Seeing Paradise through Clouds:
Generating Annual Cloud-free Mosaics from Landsat-8 Imagery

Master's Student: Yoko Uyehara, Mentor: Dr. Qi Chen / University of Hawai'i at Mānoa

Paradise in Cloud Cover

- Landsat 8 (2013 – 2020)
  - No cloud-free images
  - 1 image with <5% cloud coverage
- Islands face environmental stresses
  - Volcano eruption
  - Urban expansion
  - Agricultural abandonment
  - Coastal line changes
  - Forest losses
  - Forest restoration
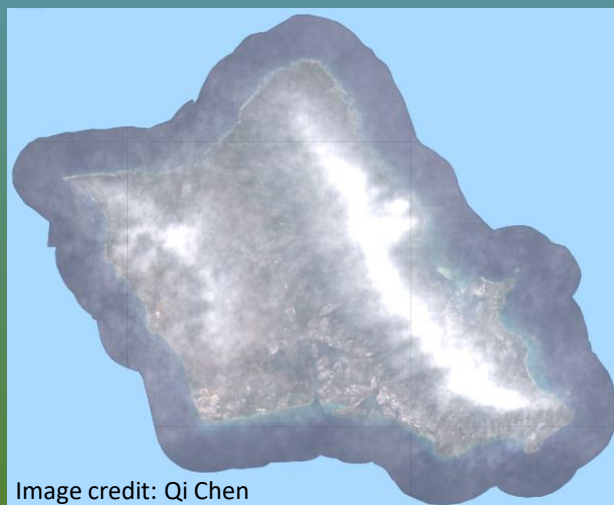- Cloud-free mosaic: Latest is 2007

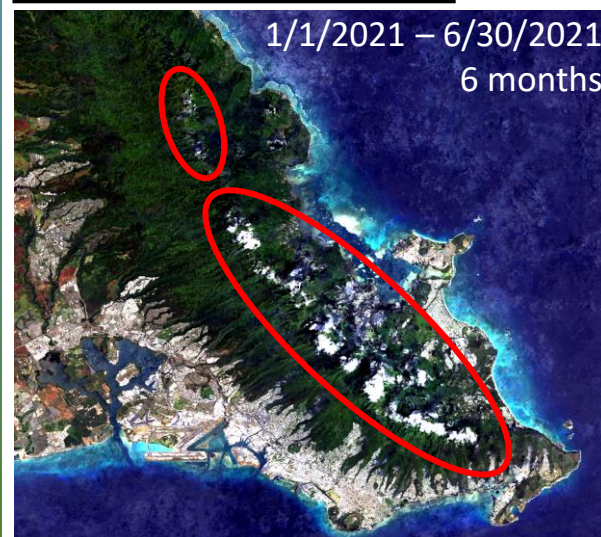Image credit: Qi Chen

Methods

- Evaluated Cloud-free mosaic methods
  - Descartes Labs
    - Requires fees
    - Only Red-Green-Blue bands
  - Google Earth Engine (GEE)
    - No fees
    - All bands
  - Other methods
- Parameters setting
  - Time range, Cloud Score, etc.

GEE Process Flow

1. Get data
   Landsat 8 data

2. Filter data
   Location boundary

3. Cloud-free algorithm
   Parameters: time, cloud score, etc.

4. Cloud-free mosaic
   Full spectral bands

Results/Discussions: Time range is the most important

1/1/2021 – 6/30/2021
6 months

1/1/2017 – 12/31/2021
3 years

Agricultural Land Change (Maui)

2014 (2013 - 2015)   2015 (2014 - 2016)
2016 (2015 - 2017)   2017 (2016 - 2018)
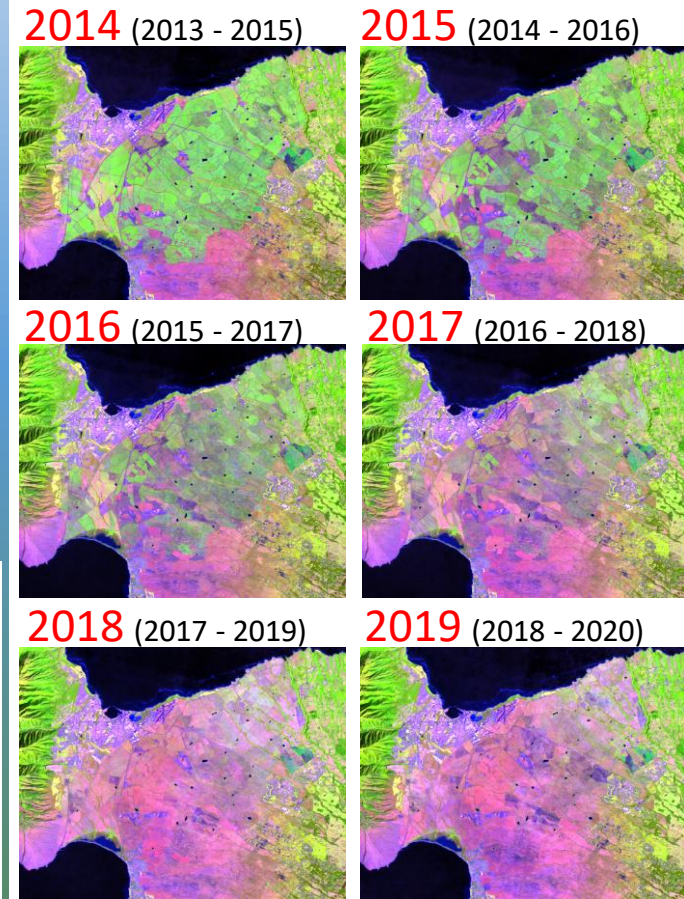2018 (2017 - 2019)   2019 (2018 - 2020)

Image credit: Qi Chen

Free to download the data

- Ready to use for GIS analysis
- Come with full spectral bands
- Visit us at http://hawaiiview.org