Resolving Permafrost, Vegetation, and Wildfire Interactions through Geospatial Space-Time Analysis

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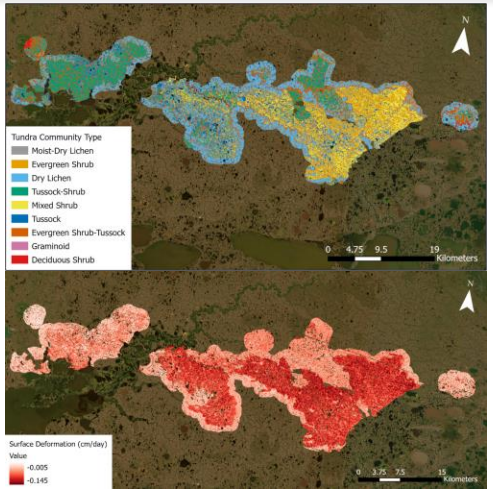
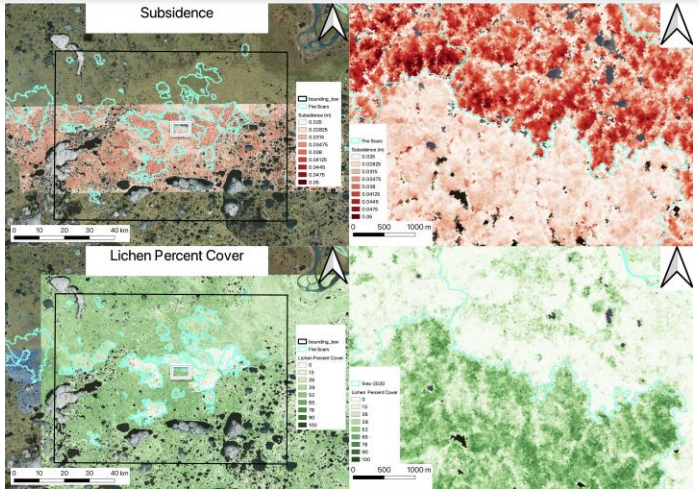
Objective:

- The purpose of this project is to better understand the spatiotemporal coupling between tundra wildfire, post-fire vegetation succession, and permafrost physical properties (e.g., active layer thickness, ground subsidence, and soil moisture content).
- We must better understand these couplings to characterize the impacts of Arctic amplification on the global climate system.



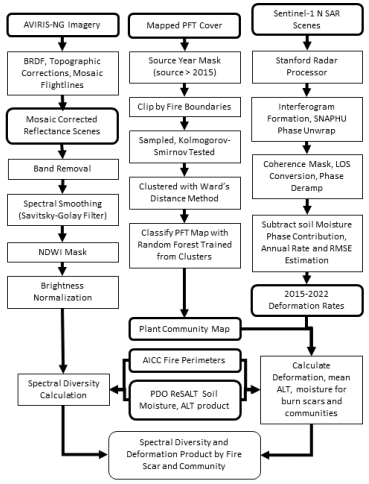
Results:

- (Top) InSAR-derived surface subsidence with inset zoom at edge of 2016 fire scar; (Bottom) Multispectral-derived lichen percent cover with inset zoom at edge of 2016 fire scar. The spatial relationship between wildfire extent, surface subsidence, and lichen percent cover is clearly observed.



Approach:

- Joint analysis of airborne InSAR, PolSAR, and hyperspectral imagery and spaceborne InSAR imagery.
- Spectral diversity calculation from hyperspectral imagery, ground deformation rate and moisture content from InSAR data
- Integration with plant functional type community type maps.
- Statistically analyze the spatiotemporal correlation between vegetation and active layer properties as a function of time since wildfire burn.



Key Milestones:

• Process hyperspectral imagery	06/23
• Process InSAR data	06/23
• Generate subsidence rates	06/23
• Present preliminary results at EUCOP	06/23
• Generate plant functional type maps	08/23
• Submitted grant to NASA ECIP-ES	08/23
• Present continued results at 2024 AGU (student)	12/23
• Finalize paper #1	Ongoing
• Finalize grant to NSF ARCSS	Ongoing

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Collaborators / Co-I's/Partners:

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