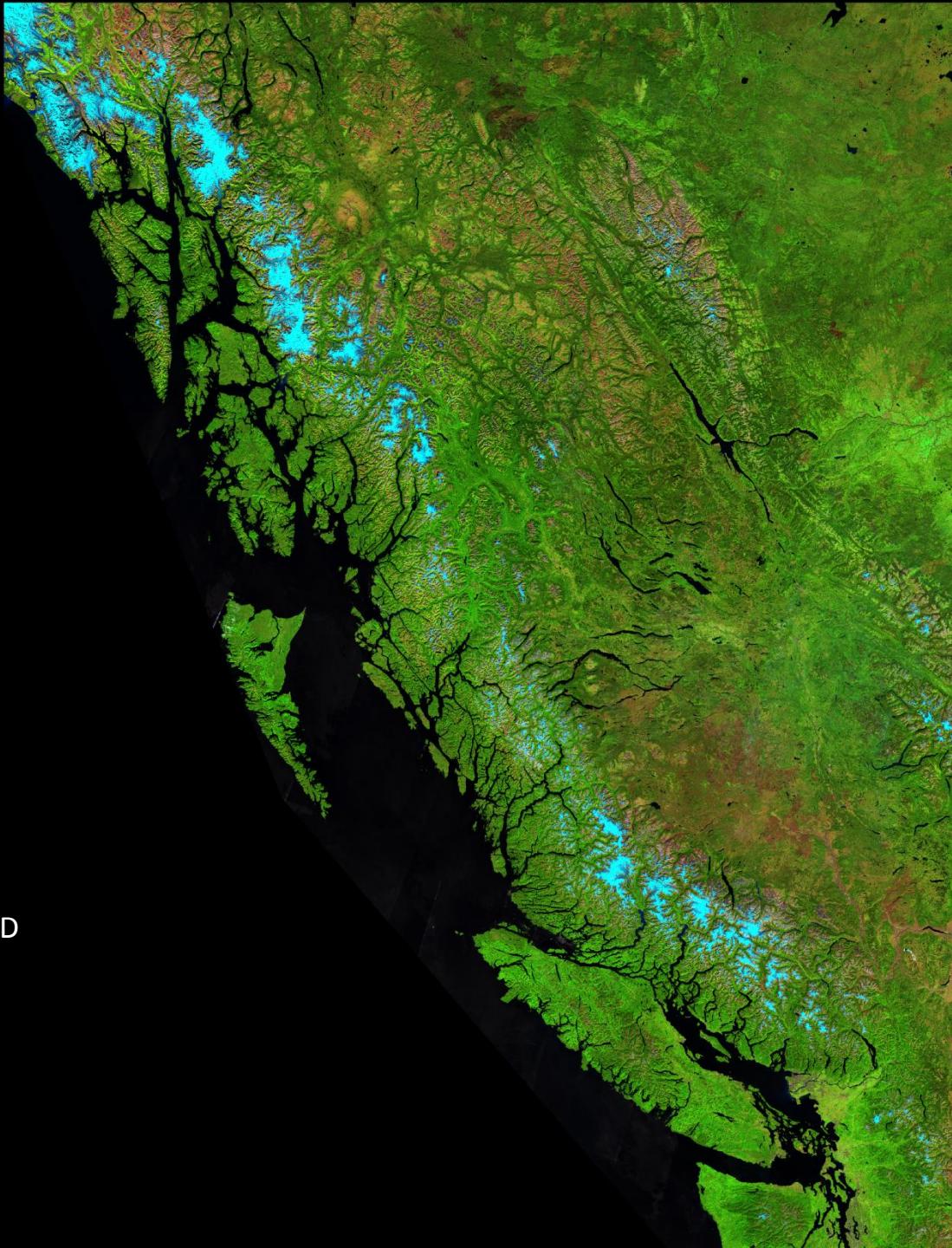
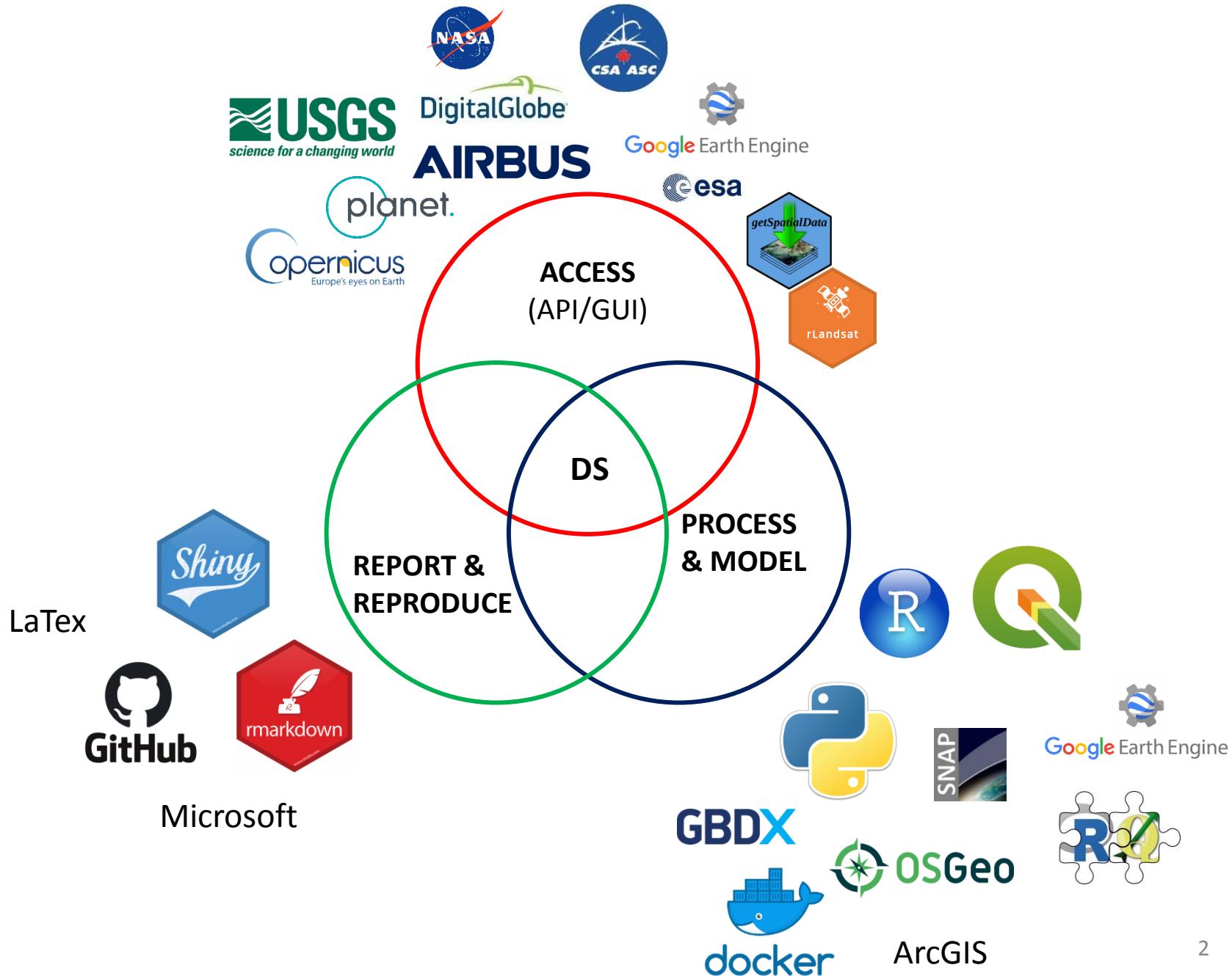


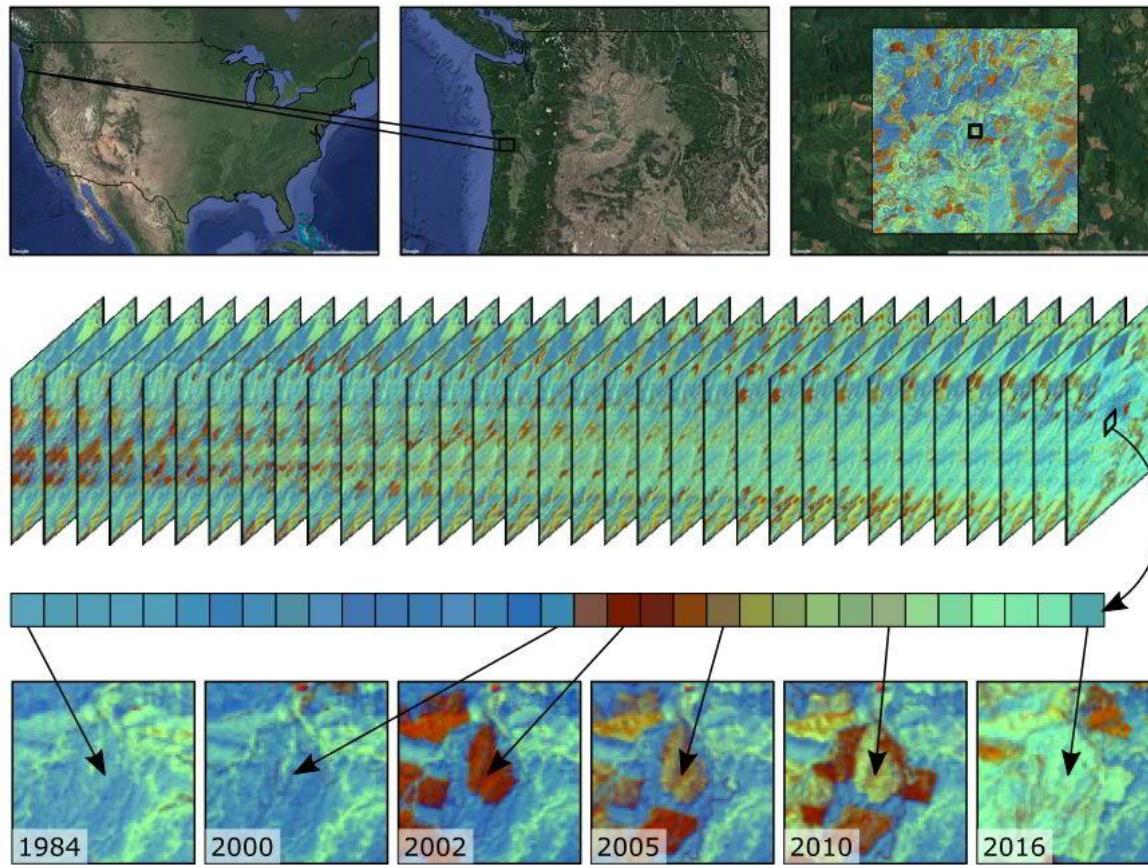
advanced *SATELLITE* *REMOTE* *SENSING*

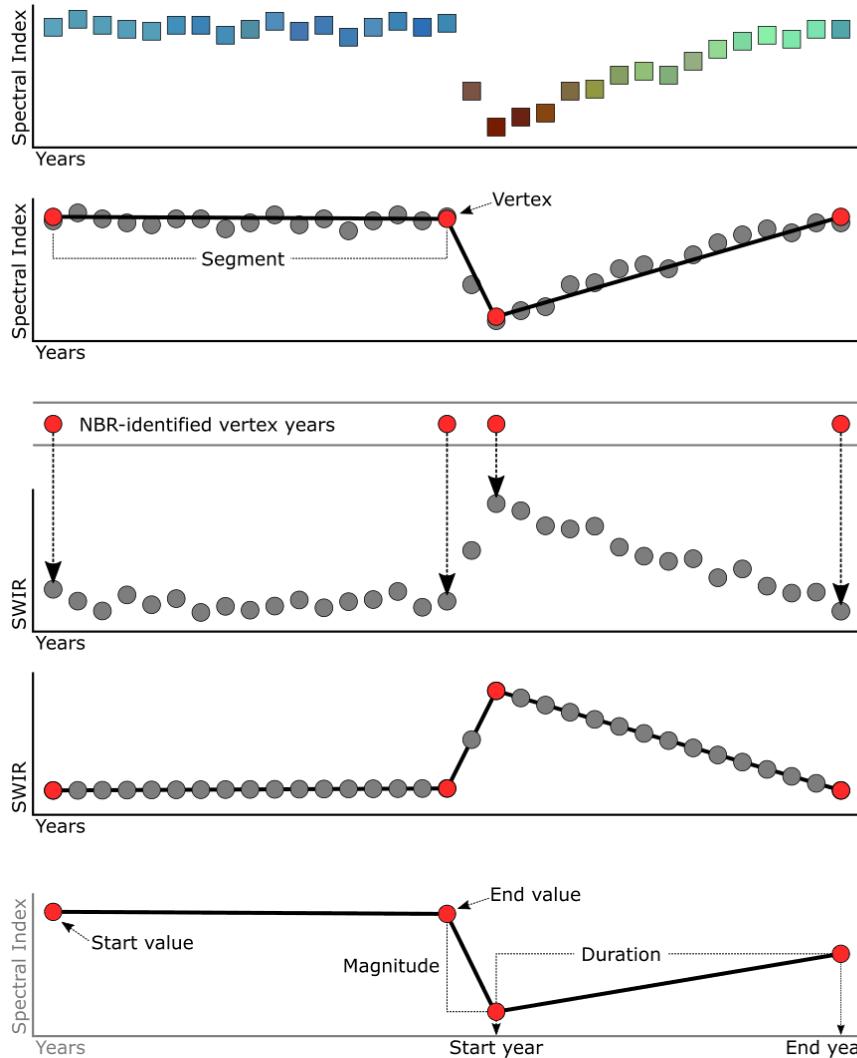


Alexandre Bevington
Research Earth Scientist, MFLNRORD

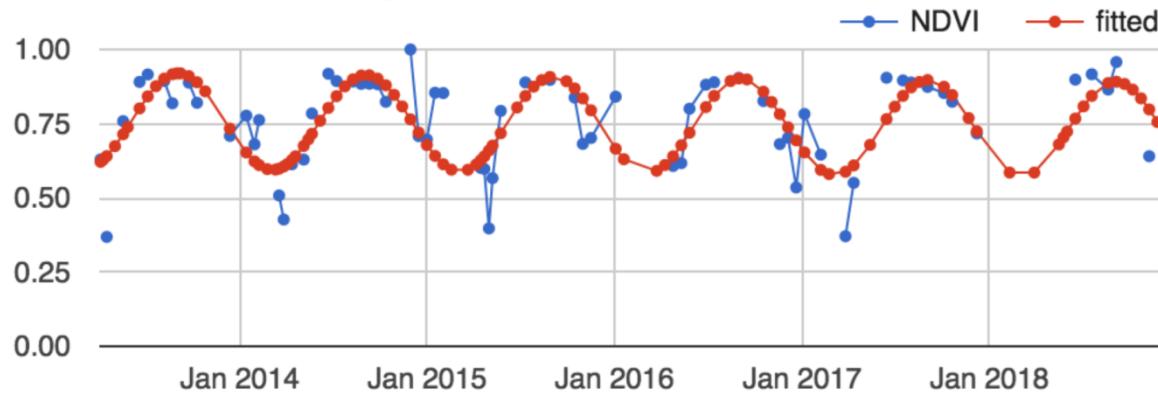


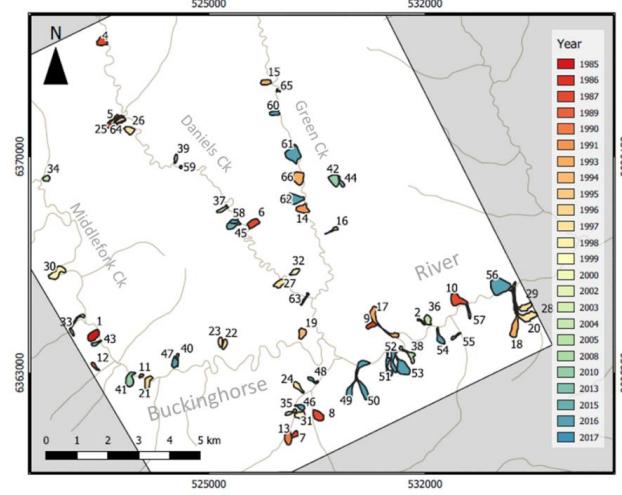
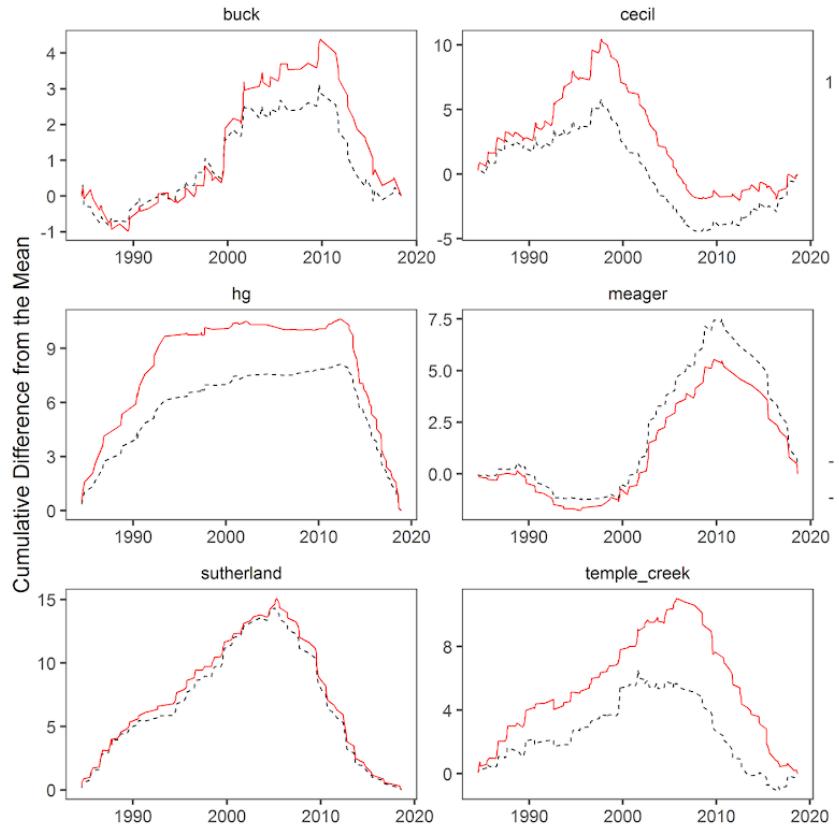






Harmonic model: original and fitted values





| Methods | Examples | Characteristics |
|--------------------------------------|--|--|
| Parametric | Maximum Likelihood classification and Unsupervised classification etc. | Assumptions: Data area normally distributed Prior Knowledge of class density functions |
| Non-Parametric | Nearest-neighbor classification, Fuzzy classification , Neural networks and support Vector machines etc. | No prior assumptions are made |
| Non-metric | Rule-based Decision tree classification | Can operate on both real-valued data and nominal scaled data statistical analysis |
| Supervised | Maximum Likelihood, Minimum Distance , and Parallelepiped classification etc. | Analyst Identifies training sites to represent in classes and each pixel is classified based on statistical analysis |
| Unsupervised | ISODATA and K-means etc. | Prior ground information not known. Pixels with similar spectral characteristics are grouped according to specific statistical criteria |
| Hard (parametric) | Supervised and Unsupervised classifications | Classification using discrete categories |
| Soft (non-Parametric) | Fuzzy Set Classification logic | Considers the heterogeneous nature of real world Each pixel is assigned a proportion of the land cover type found within the pixel |
| Pre-Pixel Object-oriented | | Classification of the image pixel by pixel Image regenerated into homogenous objects Classification performed on each object and pixel |
| Hybrid Approaches | | Includes expert systems and artificial intelligence |



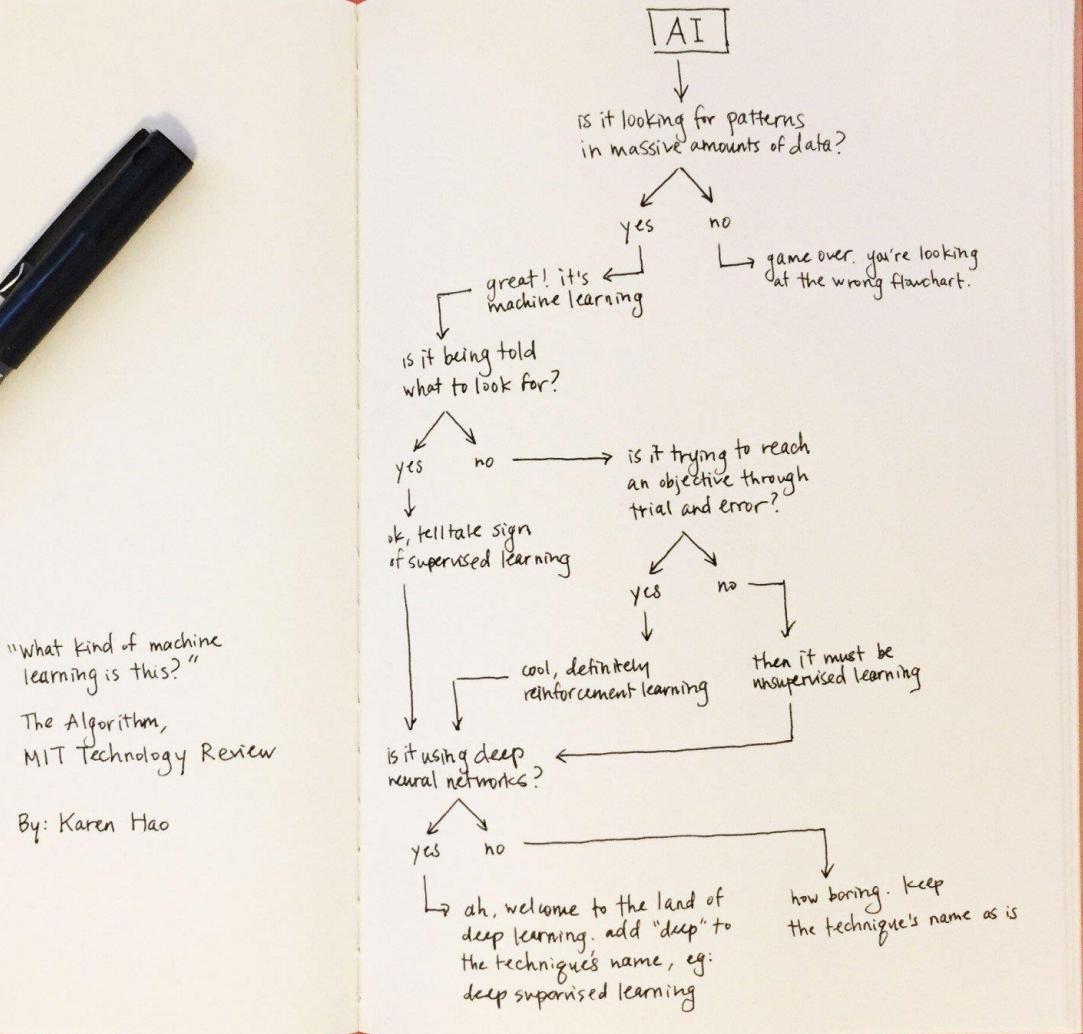


"What kind of machine learning is this?"
The Algorithm,
MIT Technology Review

By: Karen Hao

Machine learning:

- Logistic regression
- Linear discriminant analysis
- K-nearest neighbors
- Support vector machines
- Neural networks
- Deep learning
- Decision trees
- Random forest
- Gradient boosting
- ...

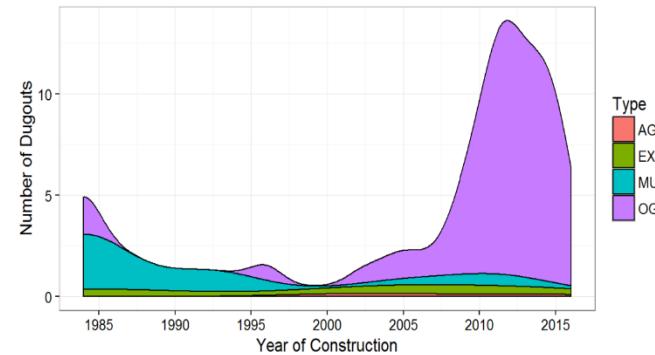
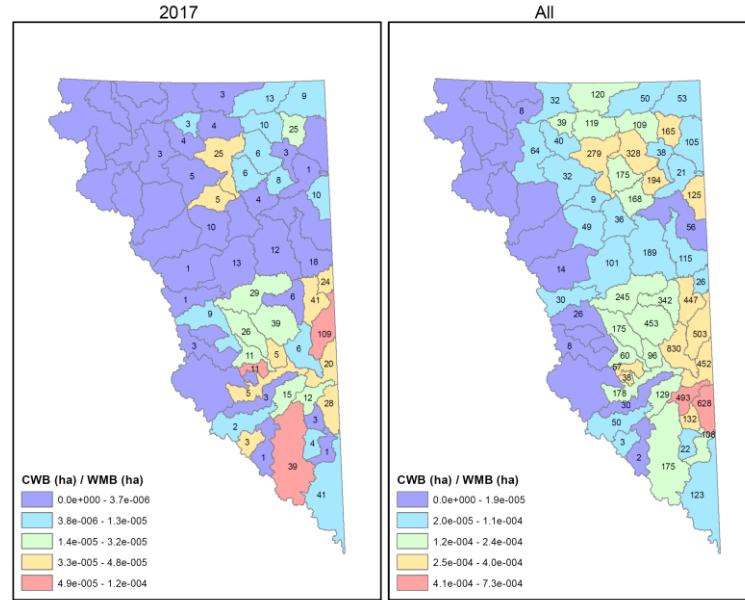


<https://www.technologyreview.com/s/612437/what-is-machine-learning-we-drew-you-another-flowchart/>



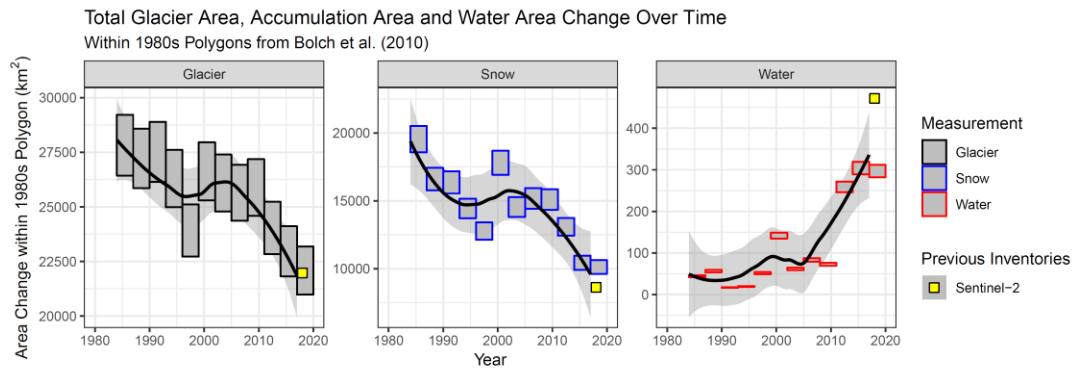
Project examples:

- **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



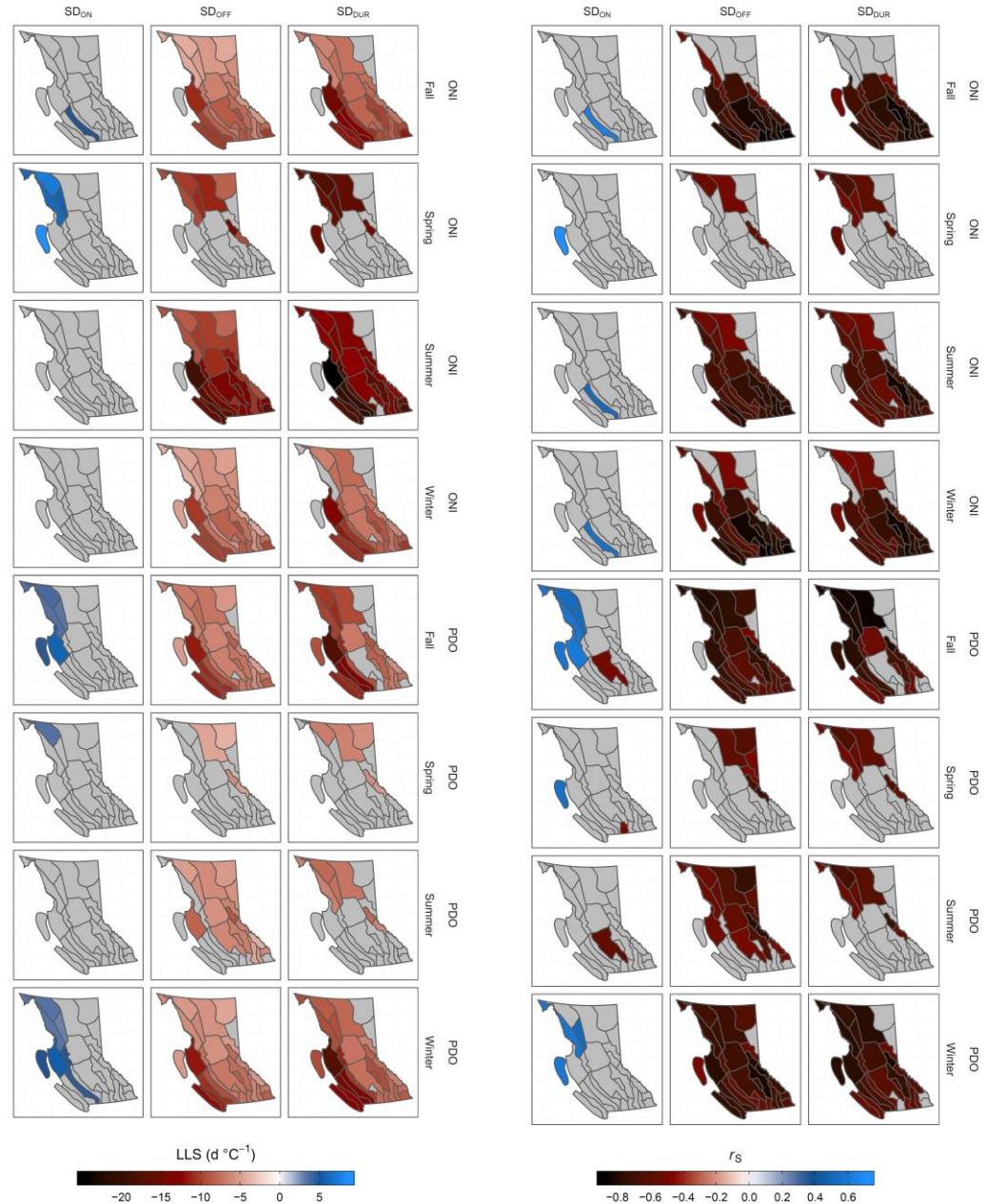
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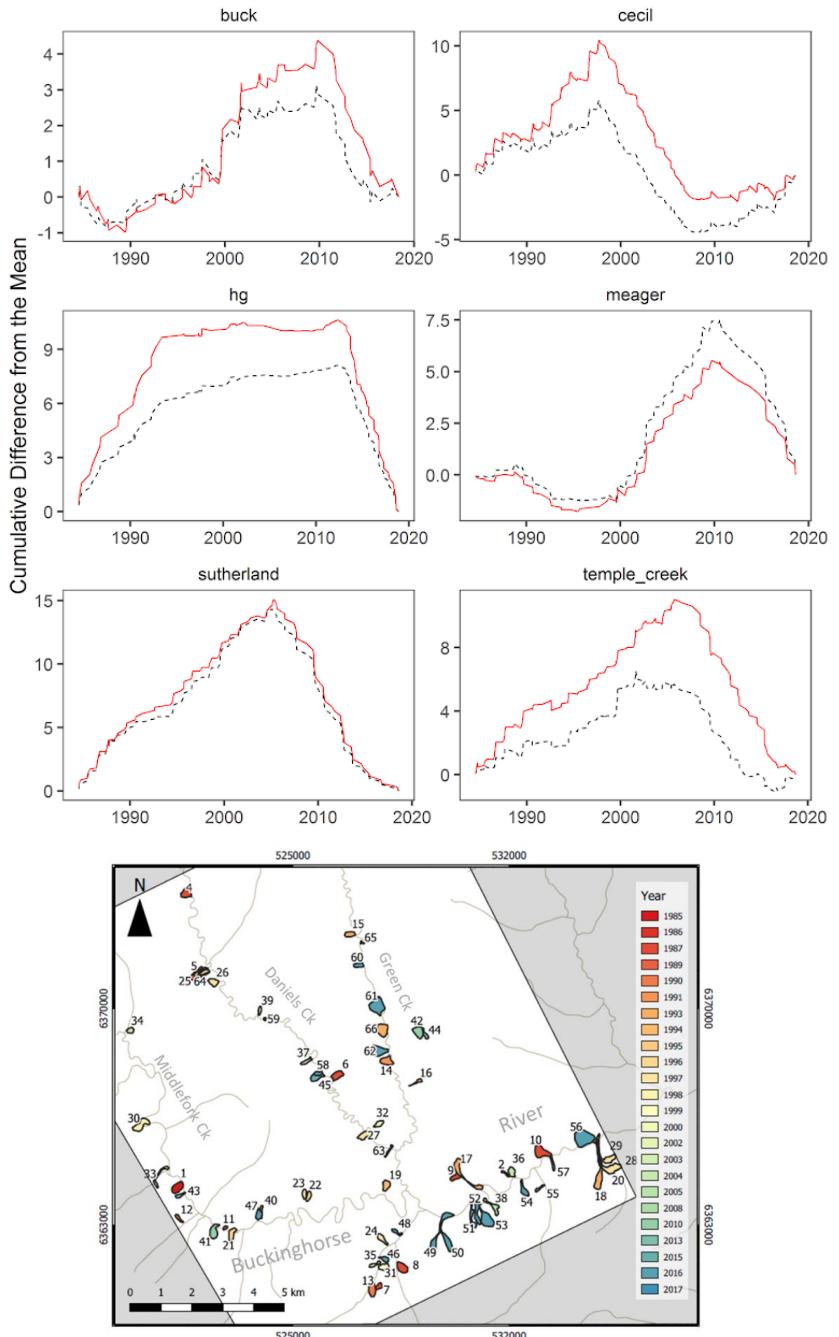
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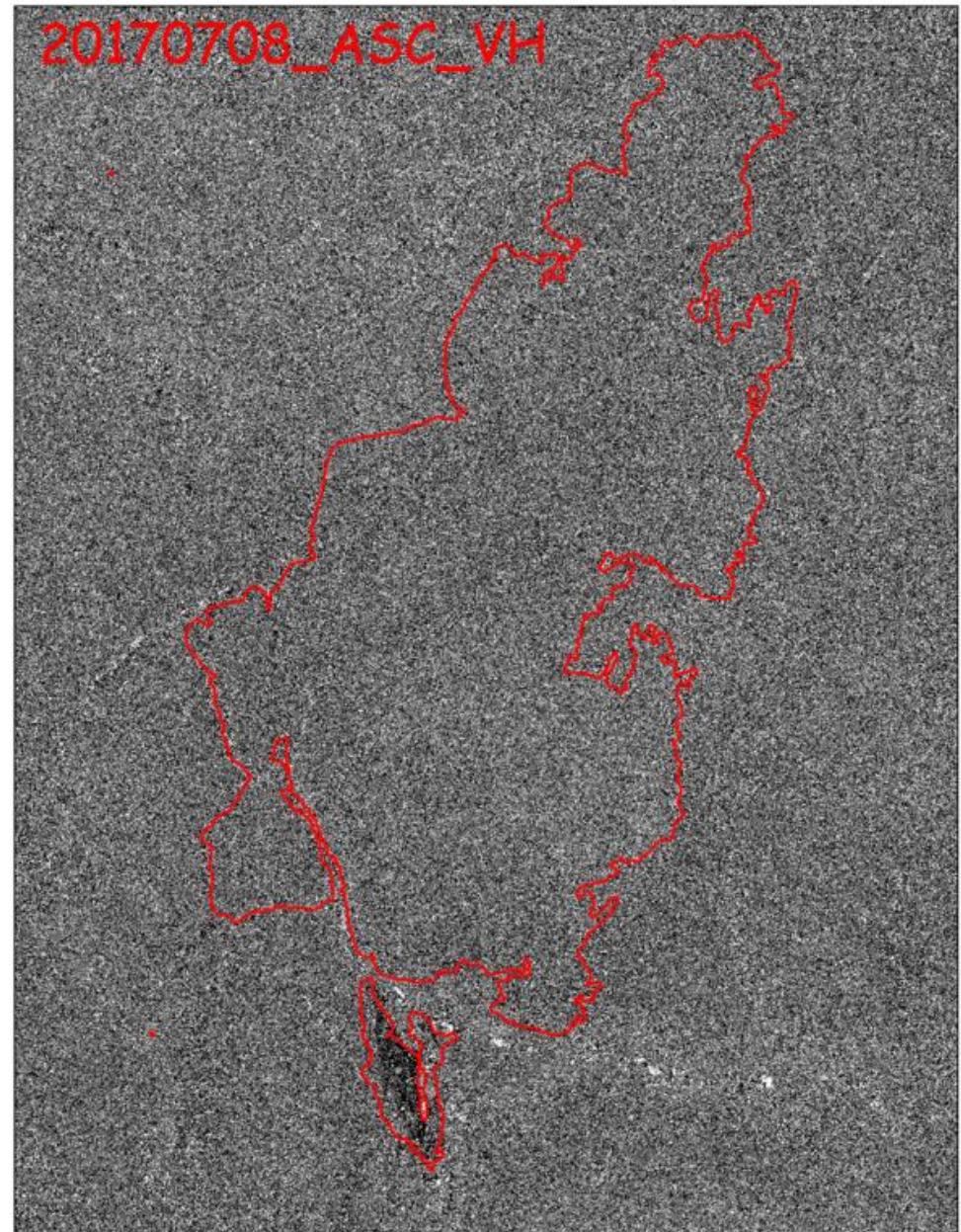
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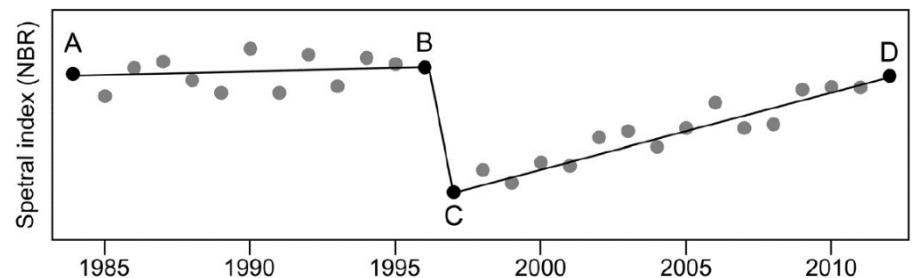
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Hermosilla et al. (2016)