



Assessing interactions between drought and insect disturbances in British Columbia, Canada

Supervisors

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Thematic Background

Forests are dynamic ecosystems that are shaped by complex interactions of disturbance and regrowth. Climate significantly influences this system by directly affecting the trees health (i.e. drought) and by influencing the trees potential to resist disturbance (i.e. insects herbivore). The forests of western North America have experienced widespread and unexpectedly severe outbreaks of different insects in the recent decades, most prominently by mountain pine beetle and western spruce budworm. Both insects have led to widespread tree mortality, having economic, ecological, and social consequences. To better understand what factors trigger such landscape-scale outbreaks, a better understanding of the interactions of landscape-scale climate pattern and insect outbreaks is needed. Landsat data can be utilized to assess those interactions and thus to tackle this questions. With a better understanding of the interactions of climate and forest disturbances, it might be possible to improve management strategies and to predict future changes in forest disturbances dynamics.

Objectives

- 1) Use Landsat to collect a comprehensive sample of long-term (1984-2015) disturbance trajectories and derive a set of metrics describing disturbance characteristics (i.e. magnitude and duration).
- 2) Develop a set of annual climate variables (i.e. standardized precipitation index) by interpolation of annual stationary data.
- 3) Assess the statistical relationship between climate variables (i.e. standardized precipitation index) and disturbance characteristics (i.e. magnitude and duration) by applying regression approaches with temporally lagged variables.

Target group

MA student with decent background in GIS, remote sensing, and statistics.

Pre-requisites

Good knowledge in ArcGIS or QGIS

Basic knowledge in R

Basic knowledge in Landsat analysis

Dates and Duration

Start as soon as possible, 6 month

Application Procedure

Interested students are asked to contact Cornelius Senf