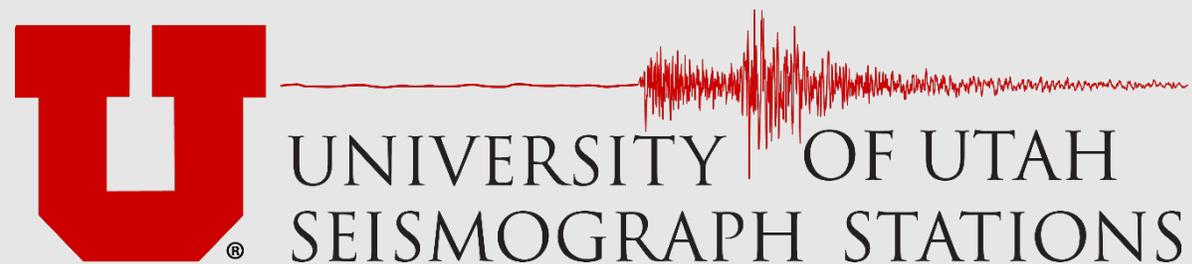


# *Episodic earthquake swarms in the Mineral Mountains, Utah driven by the Roosevelt hydrothermal system*

**Maria Mesimeri**, Kristine L. Pankow, Ben Baker & J. Mark Hale



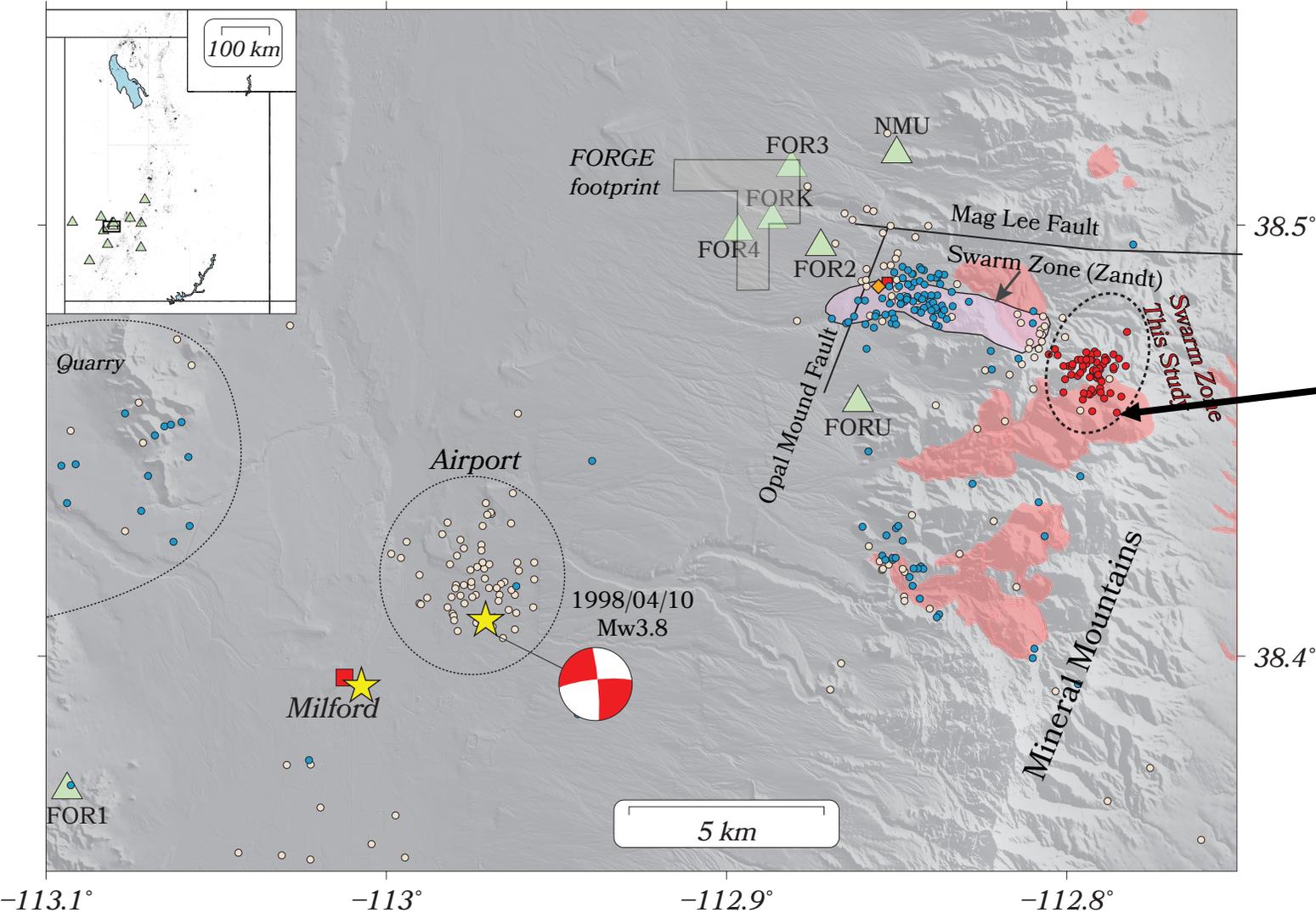
@QuakeMary



# 01. Introduction

○ Before 2016

● After 2016



**Sep. 2016 - 2019**

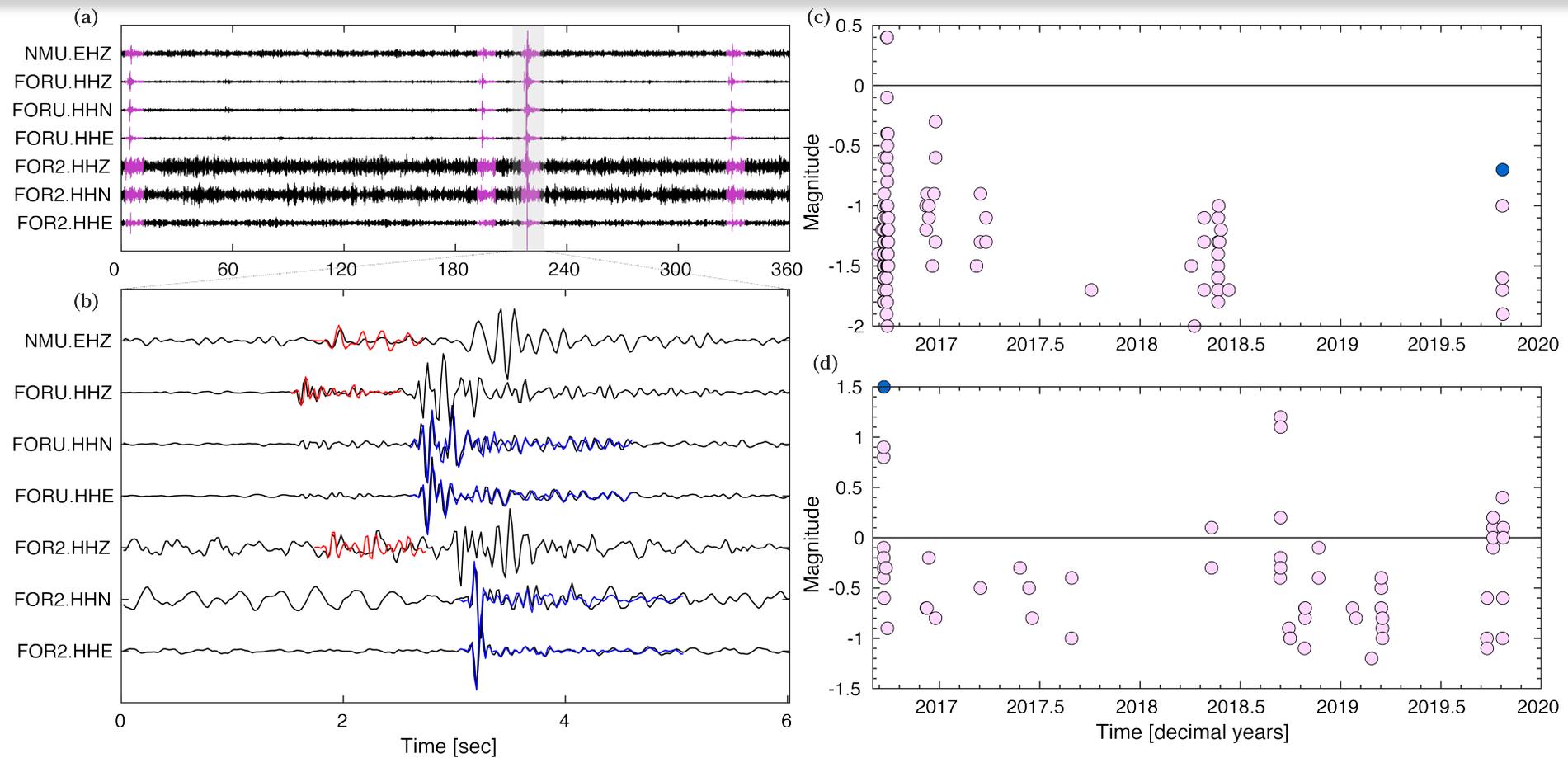
FOR[1,2,3,4] - November 2016  
FORK - April 2019

75 cataloged earthquakes (UUSS)  
under the Mineral Mountains

14 stations within 100 km

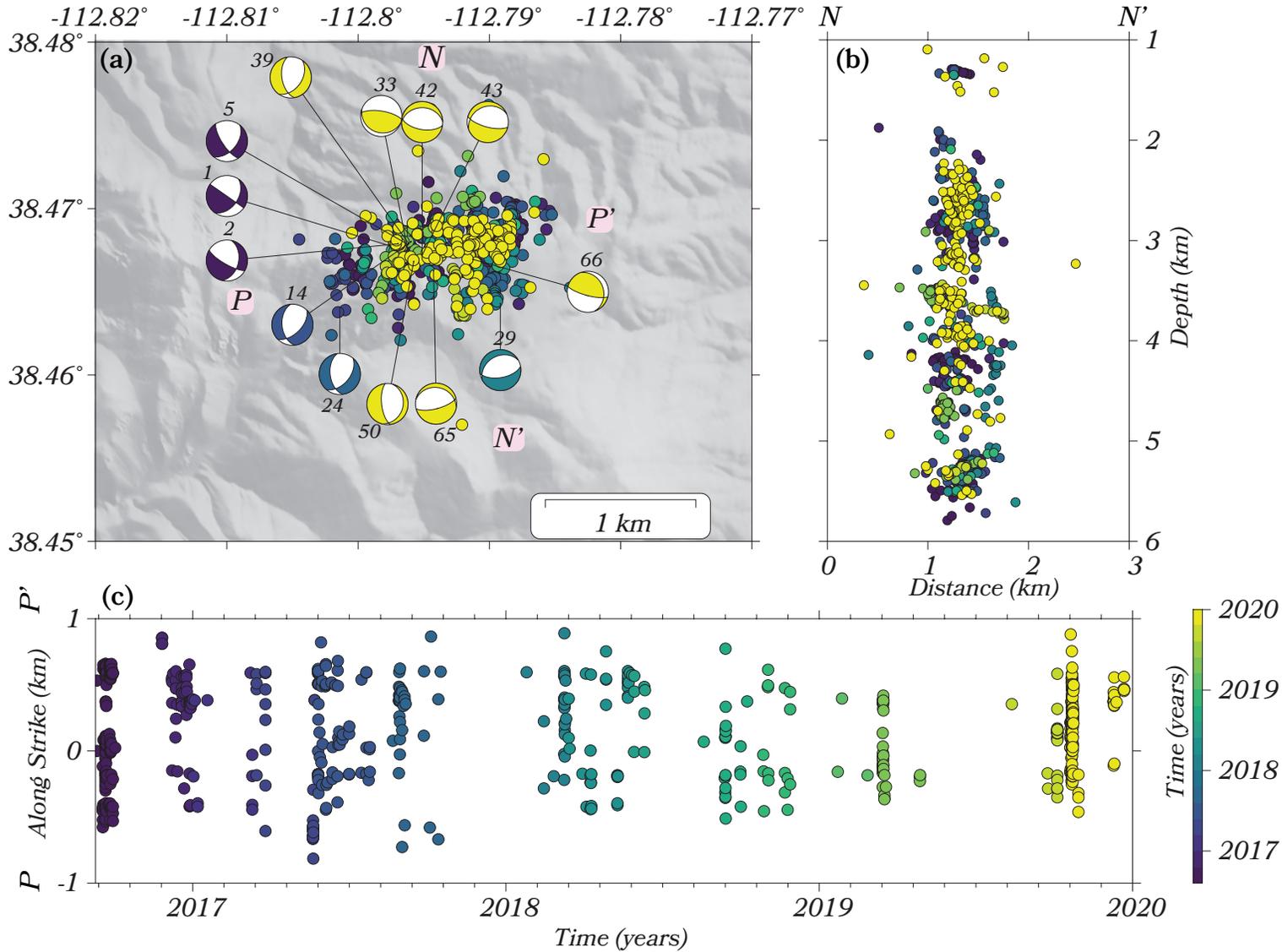
8 broadband -  
2 three-component short-period  
3 vertical component short-period -  
1 strong motion

## 02. Example of earthquake detections



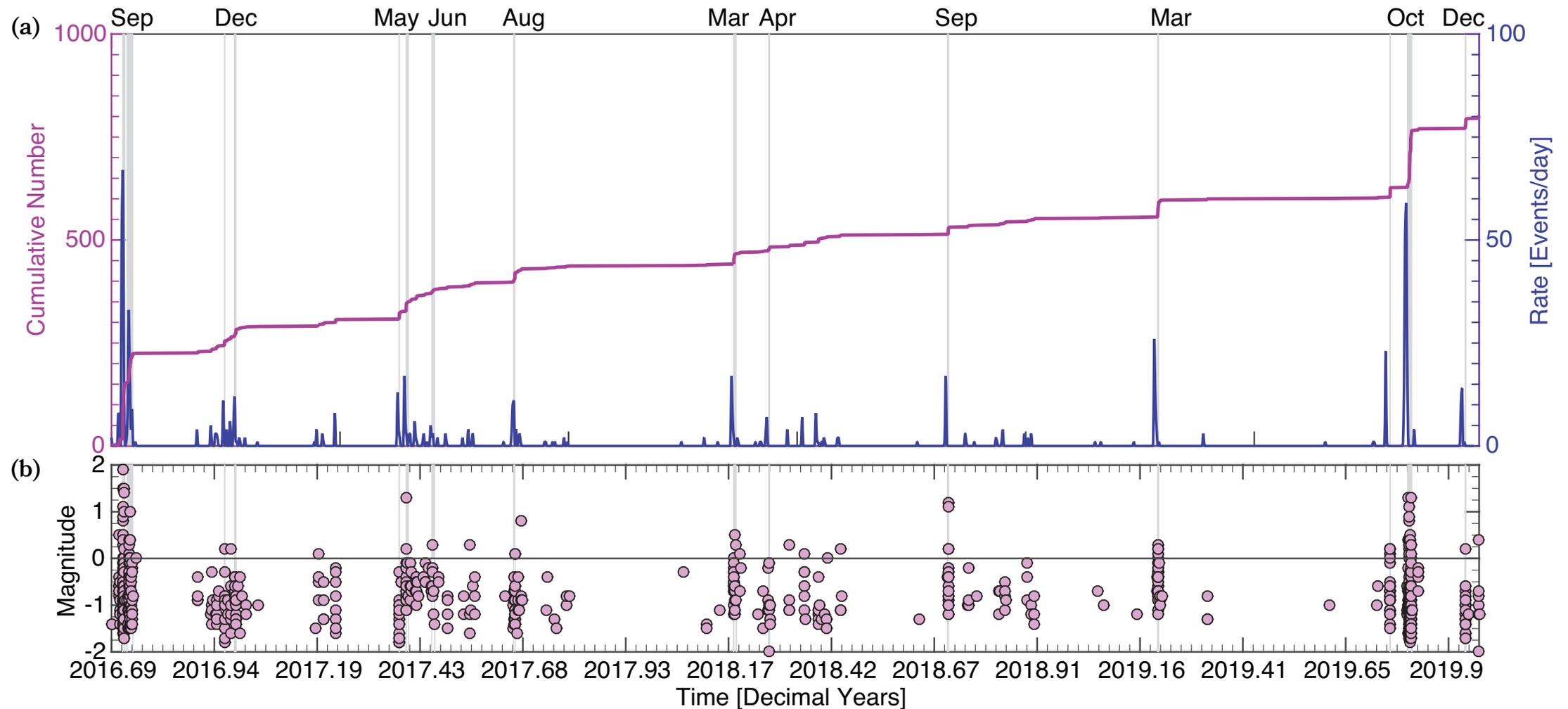
**(a)** Six-minute-long waveforms [start time: 2019/10/05 11:06:00] with four newly detected earthquakes highlighted, **(b)** zoom in to the gray shaded detection of (a), P and S templates are shown with red and blue color. Magnitude-time history of the detections performed by **(c)** template 58 [2019/10/22 17:38:56,  $M = -0.7$ ] and **(d)** template 3 [2016/09/21 19:40:18,  $M = 1.5$ ]. Templates are shown with blue circles.

### 03. Spatial distribution of seismicity



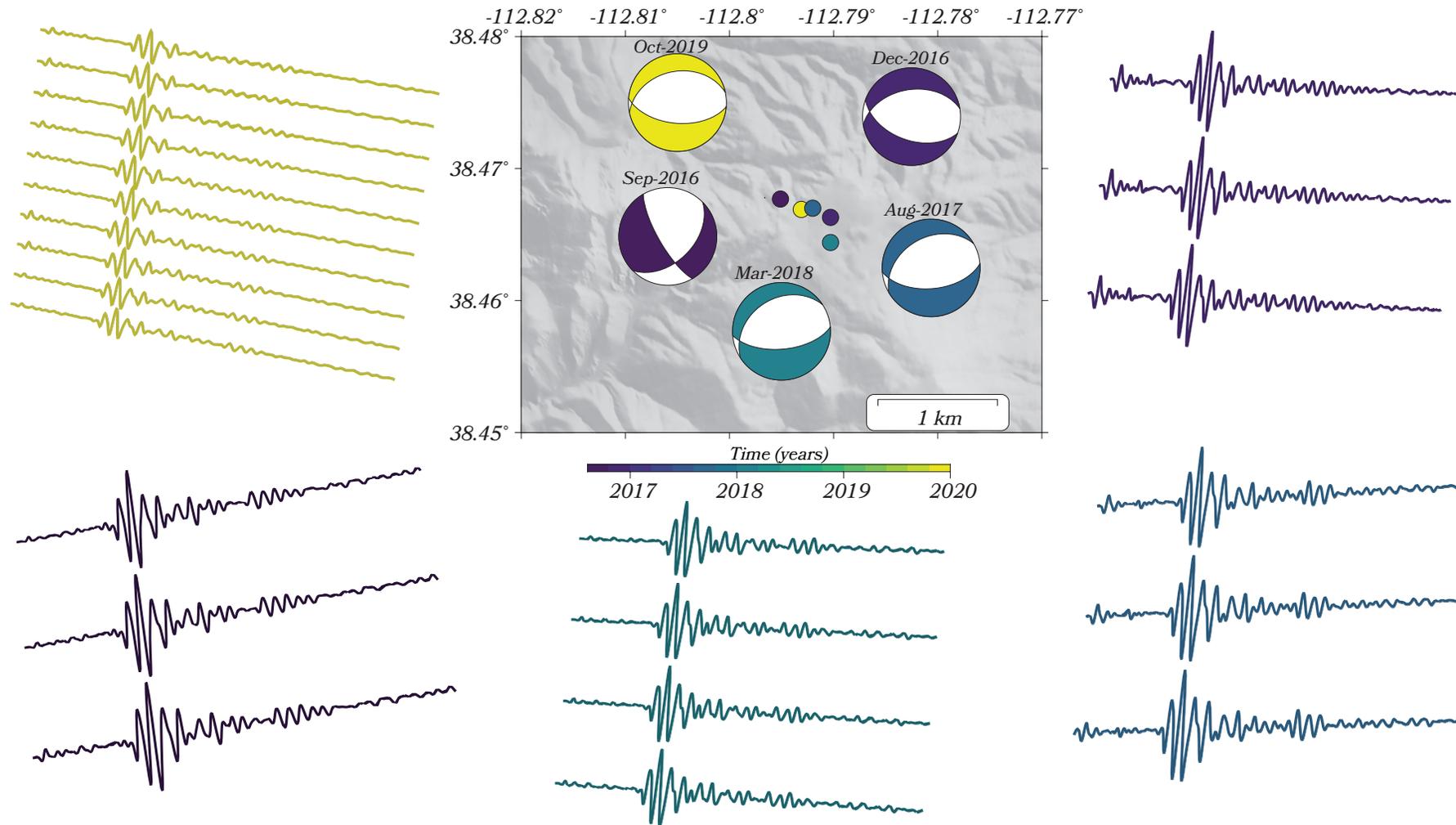
(a) Map of epicenters and focal mechanisms, (b), normal to the strike cross section (N-N'), and (c) along strike (P-P') distance earthquake with time relative to the first cataloged earthquake. Earthquakes are color-coded by date of occurrence.

## 04. Temporal evolution of seismic activity



(a) Cumulative number (purple), and daily rate (blue) of earthquakes vs time. (b) Magnitude–time history. Gray shaded areas show the 15 burst-like periods of elevated seismic activity.

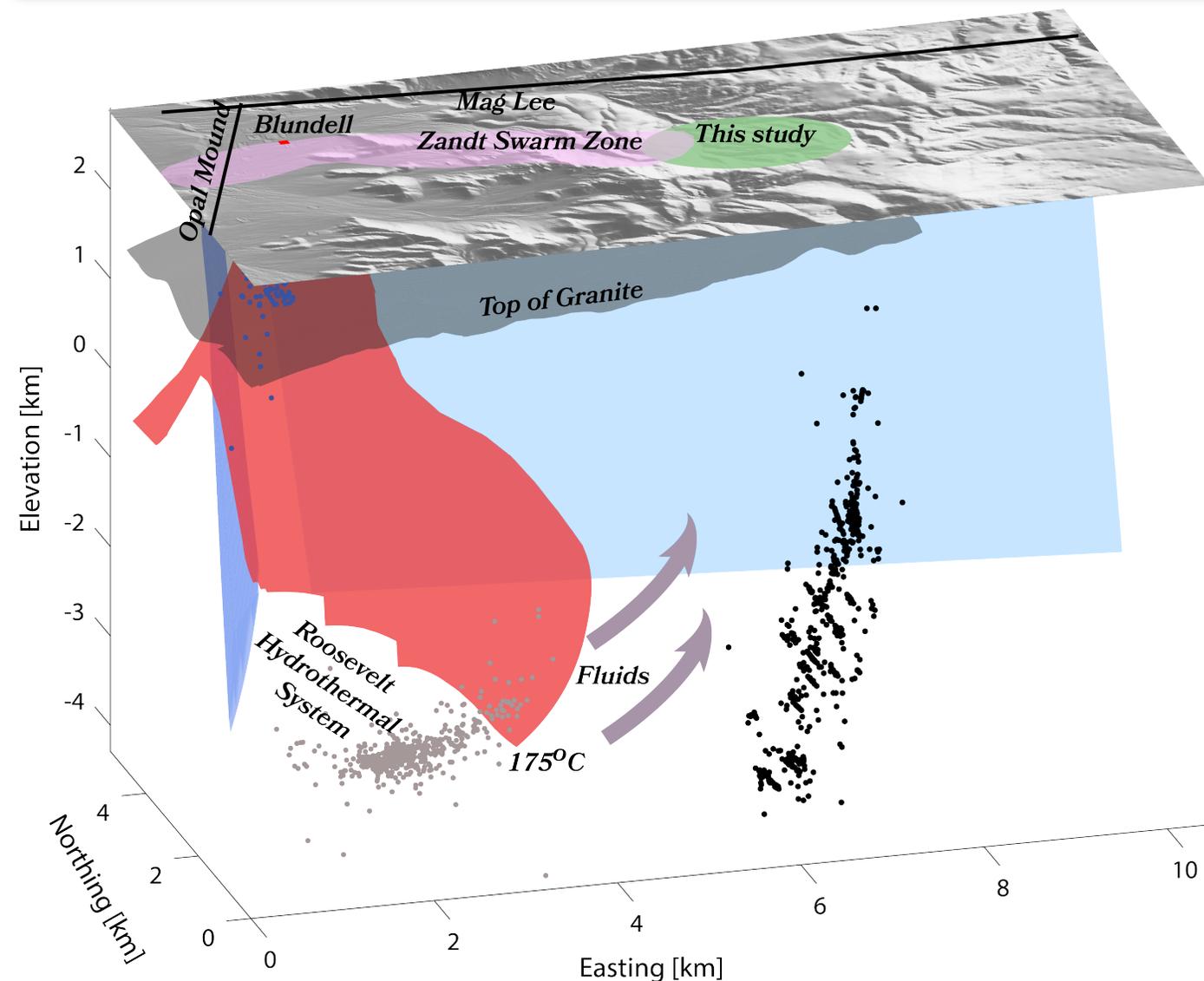
## 05. Highly similar earthquakes



Families of similar earthquakes recorded on FORU station. Solid circles show the mean epicenter for each family color coded by date of occurrence.

## 06. Conclusions

3D overview of the study area.



Earth model mesh for selected surfaces, i.e. 175°C isosurface, top of granitoid, Opal Mound and Mag Lee faults (<https://dx.doi.org/10.15121/1495398>).

Dots denote seismicity related to Zandt swarm prior to Blundell operations (gray dots), earthquakes near the Blundell geothermal plant (blue dots), and earthquakes in the Mineral Mountains (black dots).

The swarm-like activity in the Mineral Mountains identified in this study is not related to the geothermal plant that operates near Roosevelt Hot Springs but is driven by migrating fluids from the Roosevelt hydrothermal system and aseismic processes.