current happenings at the Alaska Earthquake Center

Matt Gardine

September 2019

Antelope User Group Meeting

UAF UNIVERSITY OF ALASKA FAIRBANKS ALASKA EARTHQUAKE CENTER

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One dollar MONDAY, JULY 8, 2019 newsminer.com

FAIRBANKS Daily News-Miner

THE VOICE OF INTERIOR ALASKA

OVERR

Legislature must sav

Alaska faces a bleak future if Gov. Mike Dunle
The Legislature must flex its authority as
ernment and save the state by overriding t
by the reasonable budget it approved and sent to th
The governor has gone too far, too fast in striking
from the budget. His reductions feel as though they
gard to the human and economic consequences.
Surely legislators must see this.

ANCHORAGE DAILY NEWS

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7.0 earthquake, aftershocks strike Southcentral Alaska; damage reported across region

Author: Zaz Hollander, Devin Kelly Updated: December 2, 2018 Published November 30, 2018

Vine Road, south of Wasilla, was heavily damaged by an earthquake on November 30, 2018. (Marc Lester / ADN) Buy This Photo

A 7.0 earthquake jolted Anchorage and the rest of Southcentral Alaska on Friday morning, cracking and collapsing roads and highways, damaging buildings, knocking out power and sending people scrambling outside and under furniture. The shaking left many homes a mess and aftershocks continued through the night and into Saturday morning.

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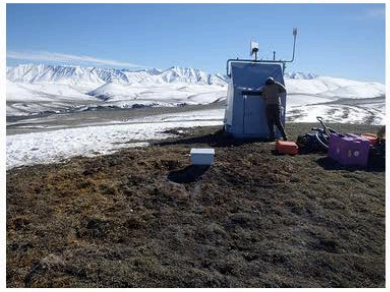
Earthquakes | Tsunamis | Volcanoes | Seismic Network | About Us



USArray station D25K located in the Arctic National Wildlife Refuge.

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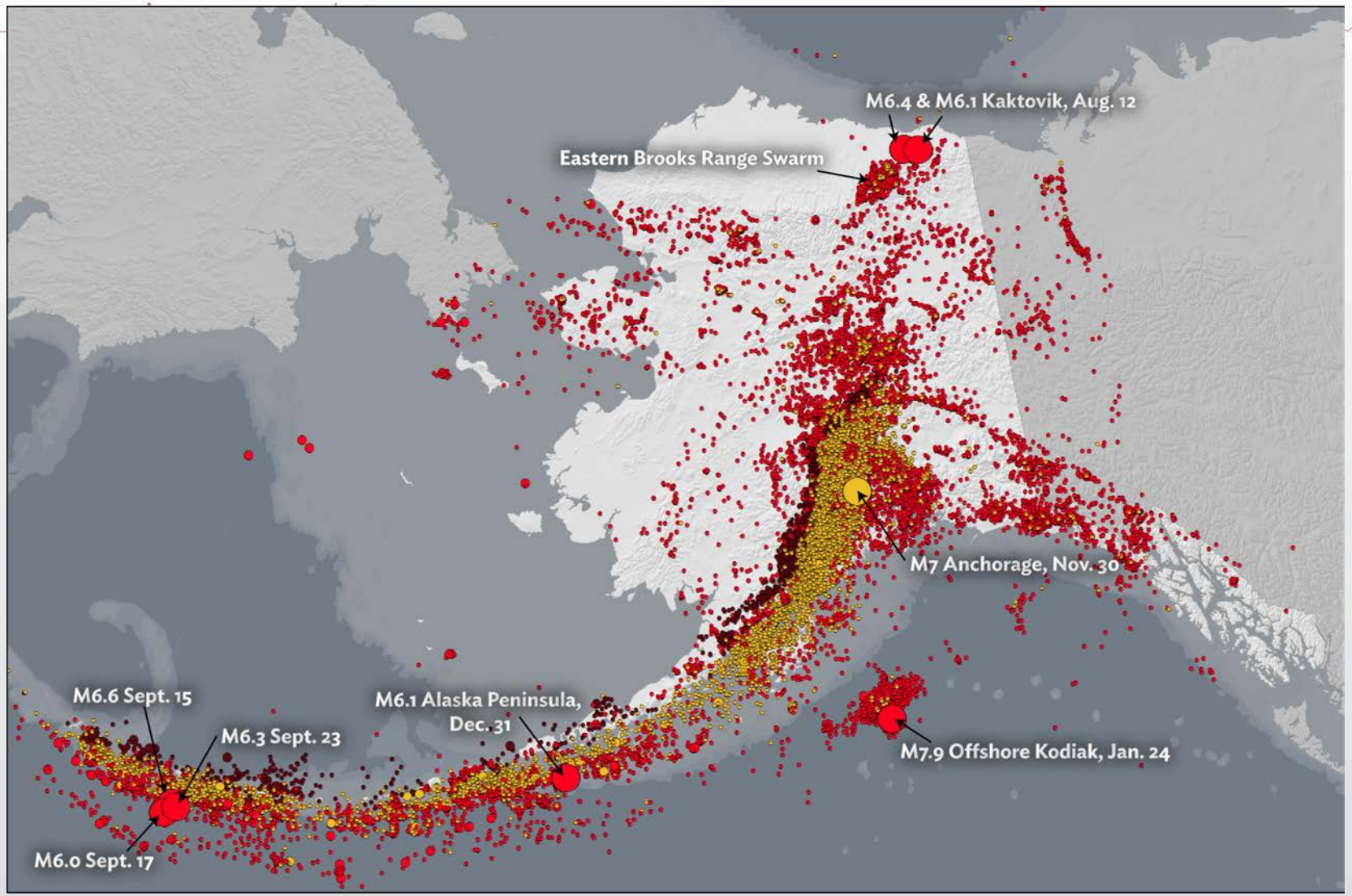

2018 Seismicity

0 50 100 200 300 Miles
0 50 100 200 300 400 500 Kilometers

Magnitude
M>6 M<4

Depth
Shallow, <30km
Intermediate, 30-120km
Deep, >120km

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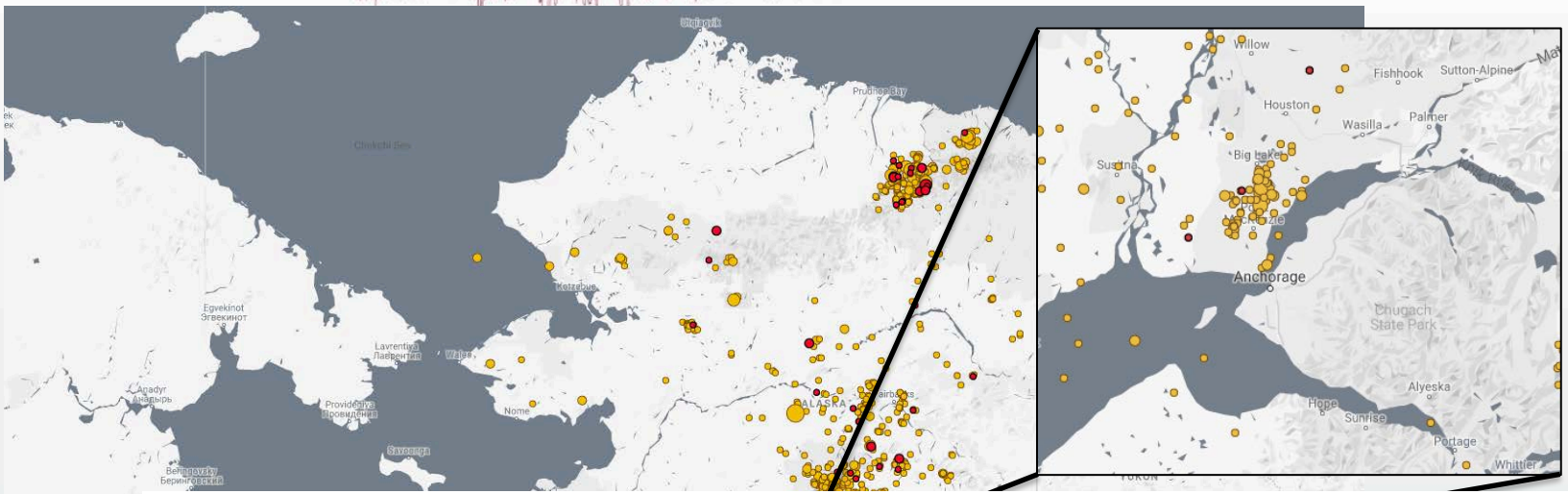
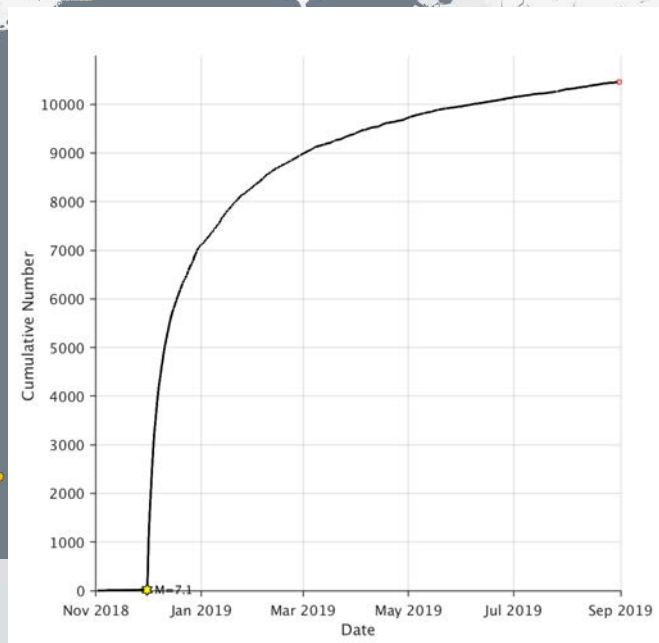
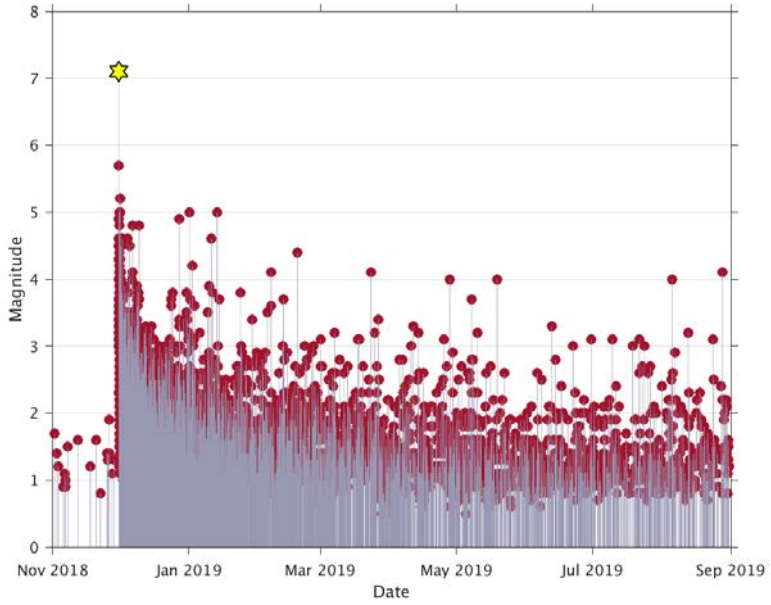
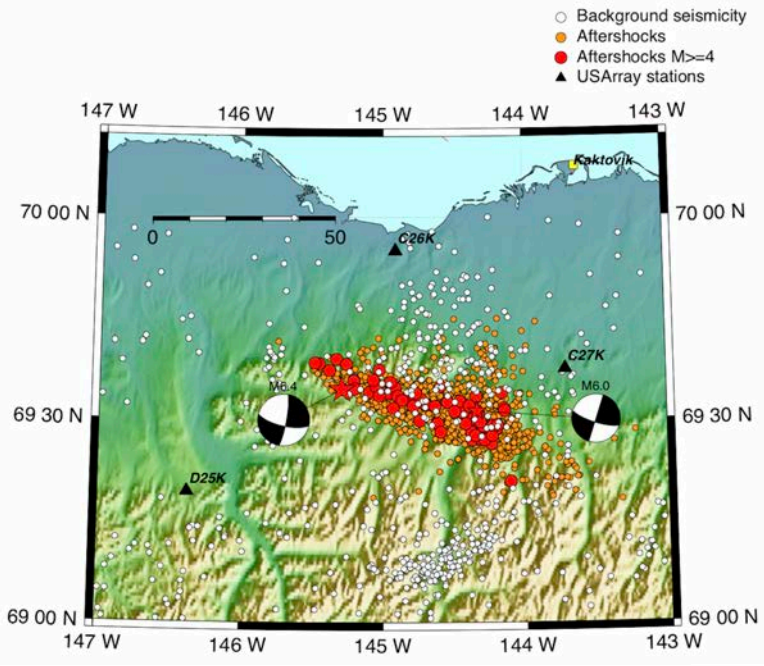


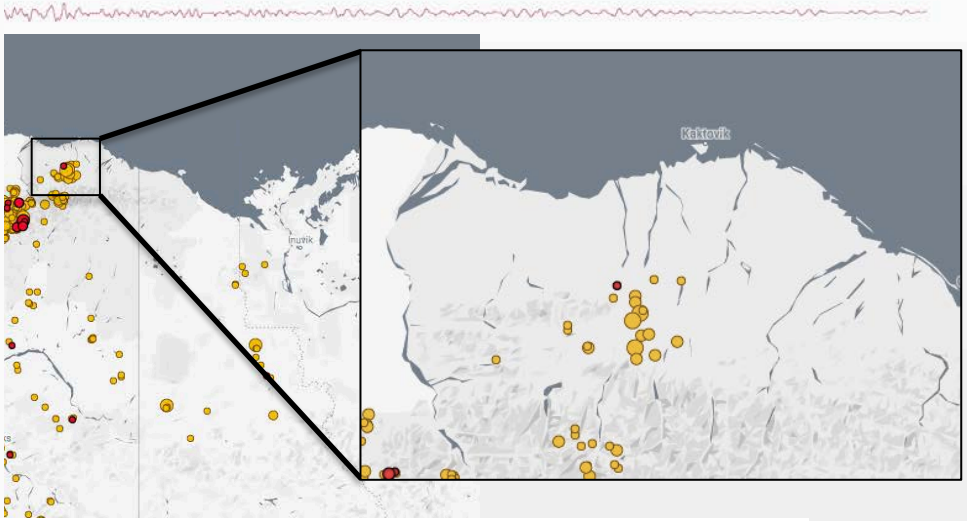


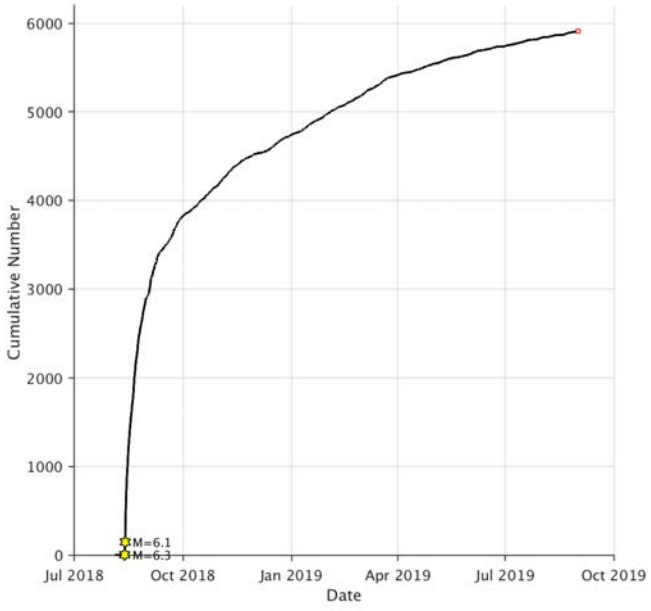


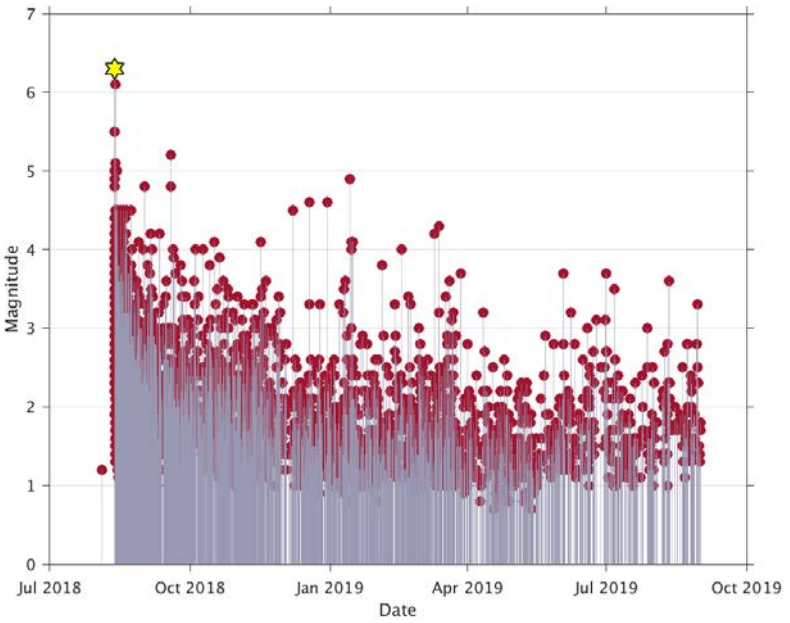
Anchorage M7.1

since Victoria



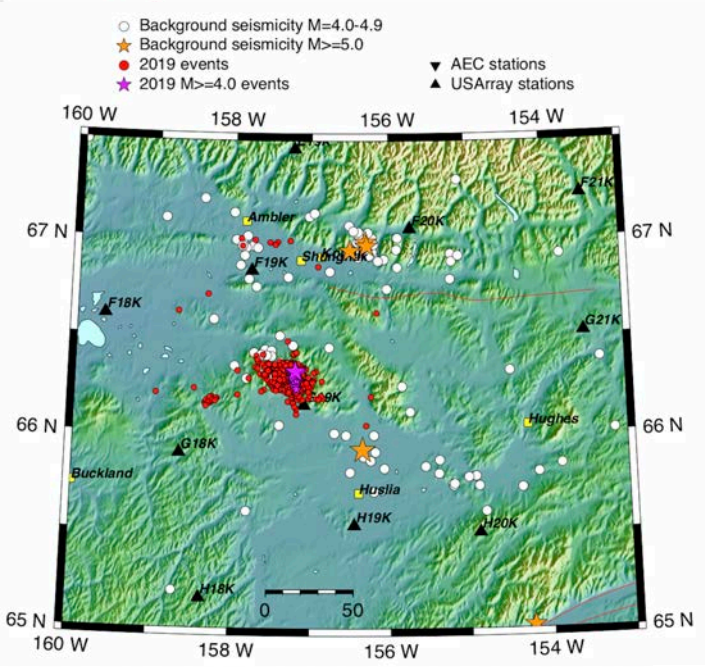


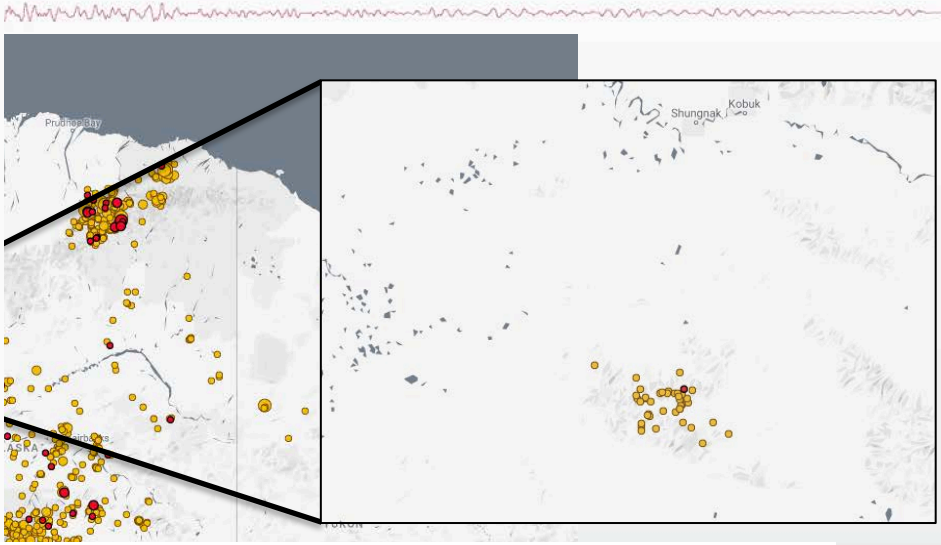


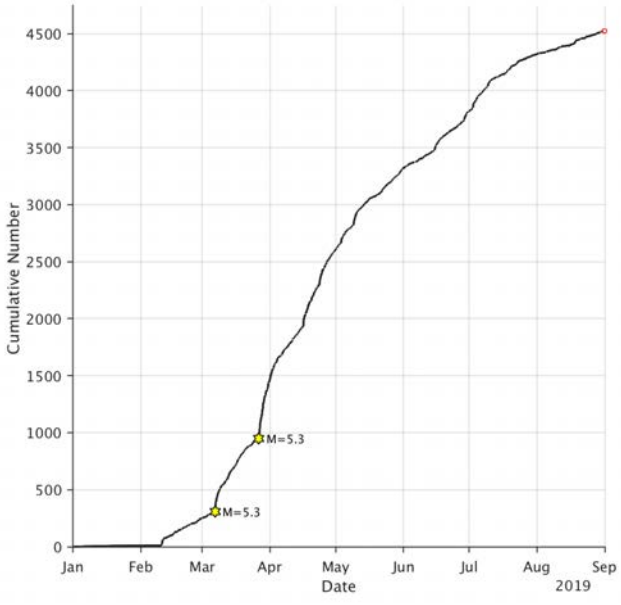


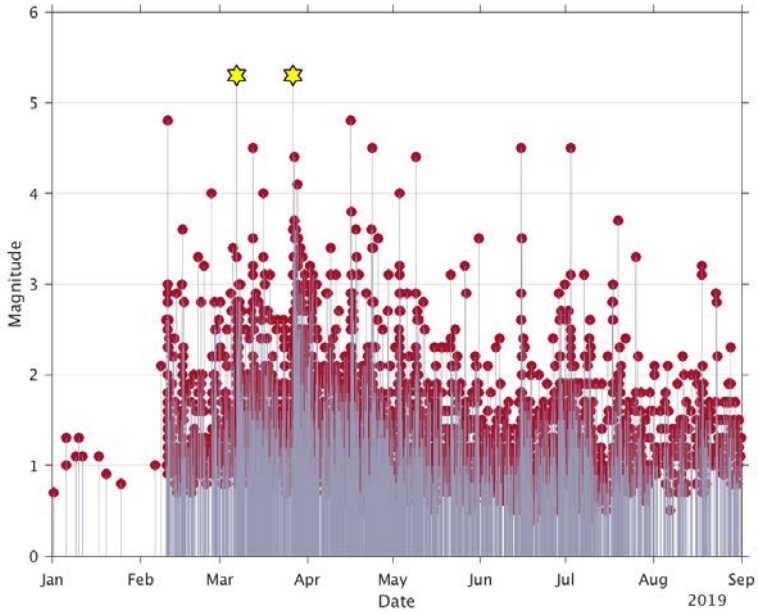
Kaktovik M6.4 & 6.0

since Victoria



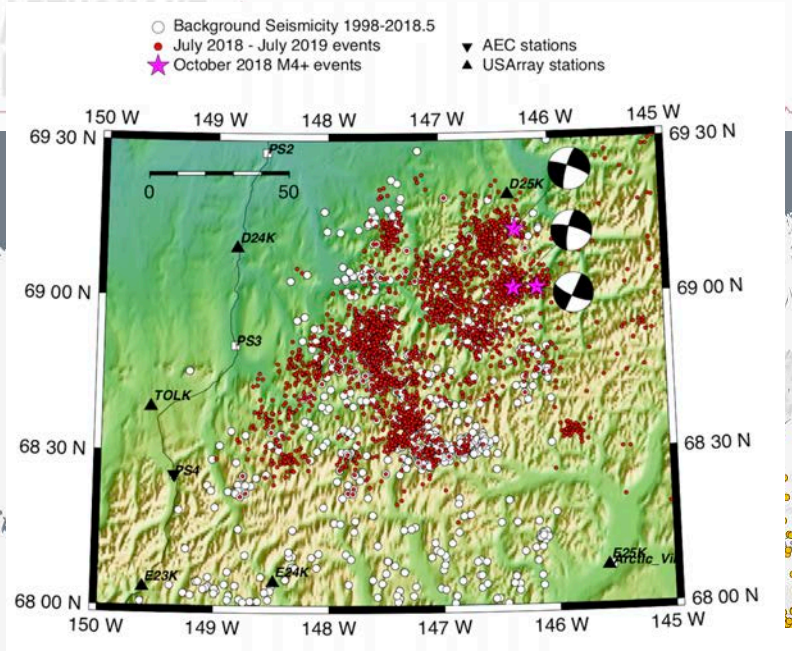


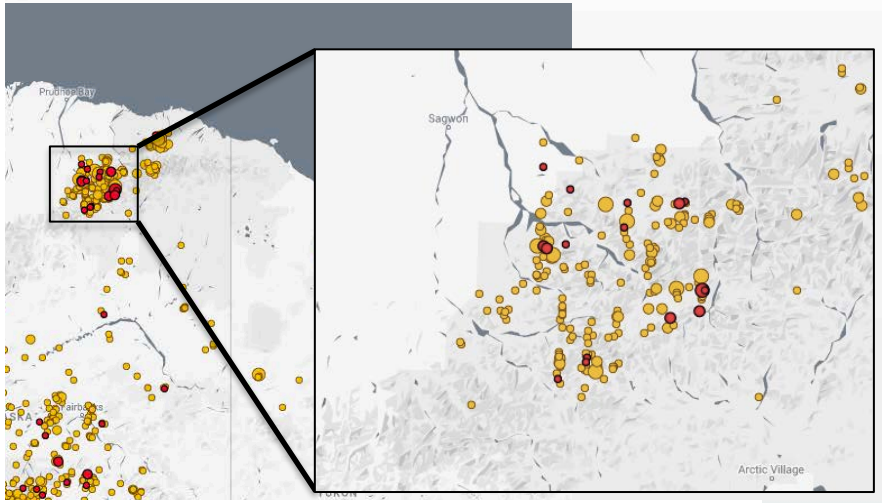


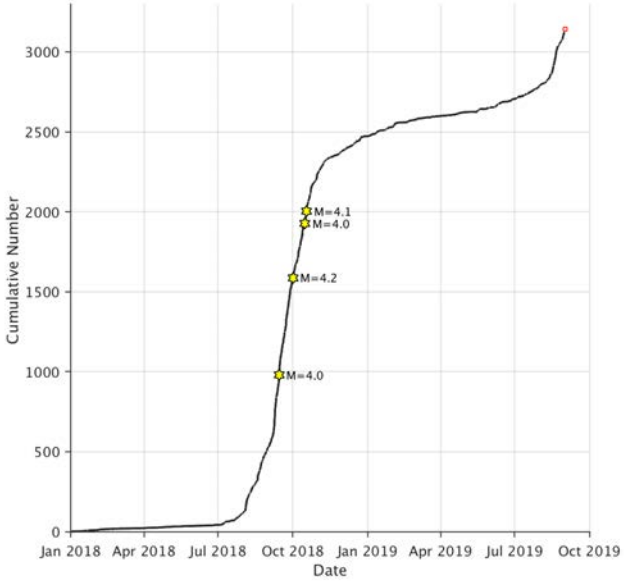


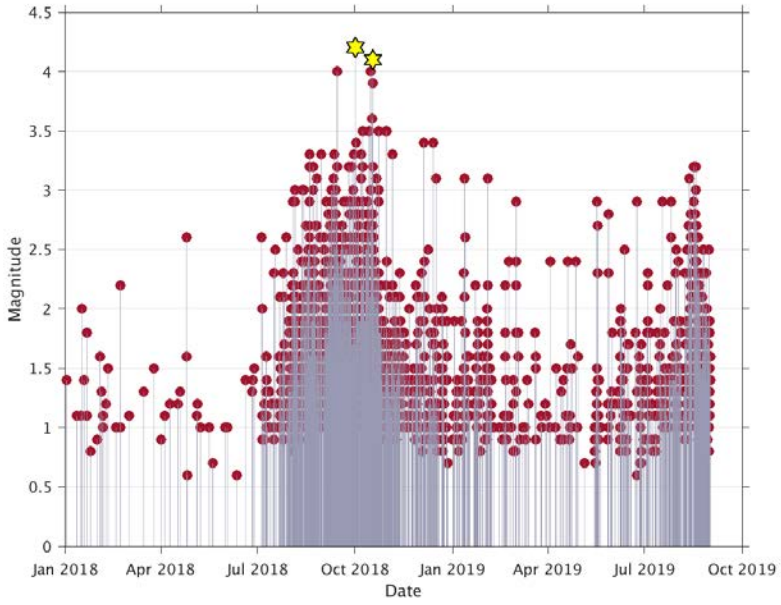
Purcell Mountains swarm

since Victoria









Eastern Brooks Range swarm

since Victoria

- rollout of permanent event identifiers
- import, integration of USGS magnitudes
- port Tcl/Tk code over to Qt
- AWS cloud backup prototype
- future: reimagining catalog workflow

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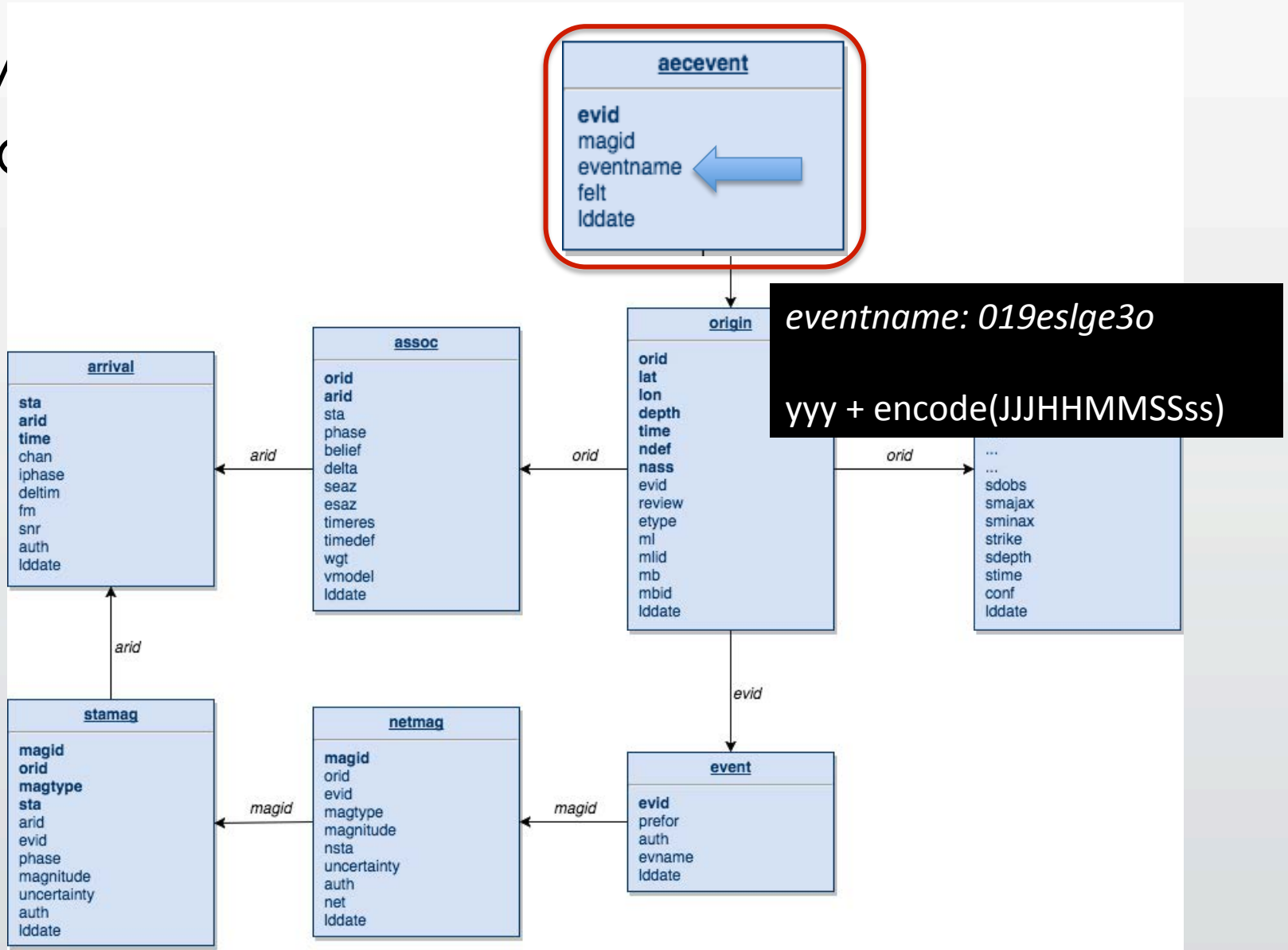
permanent event ids

permanent event ids

- v
  i



dbe: /aec/db/catalogs/summary/summary

File Edit View Options Graphics Help

Views | New Window

View100 | View101 | View102 | View103 | View104 | View105

	eventname	evid	magid	felt	lat	lon	depth	time	review	auth	magnitude	magtype	auth	lddate
0	019b7lpbt4	20751338	1291180		59.0774	-136.9642	0.5548	9/01/19 (244) 04:32:26.63312 UTC	y	AK:mheather	5.00	Mww	QKML:us	9/01/19 (244) 04:49:28.50000 UTC

1 Row

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science for a changing world

Earthquake Hazards

Latest Earthqu

Overview

Interactive Map

Regional Informatio

Impact

Felt Report - Tell Us

Did You Feel It?

ShakeMap

PAGER

Technical

Origin

Moment Tensor

Waveforms

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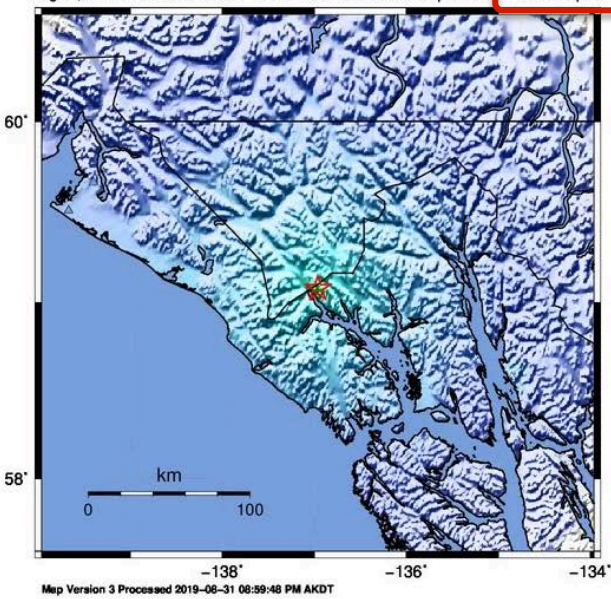
Summary | Waveforms | Shakemap | Tectonic Setting

Intensity | Peak Acceleration | Peak Velocity | Spectral | Downloads

AEC ShakeMap : 44 miles SW of Klukwan

Aug 31, 2019 08:32:26 PM AKDT M 5.0 N59.08 W136.96 Depth: 0.6km ID:019b7lpbt4



Map Version 3 Processed 2019-08-31 08:59:48 PM AKDT

PERCEIVED SHAKING	Not felt	Weak	Light	Moderate	Strong	Very strong	Severe	Violent	Extreme
POTENTIAL DAMAGE	none	none	none	Very light	Light	Moderate	Mod./Heavy	Heavy	Very Heavy
PEAK ACC.(%g)	<0.05	0.3	2.8	6.2	12	22	40	75	>139
PEAK VEL.(cm/s)	<0.02	0.1	1.4	4.7	9.6	20	41	86	>178
INSTRUMENTAL INTENSITY	I	II–III	IV	V	VI	VII	VIII	IX	X+

Scale based upon Worden et al. (2012)

Summary

Magnitude

This event was felt in

Google Map data ©2019 Google

August 31, 2019 20

59.0774°N 136.9642

https://earthquake.usgs.gov/e

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import external magnitudes

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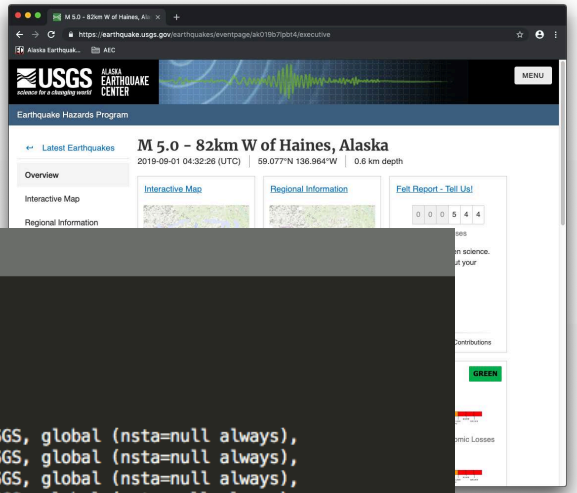
import external magnitudes

- AEC only computes Ml
- typically utilize USGS Mww for events > 5.5
- synchronize magnitudes across products (including authoritative submissions to USGS ComCat system)

import external magnitudes

USGS origin product

ComCat



USGS

AEC

netmagselect.pf

```
# authors lower in list have higher priority
authpref    &Tbl{
    # auth.netmag magtype.netmag
    orbmb       mb  # Mb automatic from AEC
    orbml       ml  # Ml automatic from AEC
    aeic_dbml   ml  # Ml reviewed from AEIC
    USGS:US     mb  # mb reviewed from USGS
    USGS:US     mwp     # Mwp reviewed from USGS, global (nsta=null always),
    USGS:US     mwb     # Mwb reviewed from USGS, global (nsta=null always),
    USGS:US     mwc     # Mwc reviewed from USGS, global (nsta=null always),
    USGS:US     mwr     # Mwr reviewed from USGS, global (nsta=null always),
    USGS:US     mw  # Mw reviewed from USGS, global (nsta=null always),
    USGS:US     mww     # Mww reviewed from USGS, global (nsta=null always),
    AK:man      mman
}

pf_revision_time 1285093522
```

QuakeML

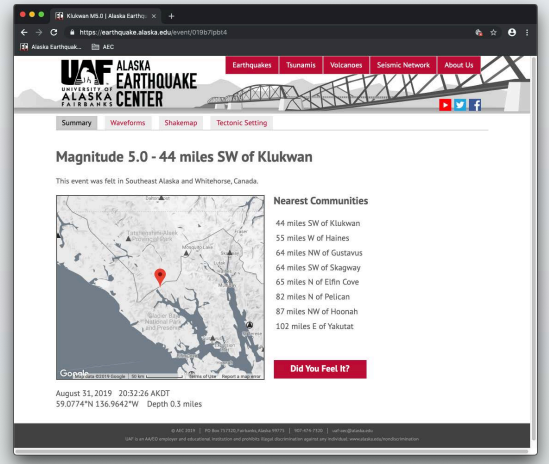
QuakeML

QuakeML

quakeml2orb

db2quakeml

summary database



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port Tcl/Tk to Qt

port Tcl/Tk to Qt

- Many existing operational scripts rely on Tcl/Tk code:
  - Duty response (done using new dbevents)
  - Ml calculator (station-by-station)
  - Daily processing record-keeping
  - QC record-keeping

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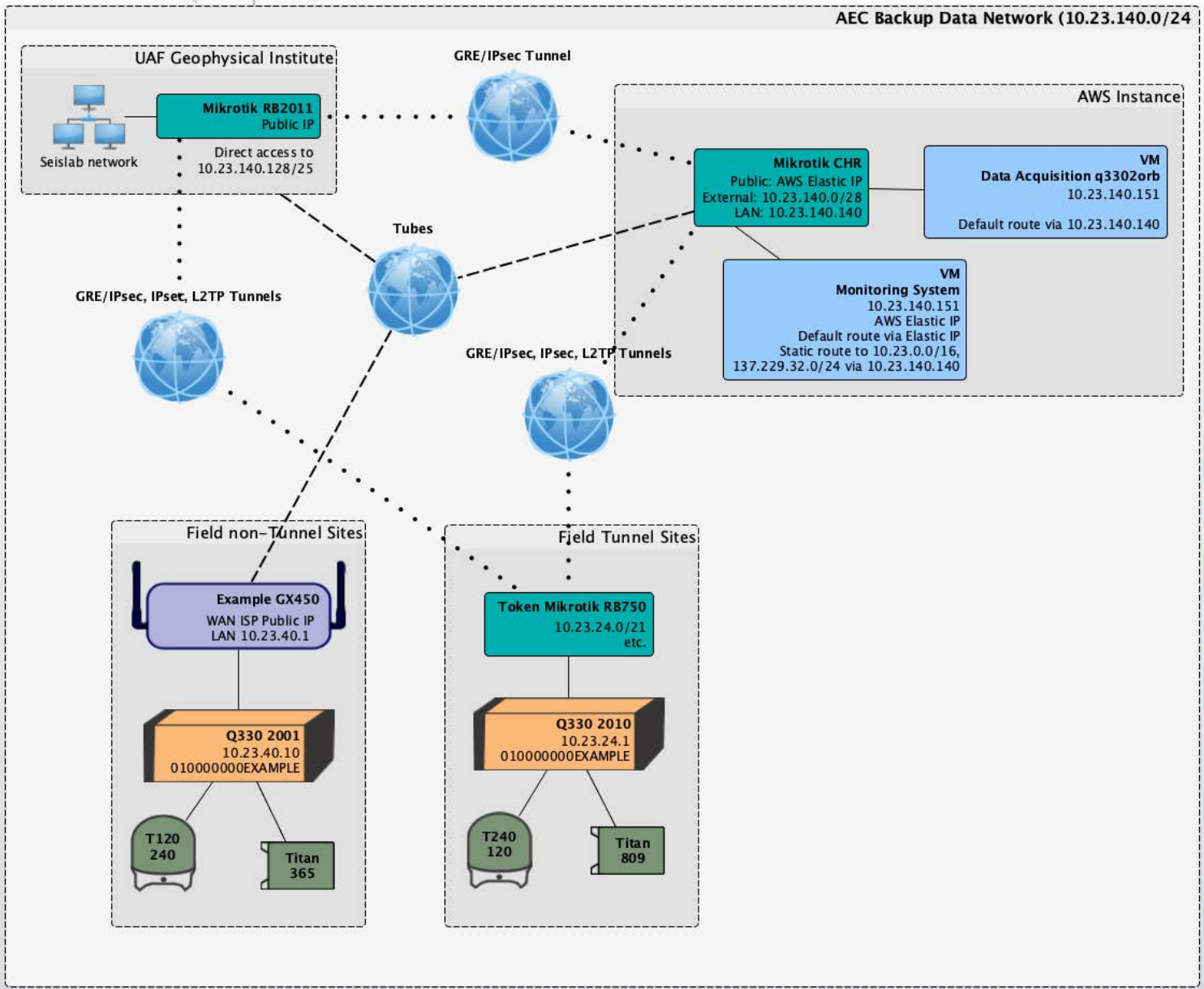
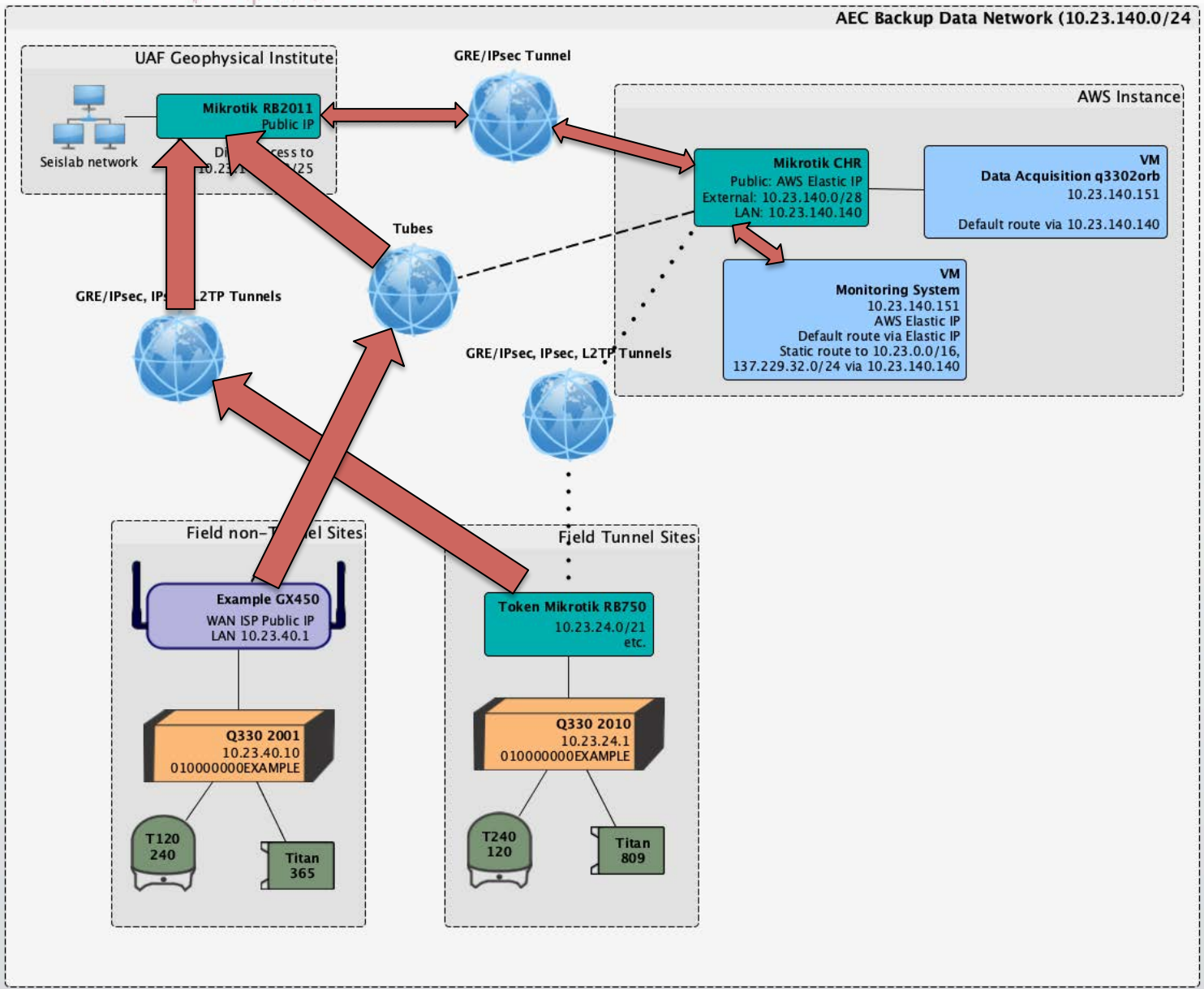
AWS backup system

the cloud makes failure cheap and success expensive

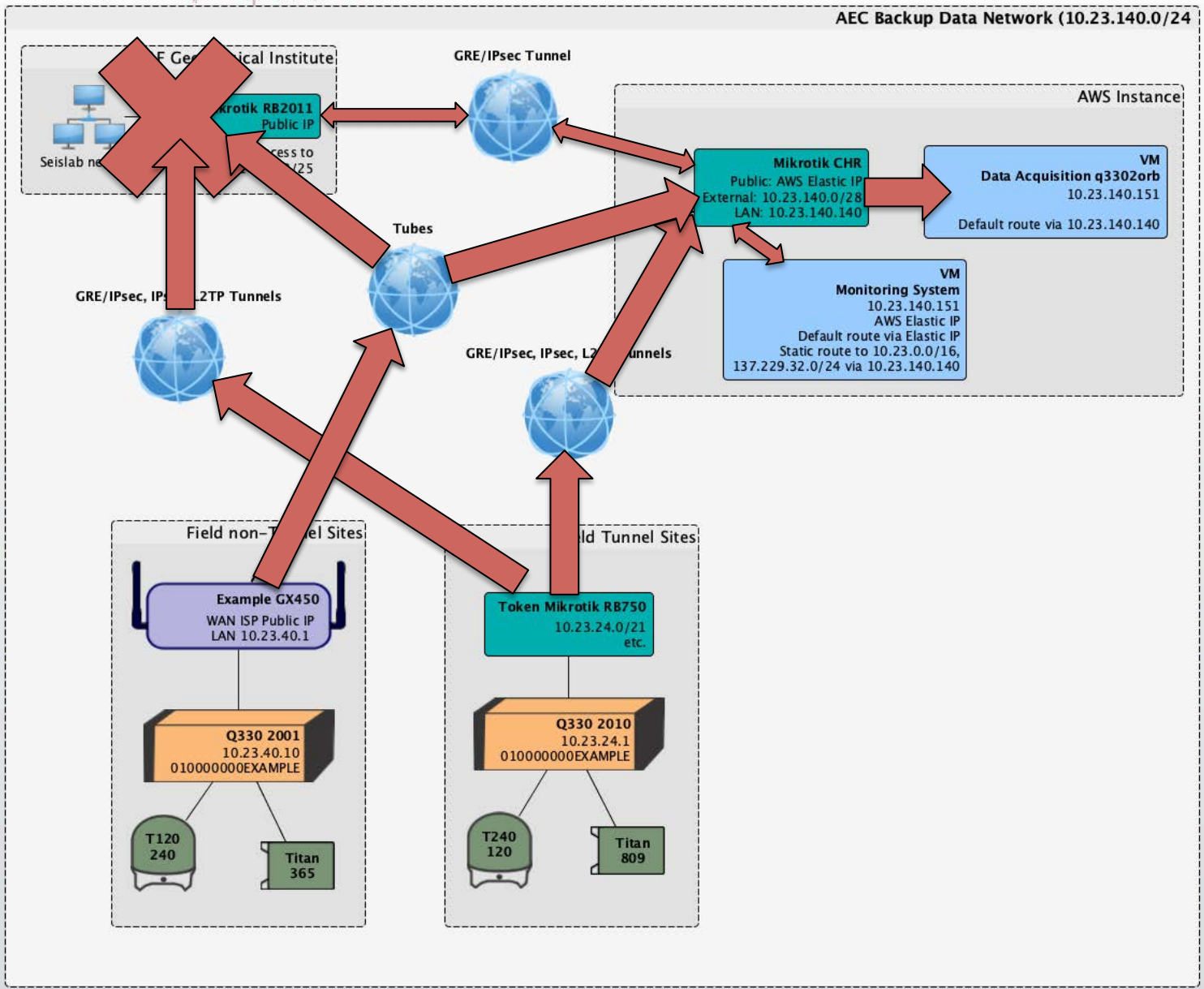
AWS backup system



AWS backup system



AWS backup system



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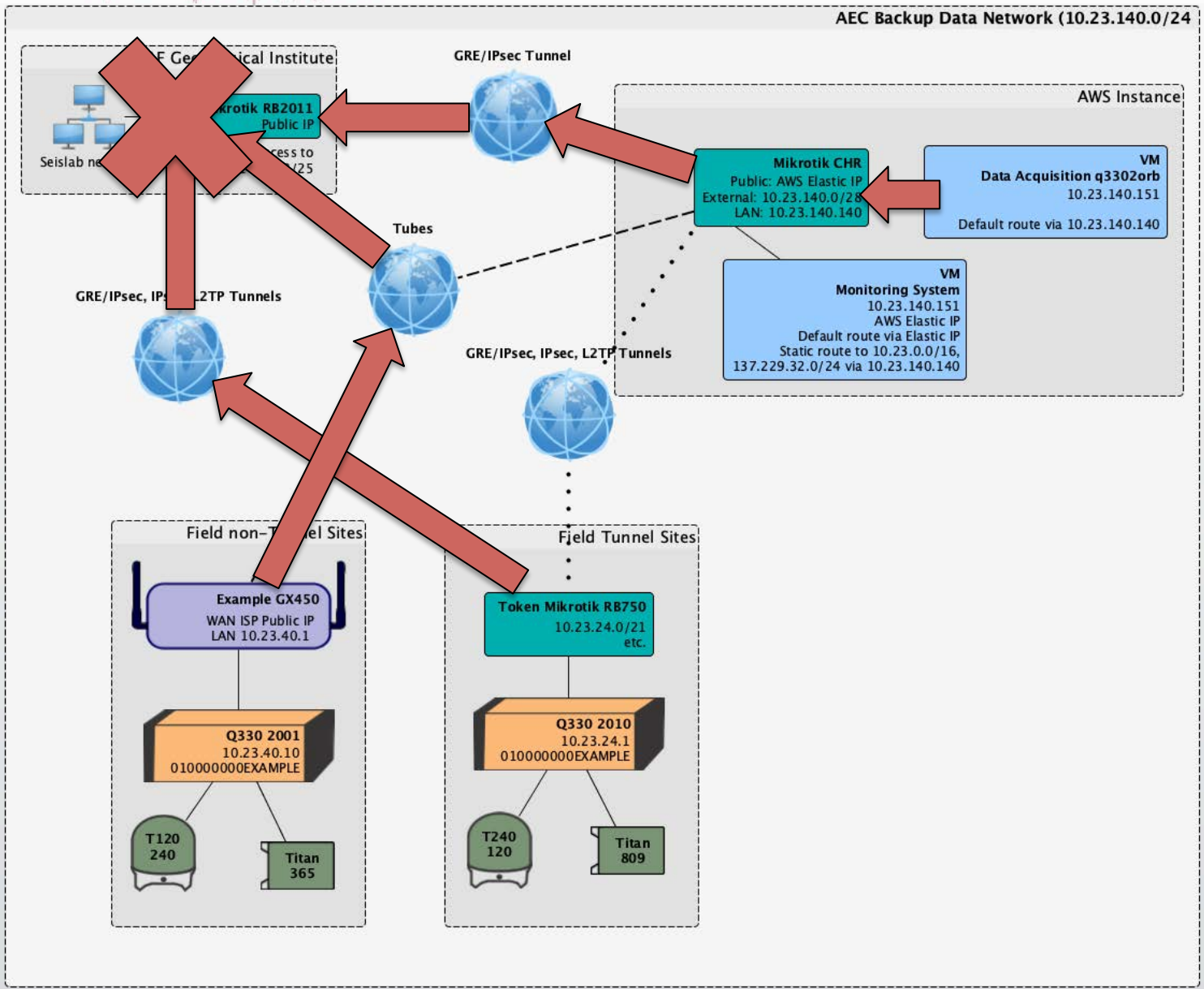

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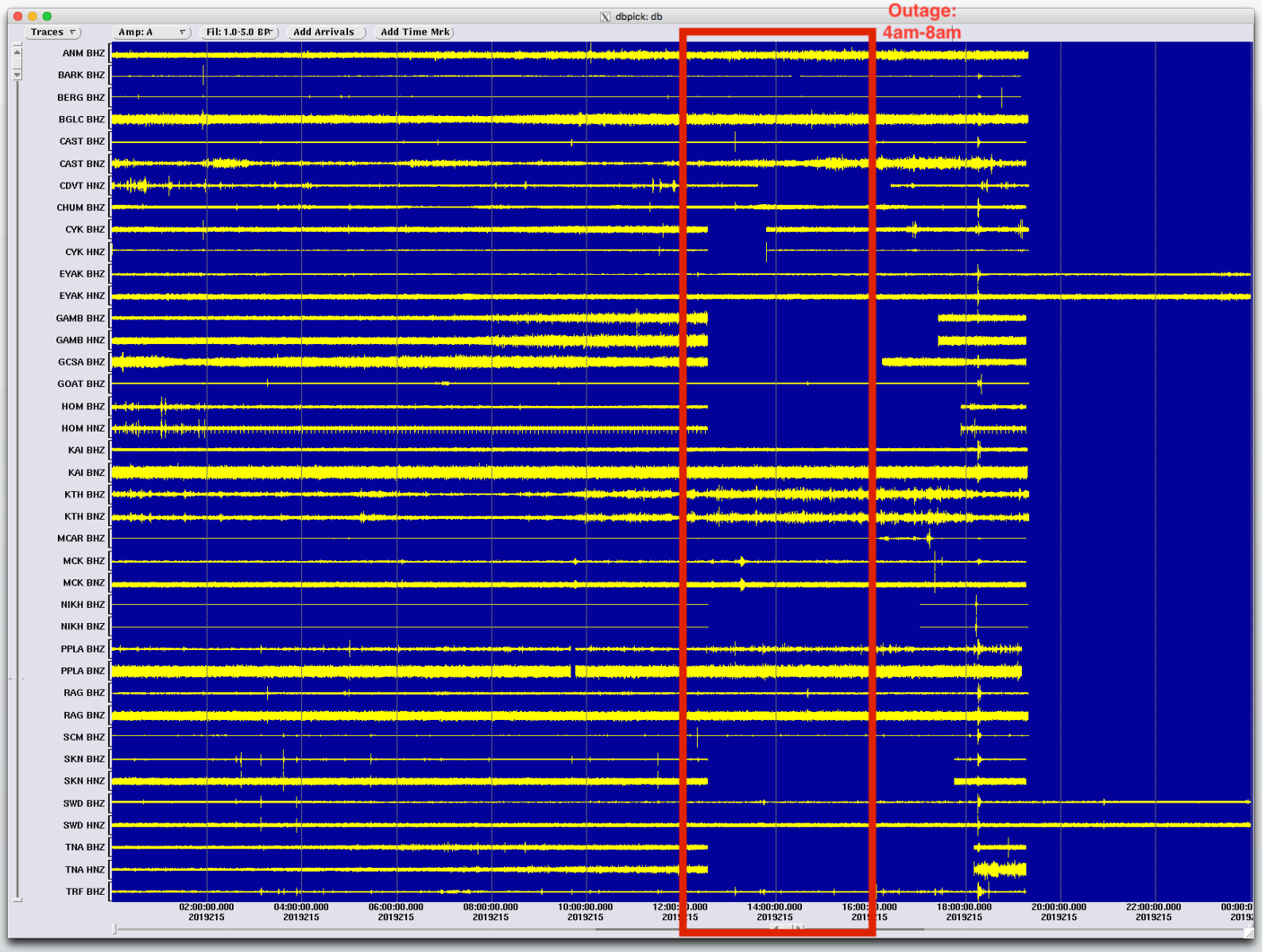
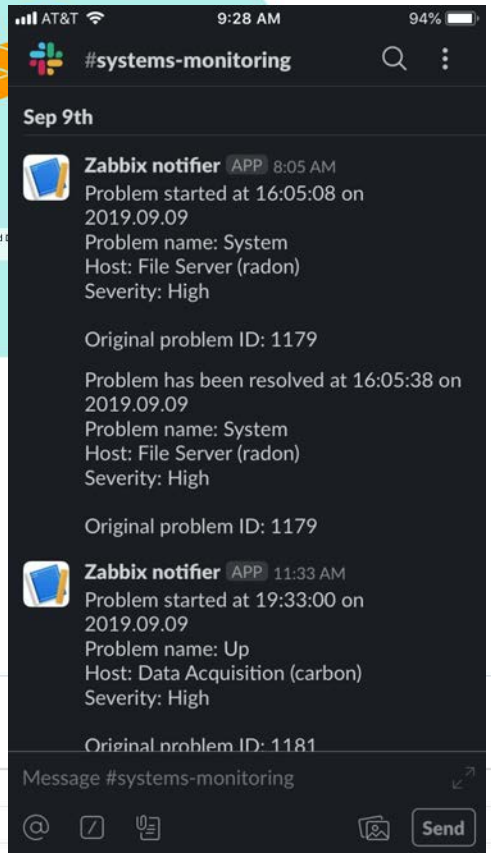
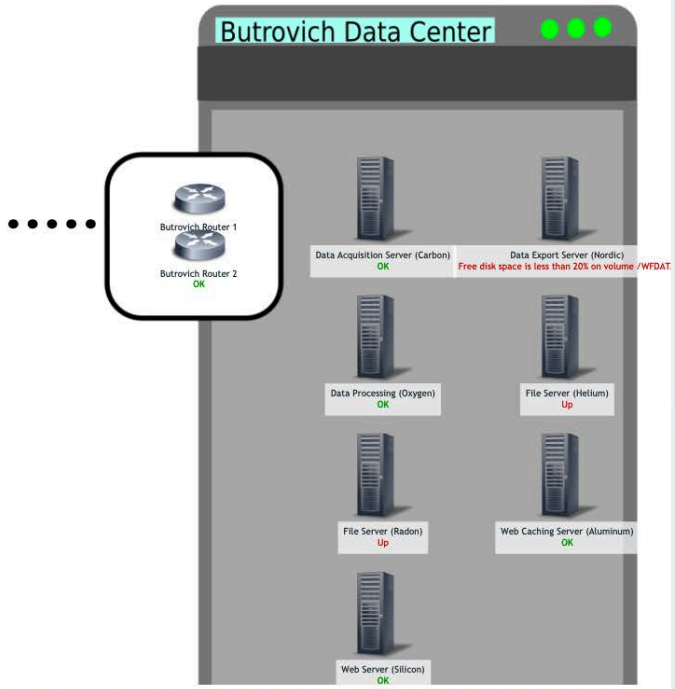
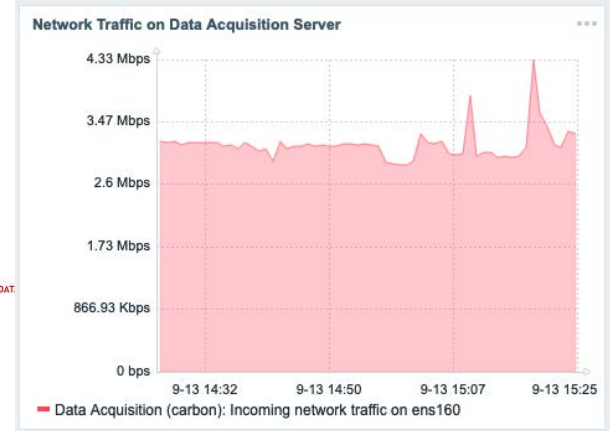
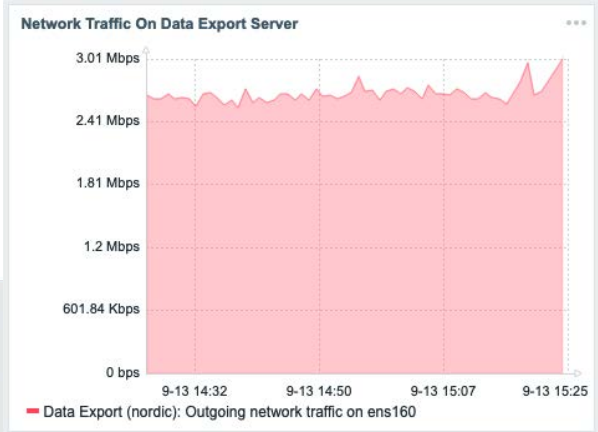


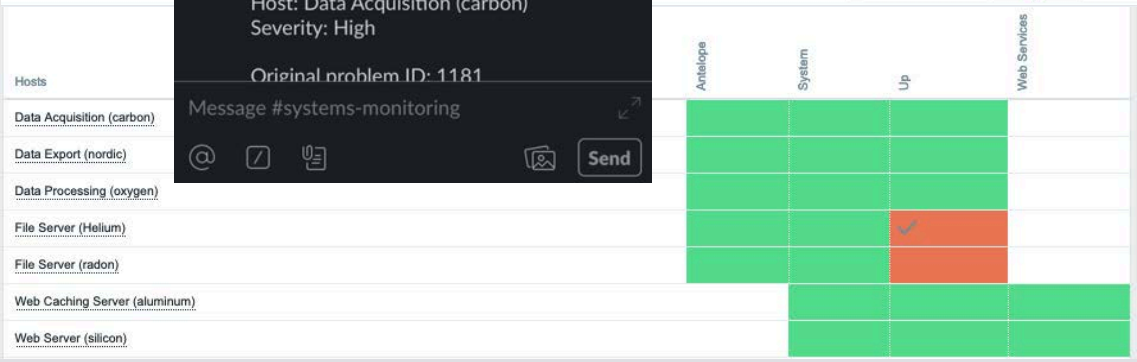
AWS system monitoring











- Up: no pings in last 2 minutes
- System: disk usage > 95%, nfs mounts unavailable, network rate < 1 Mbps on acquisition, export servers
- Web services: Apache, Varnish, MySQL
- Antelope: rtexec process kills, ShakeMap errors

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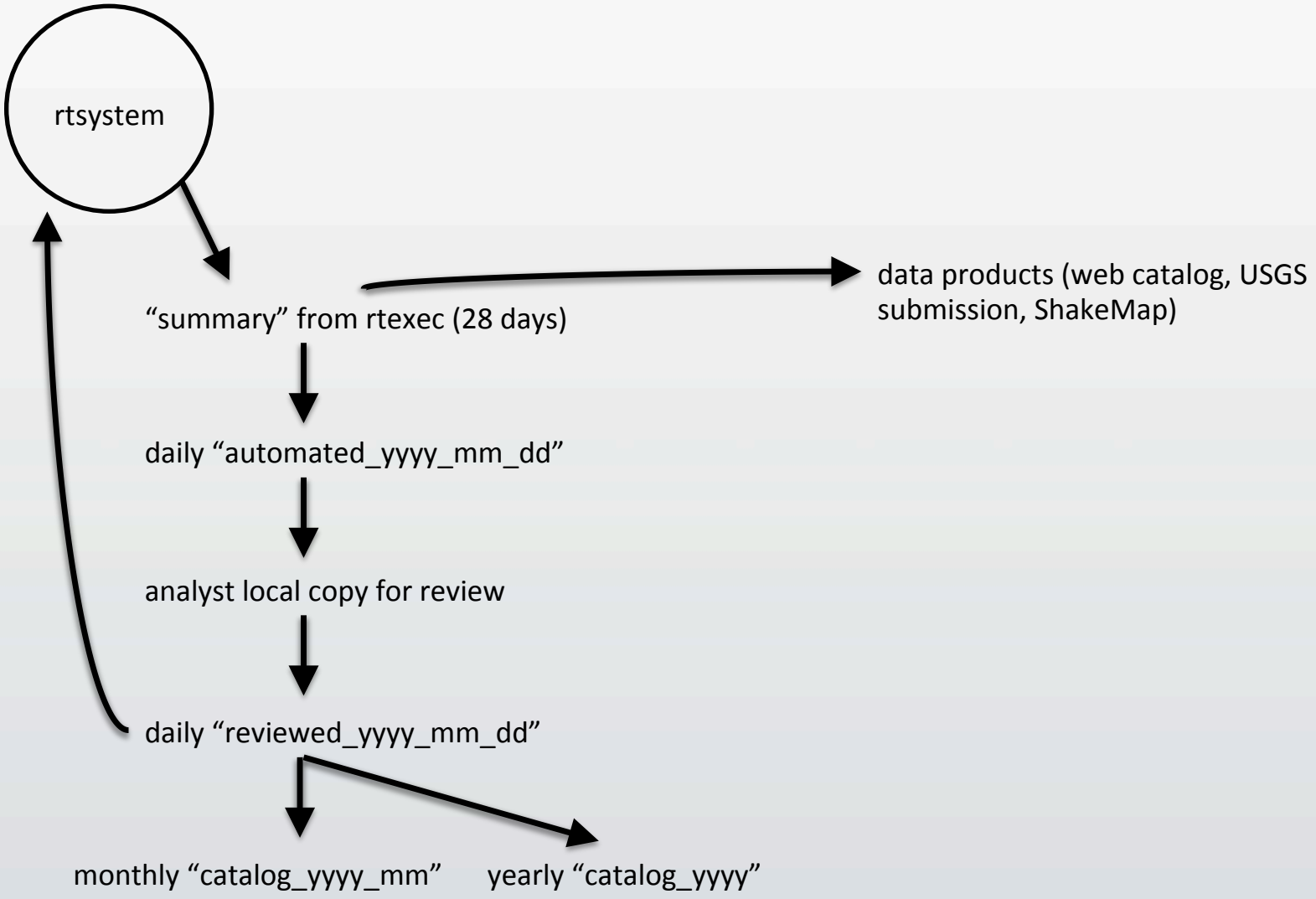
catalog workflow

catalog workflow



catalog workflow

- limitations:
  - relies on association with summary database (28 days)
  - point-of-no-return for information updates
  - "catalog from XXX to YYY"
- goals:
  - provide analysts with the most up-to-date information available at the time of processing
  - allow for dataset processing from a remote location
  - support delayed review of earthquakes
  - retain the ability to edit all aspects of the catalog at future points in time
  - provide a mechanism for querying the best possible information at any point in time

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