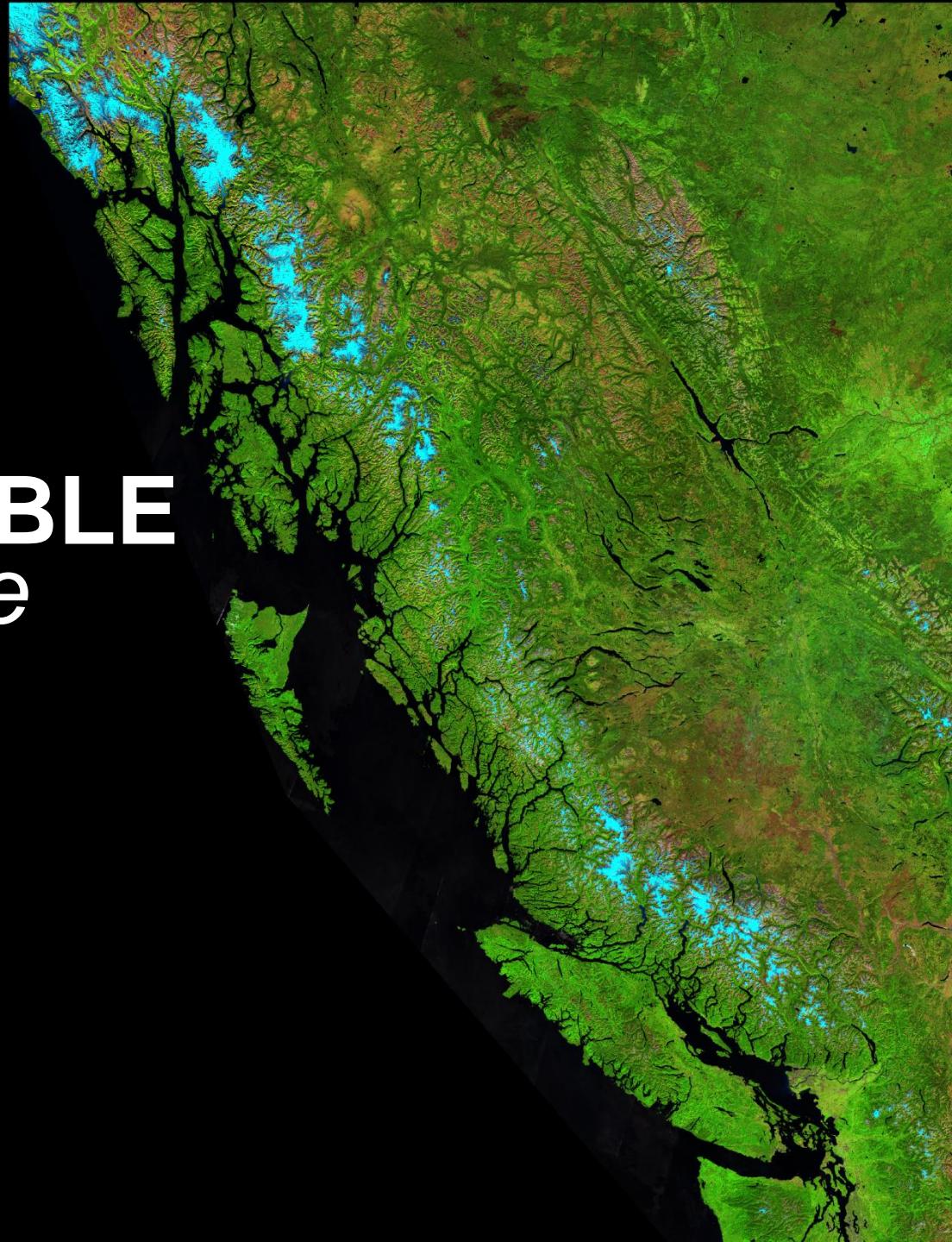
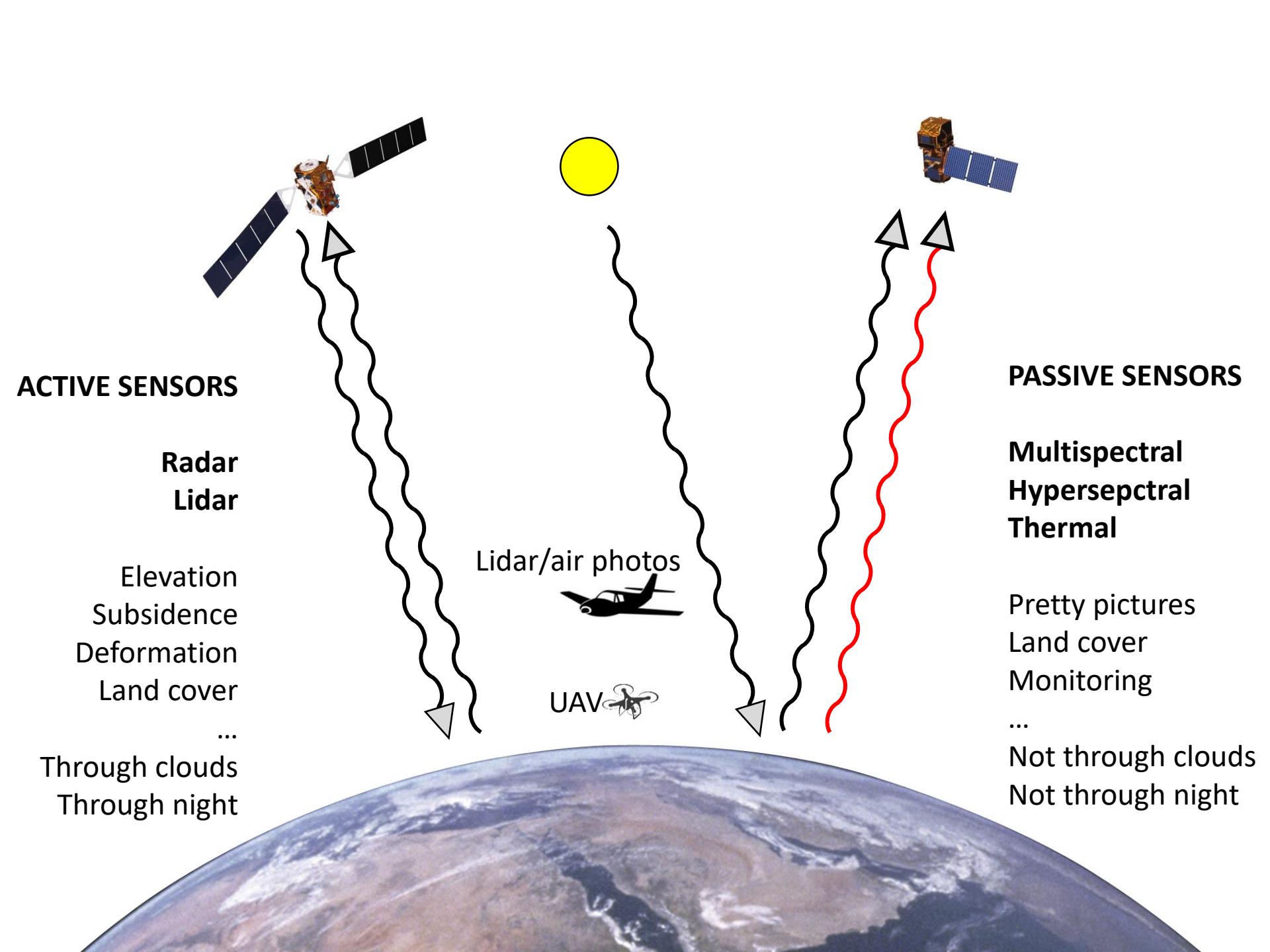


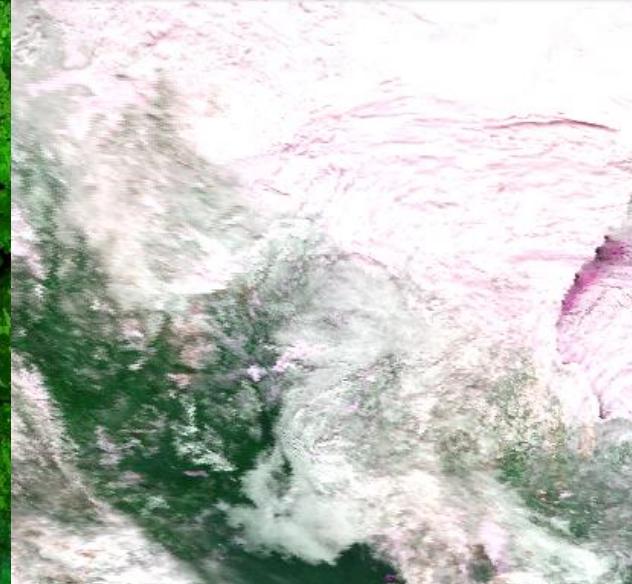
# REPRODUCIBLE *satellite image* ANALYSIS



**Alexandre Bevington**  
Research Earth Scientist,  
MFLNRORD, Prince George, BC  
[Alexandre.Bevington@gov.bc.ca](mailto:Alexandre.Bevington@gov.bc.ca)







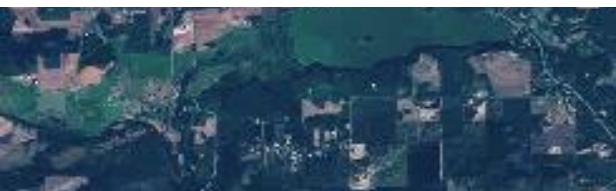
**RESOLUTION IS THE SOLUTION**



**SPATIAL**

**SPECTRAL**

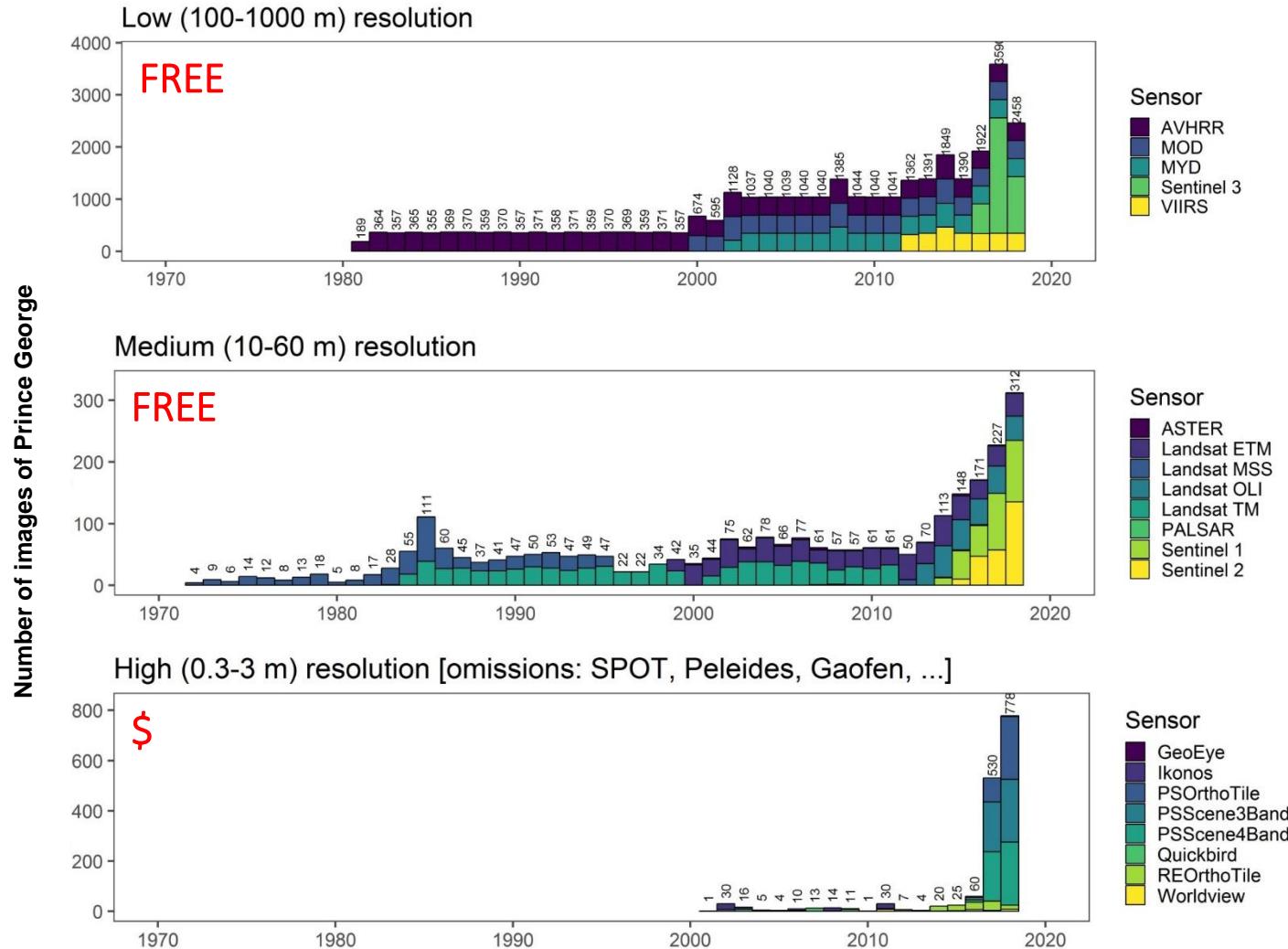
**TEMPORAL**



More information:

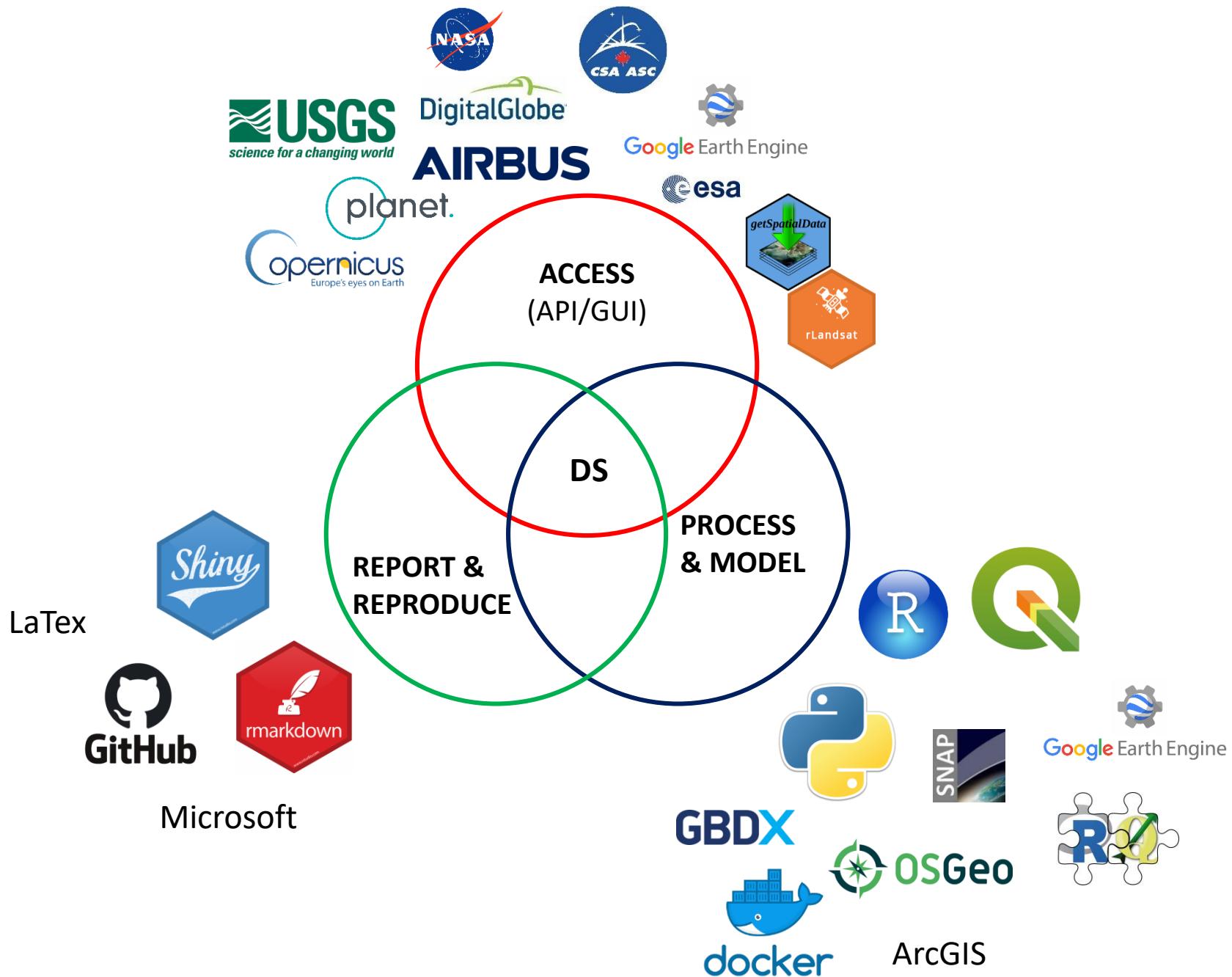
Bevington et al. (2018) <https://doi.org/10.22230/jwsm.2018v2n2a18>.

# THE *democratization* OF REMOTE SENSING



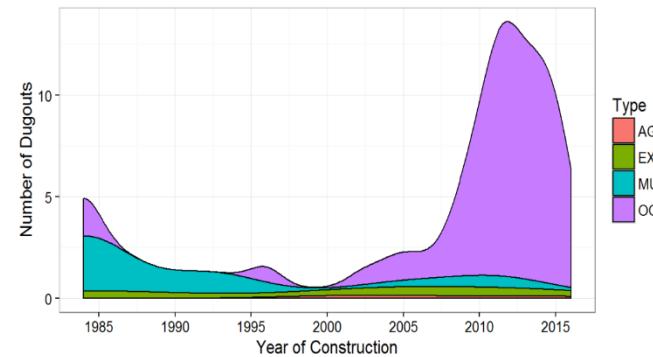
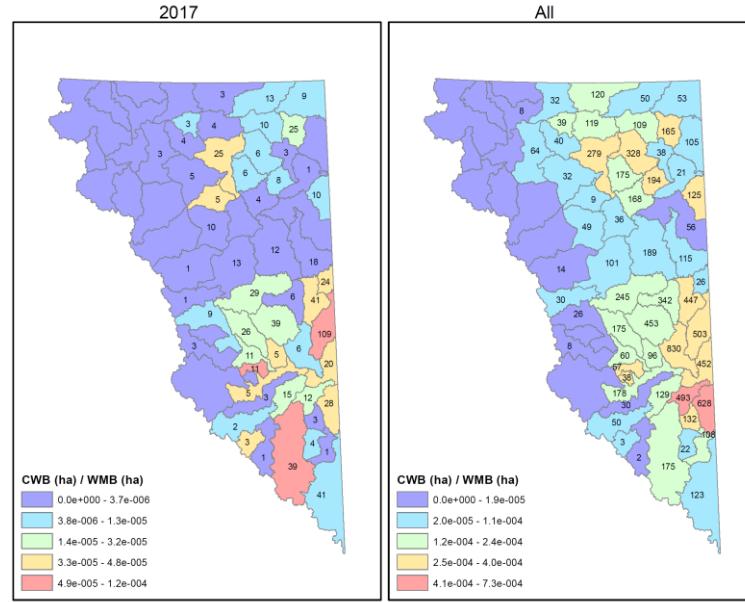


Sentinel 2A imagery of Aleppo, Syria acquired July 25, 2016 – August 1, 2016 (ESA 2016)



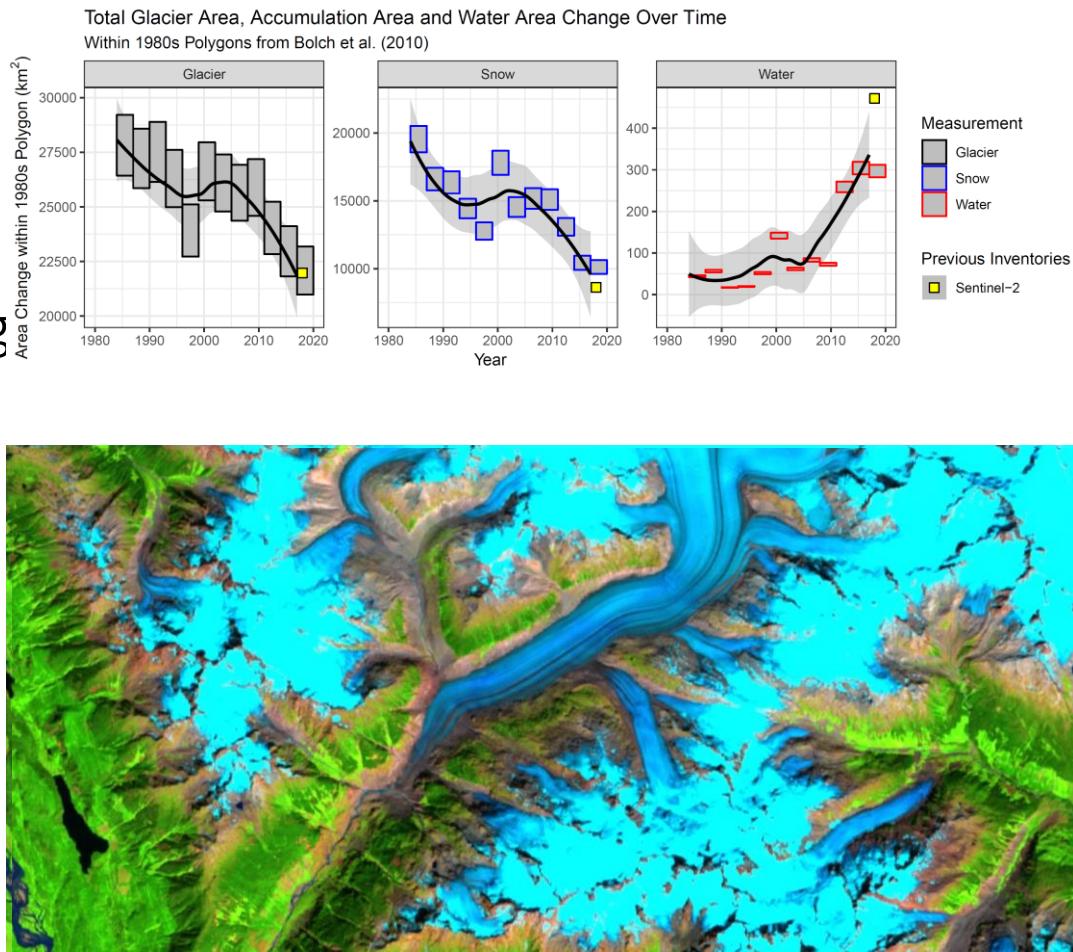
# Project examples:

- **Detection of constructed water bodies**
- Total glacier area change of BC over time
- El-Nino influence on timing of snow cover
- Automated landslide dating
- Wildfire mapping from synthetic aperture radar
- Linear disturbance recovery detection



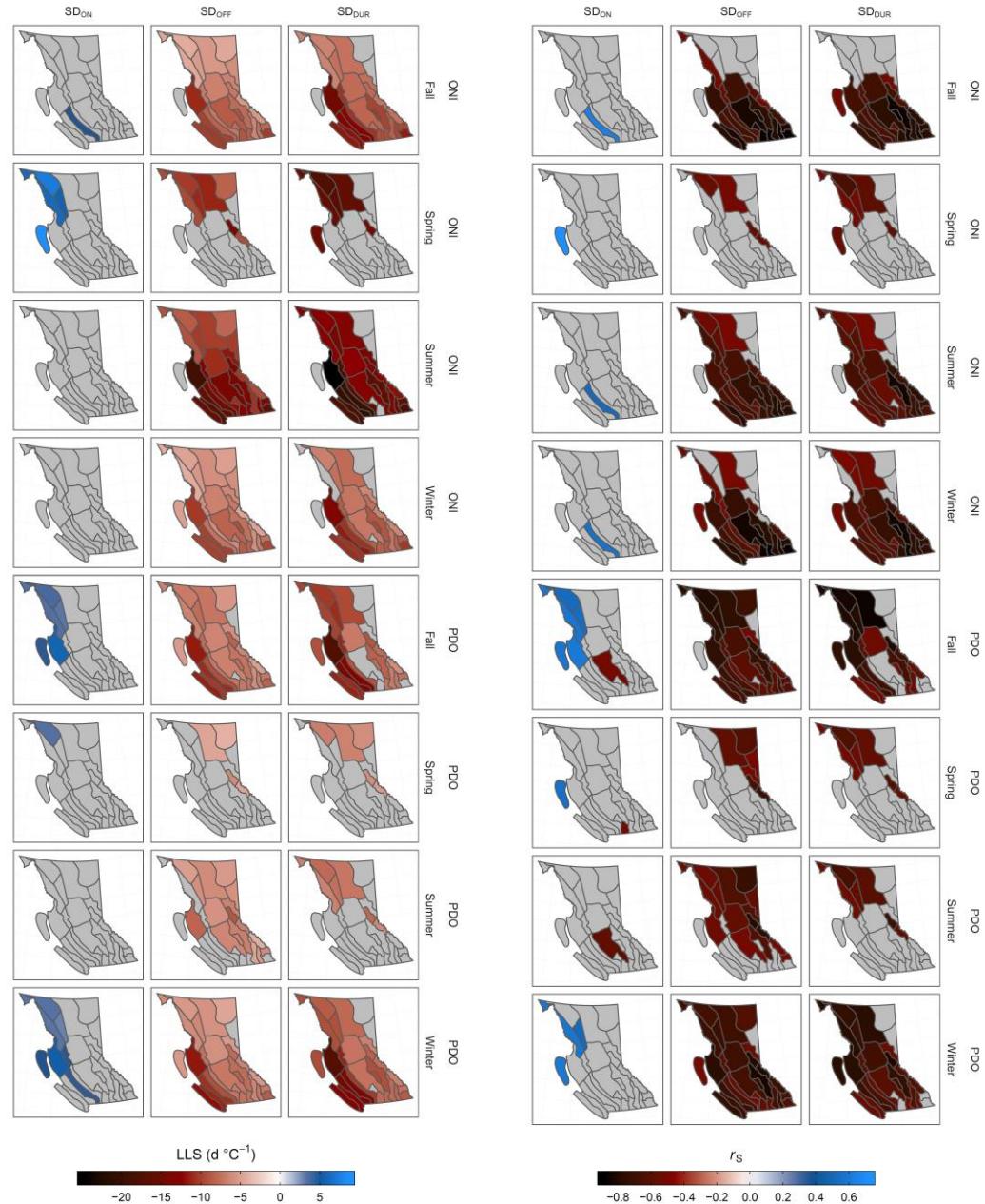
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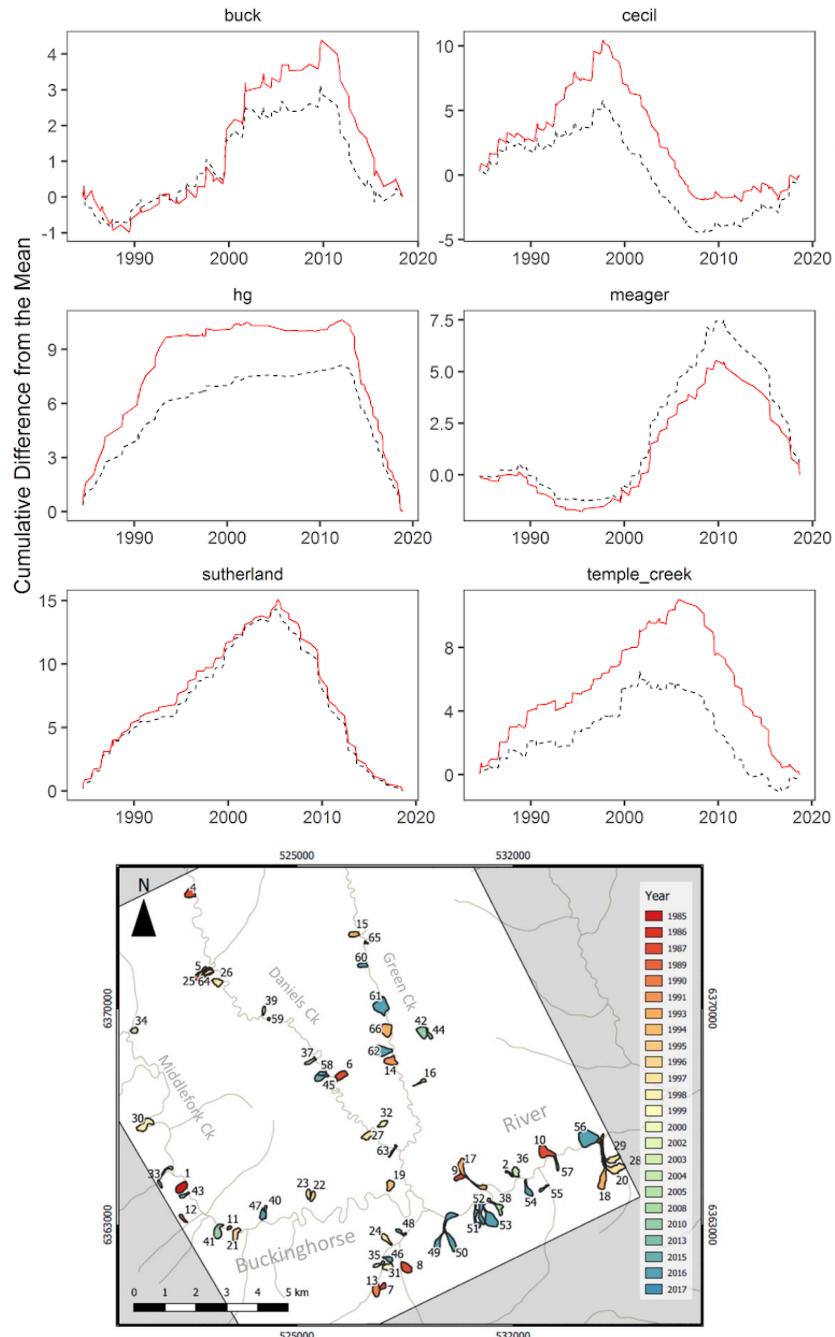
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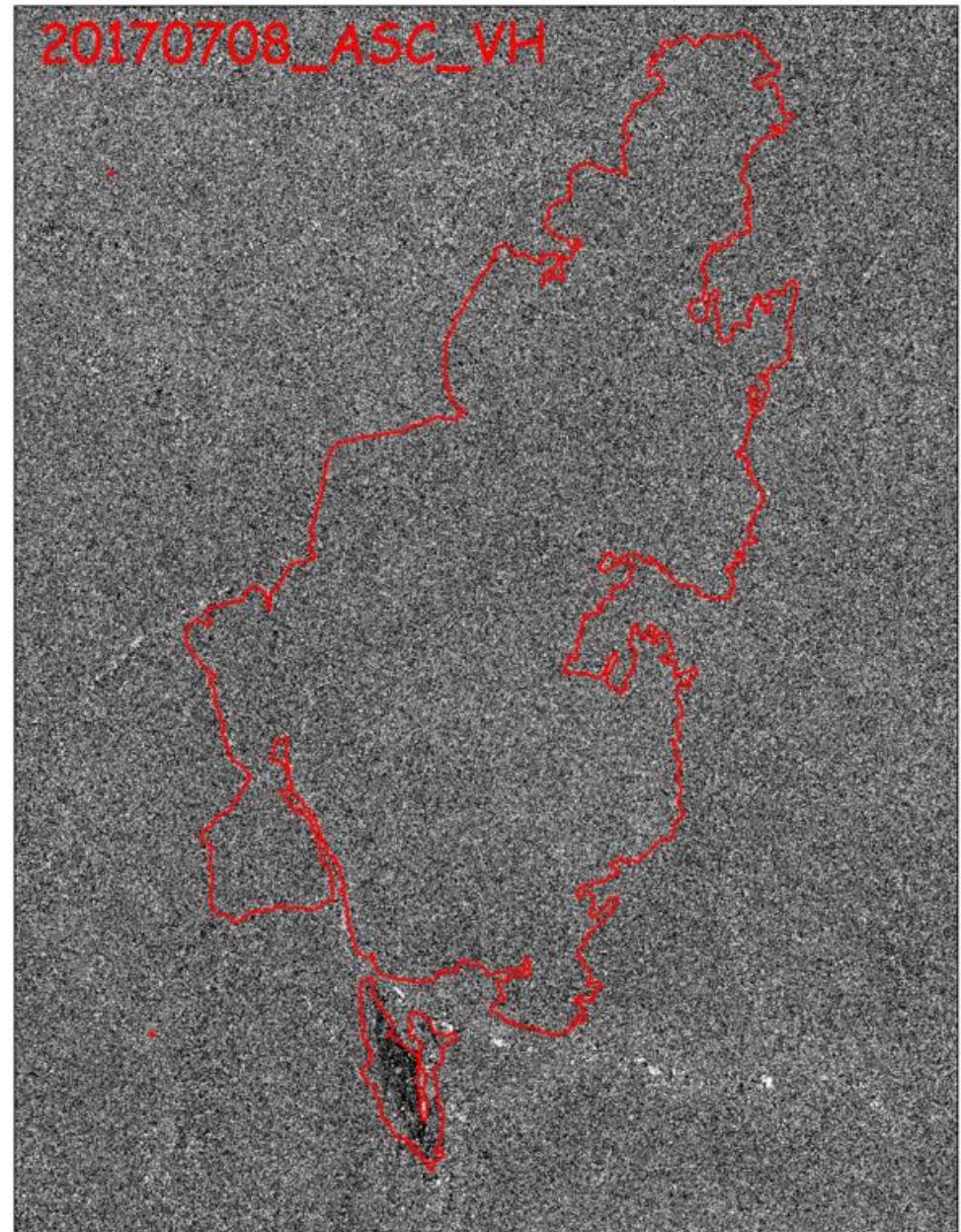
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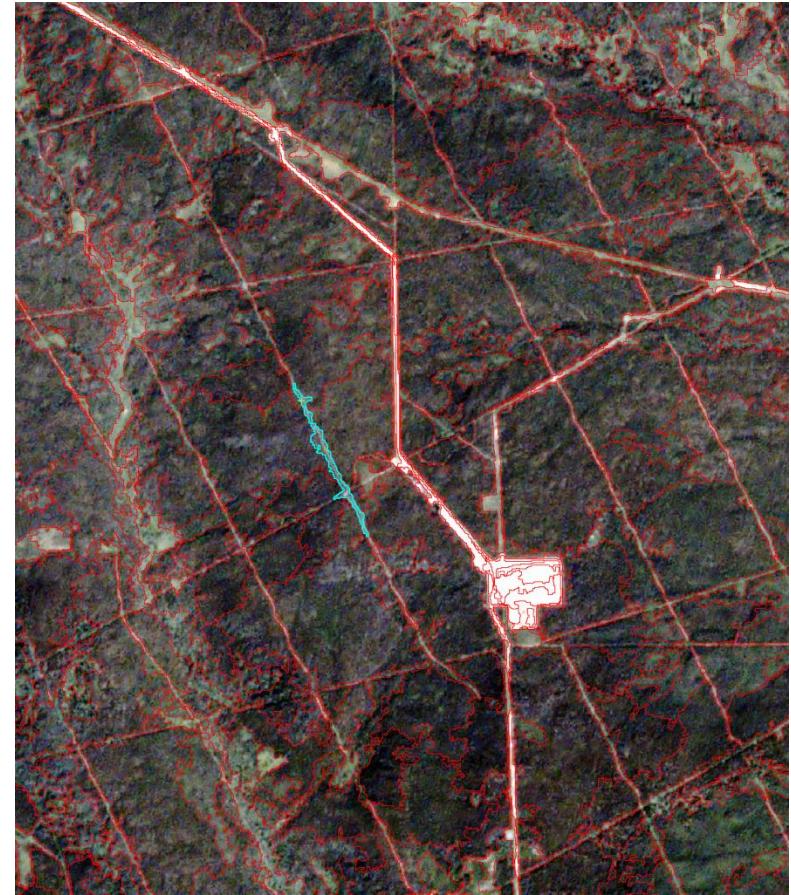
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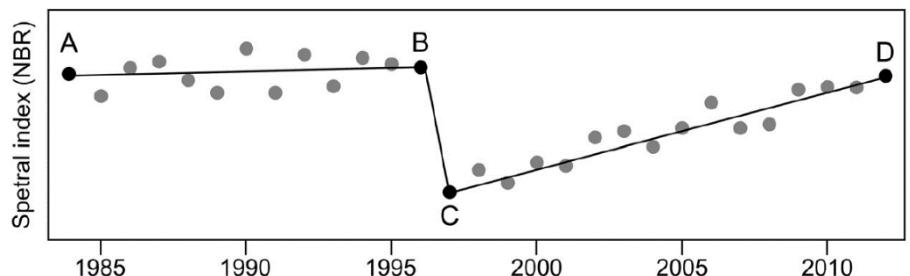


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Bevington and Gleason (in prep)



Hermosilla et al. (2016)

# Demo: Google Earth Engine

[https://code.earthengine.google.com/3bd1f2c1e83c  
84d9e1e8d2ff74676b3a](https://code.earthengine.google.com/3bd1f2c1e83c84d9e1e8d2ff74676b3a)

# Closing thoughts

- New to data science community – steep(ish) learning curve.
- It has taught me to make tools for my future self.
- Goals include: open code and open data.
- For earth observation, capacity is limited in the BC government – but there is a rapidly growing demand and interest for this work.



- References
  - **Basic remote sensing:** Bevington, A, H Gleason, X Giroux-Bougard, and T de Jong. 2018. "A Review of Free Optical Satellite Imagery for Watershed-Scale Landscape Analysis." *Confluence* 2 (2).  
<https://doi.org/10.22230/jwsm.2018v2n2a18>.
  - **Google Earth Engine:** Gorelick, N, M Hancher, M Dixon, S Illyushchenko, D Thau, and R Moore. 2017. "Google Earth Engine: Planetary-Scale Geospatial Analysis for Everyone." *Remote Sensing of the Environment* 202 (December): 18–27. <https://doi.org/10.1016/j.rse.2017.06.031>.
  - **Time series change detection:** Hermosilla T, MA Wulder, JC White, NC Coops, GW Hobart, and LB Campbell. 2016. "Mass Data Processing of Time Series Landsat Imagery: Pixels to Data Products for Forest Monitoring." *International Journal of Digital Earth* 9 (11): 1035–54.  
<https://doi.org/10.1080/17538947.2016.1187673>.
- Selected R Packages
  - **getSpatialData** <https://github.com/16EAGLE/getSpatialData>
  - **rLandsat** <https://github.com/socialcopsdev/rLandsat>
  - **RS toolbox** <https://bleutner.github.io/RStoolbox/>
- Selected Python libraries
  - **Landsat utils** <https://pythonhosted.org/landsat-util/>
  - **Landsat 578** <https://github.com/dgketchum/Landsat578>
- QGIS plugins
  - **Semi-Automated Classification Plugin** <https://plugins.qgis.org/plugins/SemiAutomaticClassificationPlugin/>