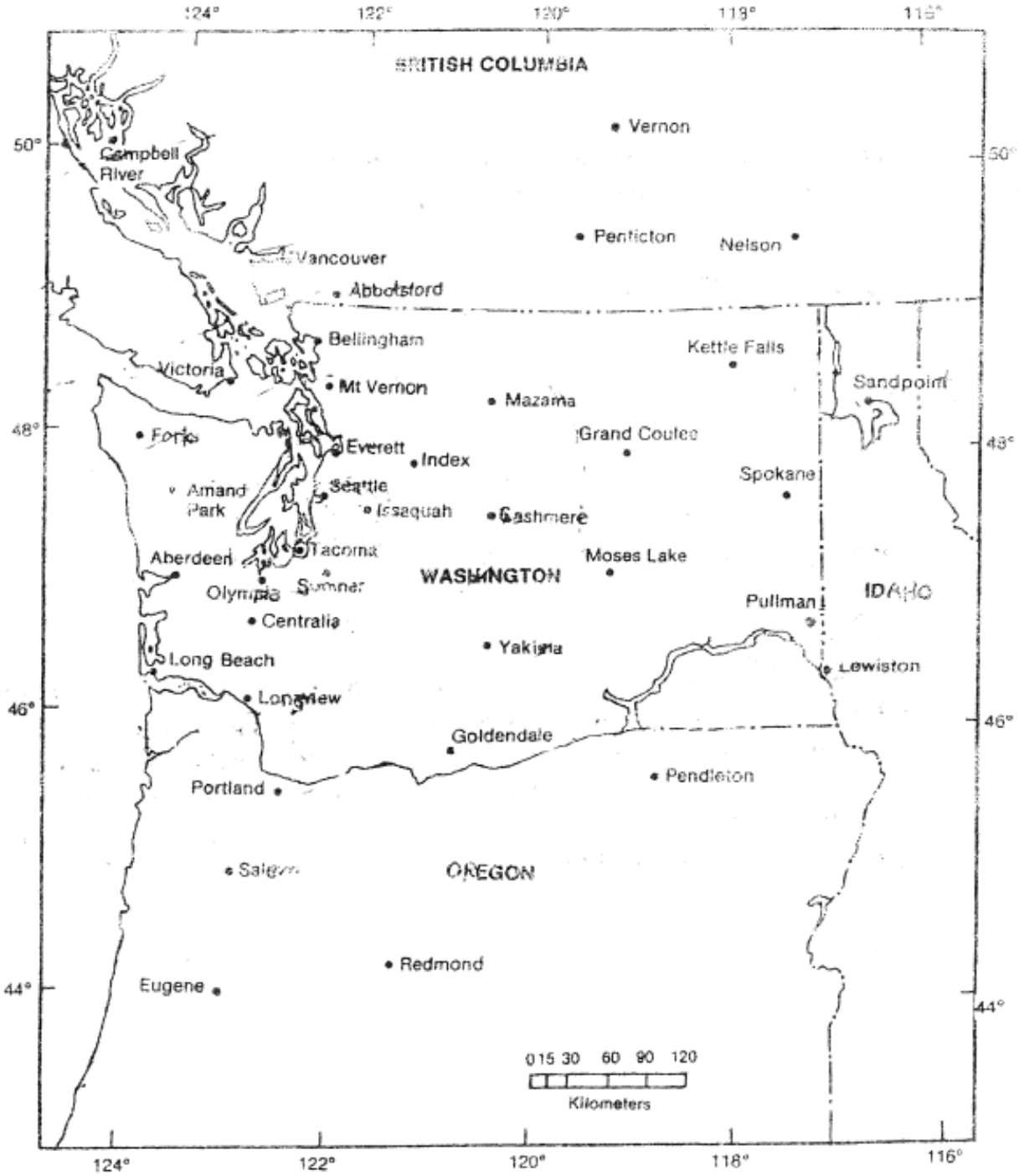
Data Table 15-1

Location	Description	Rating on Mercalli scale
Abbotsford, British Columbia	Felt by nearly everyone	
Aberdeen, Washington	Felt by everyone	
Amanda Park, Washington	Felt by everyone	
Bellingham, Washington	Many people are awakened	
Campbell River, British Columbia	Not felt	
Cashmere, Washington	Felt by everyone	
Centralia, Washington	Felt by everyone	
Eugene, Oregon	Felt by a few people	
Everett, Washington	Felt by and frightened most people; damage to some buildings of poor construction	
Forks, Washington	Some unstable objects overturned	
Goldendale, Washington	Felt by many people indoors	
Grand Coulee, Washington	Dishes, windows, and doors rattled	
Index, Washington	Some plaster falls	
Issaquah, Washington	Heavy furniture is overturned; many buildings damaged	
Kettle Falls, Washington	Felt by many people indoors	
Lewiston, Idaho	Not felt	
Long Beach, Washington	Some heavy furniture is moved	
Longview, Washington	Felt by everyone	
Mazama, Washington	Felt by nearly everyone	
Moses Lake, Washington	Dishes, windows, and doors rattled	
Mount Vernon, Washington	Felt by everyone	
Nelson, British Columbia	Not felt	
Olympia, Washington	Felt by and frightened most people; damage to some buildings of poor construction; new post office damaged and closed	
Portland, Oregon	Felt by nearly everyone	
Pendleton, Oregon	Not felt	
Penticton, British Columbia	Felt by a few people	
Pullman, Washington	Felt by many people indoors	
Redmond, Oregon	Not felt	
Salem, Oregon	Felt by many people indoors	
Sandpoint, Idaho	Felt by a few people	
Seattle, Washington	Great damage in poorly built buildings; extensive damage to chimneys	
Spokane, Washington	Felt by many people indoors	
Sumner, Washington	Most people were in alarm and ran outside	
Tacoma, Washington	Damage considerable; felt by and frightened all community	
Vancouver, British Columbia	Dishes, windows, and doors rattled	
Vernon, British Columbia	Not felt	
Victoria, British Columbia	Felt by nearly everyone	
Yakima, Washington	Felt by nearly everyone	

Data on the April 29, 1965, earthquake in the Pacific Northwest area. From *The Puget Lowland Earthquakes of 1949 and 1965*, Washington Division of Geology and Earth Resources, Information Circular 81, 1986.

Modified Mercalli Scale

Data Table 15-2



Modified Mercalli Scale

/10

1. What is the difference between a focus and an epicenter? (2 points)

2. What cities were nearest to the epicenter of the Earthquake? (2 points)

_____ & _____

3. Where was the focus of the earthquake? (1 point)

4. How did you reach the conclusion of where the epicenter was in this activity? (2 points)

5. Why might using the modified Mercalli scale not be the best approach for the epicenter of an earthquake? (3 points)
