

ASHSC

HAZARDS IDENTIFICATION COMMITTEE

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GOALS

- Identify and Characterize Seismic Hazards

What, Where, When

Seismic Hazards = The earthquake and related natural phenomena

Seismic Risk = The effects of seismic hazards on the built and operational human environment

- Define and describe seismic risks
- Promote and encourage seismic hazard and seismic risk research
- Disseminate seismic hazard and seismic risk information

To: State and local government

Public

Business and industry

Scientific and professional communities

Identification

- Primary Seismic Hazards
 - Strong Ground Motion - Shaking
 - Surface Fault Displacement
 - Ground Failure, Slope Failure
 - Liquefaction
 - Subsidence
 - Tsunami and Seiche

Primary Seismic Hazard - Surface Fault Displacement
- November 3, 2002 Denali Fault Earthquake -
Road offset by surface displacement on the Denali fault at Mentasta



- November 3, 2002 Denali Fault Earthquake -
Dent in a vertical support column on the Trans Alaska Pipeline from pipe impact during strong seismic shaking



Primary Seismic Hazard - Liquefaction
- November 3, 2002 Denali Fault Earthquake -
Liquefaction and lateral spreading at the Northway airport runway



Primary Seismic Hazard - Slope Failure
- November 3, 2002 Denali Fault Earthquake -
Large landslides on the Black Rapids glacier triggered by the Denali Fault
Earthquake



Primary Seismic Hazard - Subsidence
- 1964 Prince William Sound Earthquake -
Coseismic subsidence at Afognak Village, Afognak Island, Alaska



Primary Seismic Hazard - Tsunami
- 1964 Prince William Sound Earthquake -
Tsunami Damage to the Kodiak City waterfront from the 1964 tsunami



Characterization

Surface Fault Displacement

Fault location

Active fault maps

Site specific mapping

Fault type

Detailed fault studies, mapping, trenching

Characteristic and maximum slip

Detailed fault study, mapping, trenching

Slip rate, strain accumulation

(Paleoseismology and Geodetics)

Recurrence

Seismicity, paleoseismicity

Slip rate, strain accumulation (Geodetics)

Characterization

Strong Ground Motion

Source Characterization - Geologic

Where: Fault location (Active fault mapping)

Attenuation relationships (Soil mapping)

What: Fault type (Active fault mapping, trenching)

Fault length (Active fault mapping)

Segmentation (Structure mapping, paleoseismic studies)

Characteristic displacement (Paleoseismic studies)

Maximum displacement (Active fault mapping, paleoseismic studies, offset measurements)

When: Recurrence (Paleoseismic studies, trenching)

Date of last event (Paleoseismic studies, trenching)

Characterization

Strong Ground Motion

Source Characterization - Seismologic

Where: Fault location (Earthquake locations, epicenter maps)

Attenuation relationships (Intensity mapping, strong motion seismographs)

Rupture propagation (Directivity studies)

What: Fault type (focal mechanism studies)

Fault length (Earthquake locations, epicenter maps)

Segmentation (Earthquake locations, epicenter maps)

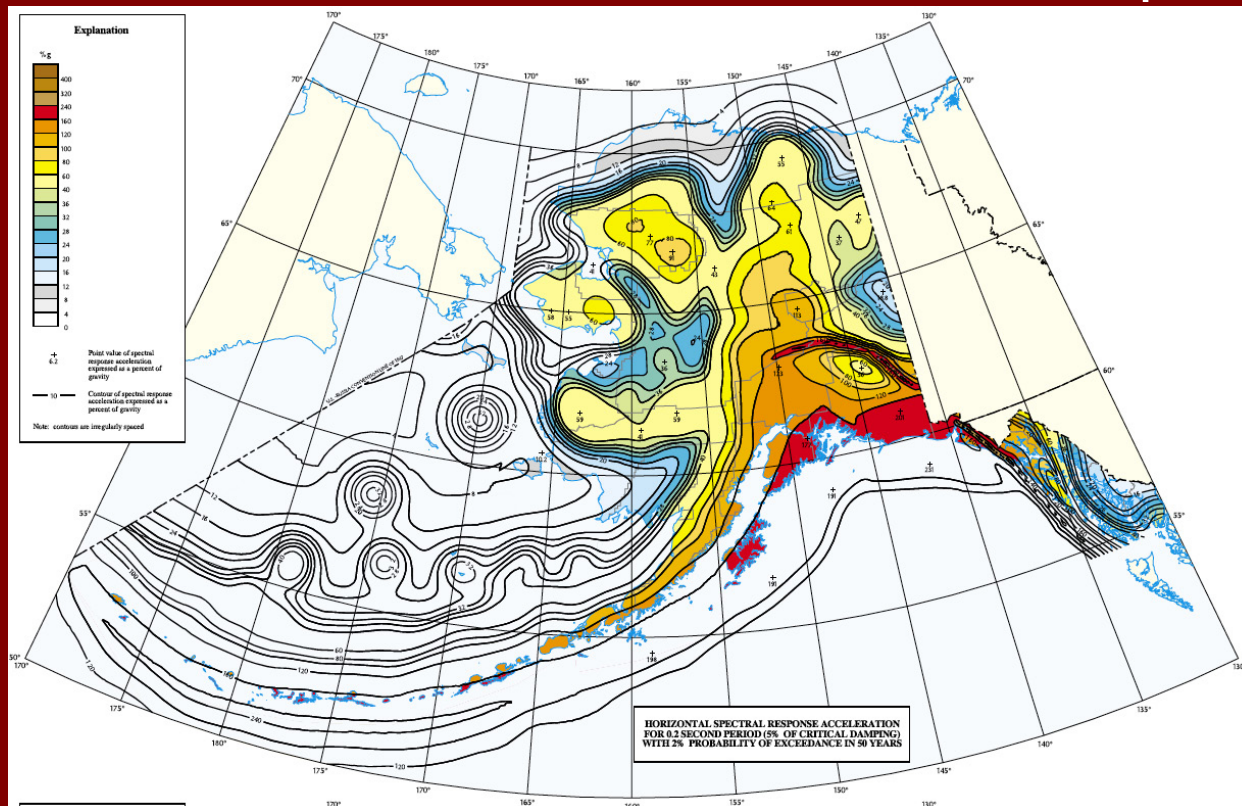
Characteristic & maximum displacement (Magnitude/frequency measurements, seismic moment studies)

When: Recurrence (Moment studies, b-value analysis)

Date of last event (Historic seismicity)

Characterization Strong Ground Motion Geodetic, NEHRP Maps

- GPS Monitoring - Invite Jeff Freymueller to make presentation to the Commission
- USGS NEHRP Probabilistic Seismic Hazard Maps



Characterization

Liquefaction, Ground Failure

- Geologic and soils mapping
- Target high use/occupancy sites
- Target critical facilities
- Develop an approach for a data repository to assemble site response and soils data from a variety of sources of opportunity.

Tsunamis

- Tsunami Inundation mapping program by DGGS and UAF GI in progress
- Focus on population centers on Gulf of Alaska coast.
- Funded by NTHMP

Present Status

Source Identification and Characterization

Active Fault Mapping - Poor - First Priority for Future Work

Few active faults mapped, many unmapped or unknown

Most mapping very general, not at detailed scale

Active Fault Characterization - Poor - First Priority for Future Work

Some information available for:

Aleutian subduction zone - Kenai and Kodiak segments

Central Denali Fault

Castle Mountain fault

Fairweather Fault

Donnelly Dome fault

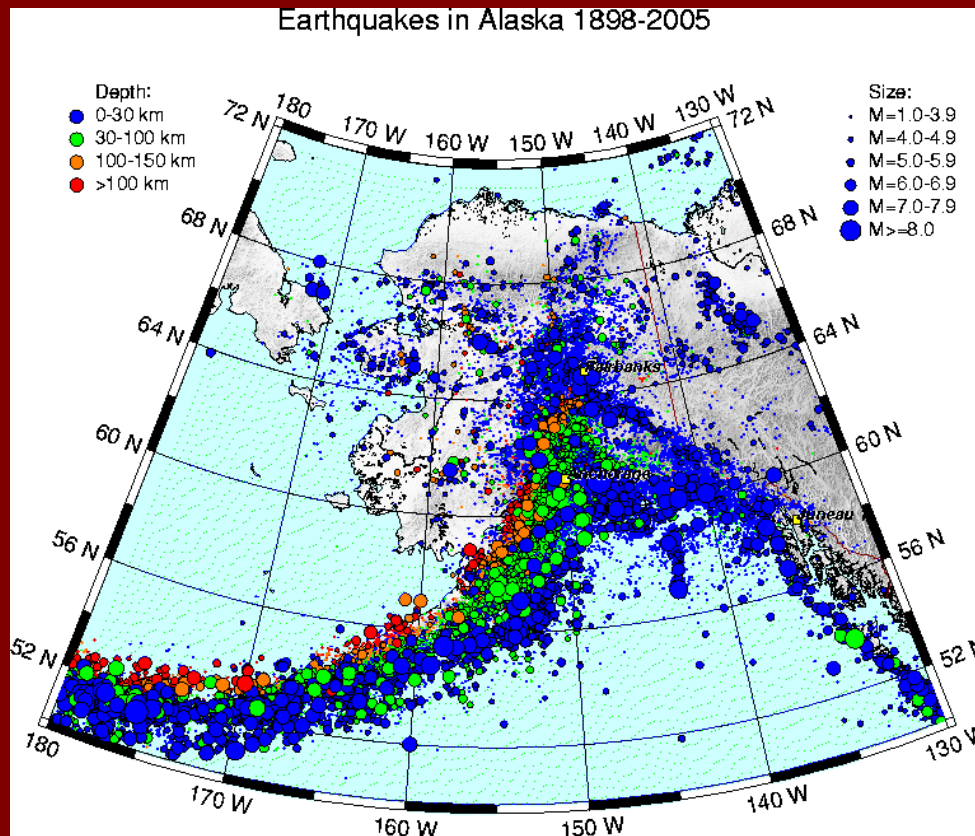
Very little characterization information for other known active faults.

Many (most) active faults in Alaska are unknown, unmapped

Present Status

Source Identification - Seismicity

- Regional seismicity mapping fair to locally very good
- Seismograph network expanding
- Some strong motion instrumentation but short record, few large events recorded
- Attenuation studies needed for Alaska



Present Status

Liquefaction, Ground Failure, Soils, Site Response

- Anchorage Urban area - some good data and an ongoing effort to develop local site response information
- Limited information available for some specific use sites in other parts of the state
- No statewide data base
- No statewide program for seismic soils mapping, site response information
- Site response studies and surface geology/soils maps needed for urban areas in high hazard parts of the state.

Seismic Risk

Based on:

Seismic hazards and land uses, development specifications, activities

Needed - Inventories and descriptions of uses, infrastructure, and activities at sites or facilities of concern.

These include: Population centers, dams, power plants, critical and important infrastructure, large buildings emergency response facilities and shelters, schools, hospitals and medical facilities, fire departments, communication facilities, highways, bridges, energy production and transmission, ports, airports, hazardous facilities or materials, water and sewage treatment systems, repositories of fuel, food, etc.