#### Paleoseismology, A tool for Earthquake Risk Assessment

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#### **Overview:**

- > What is Paleoseismology?
- > What are the Typical Method used?
- > Applications
- How it is used for Risk Assessment?
- Final Remarks

Paleoseismology is a fairly new field that involves the delineation and study of the past behavior of earthquake source zone.

#### What are we looking for?

Soil disturbance Faulting Lateral extension **Subsidence & uplift** Liquefaction Sand Blows **Tsunami deposits** Landslides

**Satellite Imaging** 



Satellite Imaging Aerial Photography



Satellite Imaging Aerial Photography **Surface Geology** 



Satellite Imaging Aerial Photography Surface Geology **Geomorphology** 



Satellite Imaging Aerial Photography Surface Geology Geomorphology **Geophysics** 



Satellite Imaging Aerial Photography Surface Geology Geomorphology Geophysics **Trenching and Logging** 





Satellite Imaging Aerial Photography Surface Geology Geomorphology Geophysics Inipled Long puintaner T Dating

## Radiocarbon

## Optically Stimulated Luminescence (OSL)

## Archeology & Artifacts

Satellite Imaging Aerial Photography Surface Geology Geomorphology Geophysics Inipled Long puintaner T Dating **Geotechnical Testing** 



Satellite Imaging Aerial Photography Surface Geology Geomorphology Geophysics Inipled Long puintaner T Deiting **Geotechnical Testing Data Integration & Interpretatipon** 

#### Earthquake Risk Assessment?

- Earthquake source location and identification
- Magnitude estimation
- Time of event(s)
- Recurrence period
- Soil characteristics

# Application

#### **Central United States**

**Collaborators:** Hanan Mahdi **Martitia Tuttle Support: USGS ASTA** NASA **ADEM** UALR

#### Historic Seismicity Sites (1800 - 1983)





Recent Seismicity (1974-1996; St Louis University).

 Earthquake Epicenters Scenario PGA Hazard Map NM SW Segment, M 7.7

































**2Sand Blows** 

Big Creeks Fault 20me

Marteur San Escarponent San Escarponent St. Francis 500 Site

Reelfoot four Sand Blows Esc Reelfoot Jun Sand Blows Esc Marianna

> Daytona Beach Site

> > NOC

10 km







#### St. Francis 500 Site





#### UUIIU .

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#### Subsurface Exploration Unit

HOGENTOG: LR

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\*Soil behavior type and SPT based on data from UBC-1983



#### Scenario PGA Hazard Map NM SW Segment, M 7.7



#### Scenario PGA Hazard Map NM SW Segment, M 7.7







