Thesis

Using LiDAR atmospheric data to examine the impact of human pollutants by quantifying its decrease during the COVID-19 lockdown

It is well established that LiDAR data taken from Earth’s surface has good applications towards investigating the impacts of air pollutants in the atmosphere. This thesis attempts to use the applications of LiDAR data with respect to current events that may be influencing total air pollutants, and overall global climate warming. With the implementation of the sudden global lockdown due to the COVID-19 virus, an opportune moment was presented in which the use of transportation, and consequently the release of major human pollutants, was decreased quickly and drastically. In this report, I will attempt to determine the extent of the impact of human transportation on the total air pollutants and air “transparency” within Southern Ontario, Canada. In doing so, I must determine a method in which to process and compare LiDAR data from different time periods. To do this, I will look at an easily definable anomaly in the LiDAR data, such as that from the California wildfire smoke, and compare with normal conditions. By processing and establishing a method in which to compare data using a clearly definable anomaly, I will be able to apply the same techniques to data from the months of March2020 – Sept 2020 with a good deal of success. Thus, to accurately come to conclusions about the impact of this lockdown, I determine a baseline (average) level of air pollutants and transparency using data from 2017 to the present day. A sudden decrease in human created pollutants as clearly defined as the one seen in the year 2020 has not been studied before. This opportunity provides an ideal basis in which to determine the impacts of pollutants on the atmosphere and henceforth come to a conclusion about its overall impact on global warming.