# SEISMOLOGICAL WORK IN PROGRESS

TAIMI MULDER

ANTELOPE USER GROUP SEPTEMBER 16-18, 2019 CALGARY, ALBERTA, CANADA

#### LEECH RIVER FAULT ARRAY



### LRF – SOOKE DAM SITES



### LRF - BOATHOUSE



### LRF – HEAD OF SOOKE DAM





## LRF – 23S QUARRY









#### LEECH RIVER FAULT ARRAY SUMMARY

- 2017 2019 installed 10 stations in the Victoria, BC, area.
- 2019 Aug/Sep installed 3 stations in the Sooke (Victoria) watershed.

To Do:

- Dbmaster
- Organize waveform archive, create wfdisc
- Collaboration with Chris Johnson (UCSD) to process waveform data through machine learning code.
  Looking for small earthquakes not recorded by the regional network.

### HISTORIC SEISMIC CATALOGUE

- Current summary database does not correctly represent the holdings of western canada seismic catalogue
  - Missing blasts
  - Missing teleseismic arrivals
  - Preferred origin not always correctly assigned
  - Preferred magnitude not always correctly assigned
  - Ghost events (previously deleted events that were not removed from seismic catalogue)
- Make entire catalogue data holdings available for analyst review
- Re-design dataflow to summary database

### THE HISTORIC SEISMIC CATALOGUE

- Pre 1970: Index cards
  - Antelope database exists for northern events from 1950's to 1970's
- 1970's: Quakards
- 1980's: Sam format
- 1990's: Loon pickfile format
- 2006 onwards: Antelope database
  - Needs magnitude re-calculations
  - Needs event origin reassociation for some events.



### MAGNITUDE RE-CALCULATION

Re-calculations of magnitude over time. Why?...

- Changes in magnitude calculation over time. E.g. offshore Vancouver Island earthquakes:
  - Initially only used highest ML
  - Then averaged ML, but discarded "anonymously" low magnitudes
  - Finally used antelope ML calculations, magnitude determination based on a minimum snr value per station.
- Corrected bad instrument responses for various sites often due to incorrect sensor or datalogger information in database.
- Verification of site lat and lon values for network stations resulted in lat lon updates to a number of stations.

#### STEPS

- Initially only re-calculate magnitudes within Antelope database.
- Explore magnitude re-calculation with events imported from previous pickfile formats:
  - Import origins and arrivals into datascope css3.0 tables
  - Create dbmaster for those time periods
  - Make wfdisc table for digital waveform files