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CIRES
7/8/24

ABSTRACT

In September 2013, a severe storm hit the Front Range of Colorado, causing significant flooding, debris flows, and landslides, particularly affecting the area between Estes Park and Boulder.

Research Question:

Despite extensive research on the immediate effects of the flooding and the causes of the slides, there's a lack of updates on the current location of the sediment ten years later. This information is crucial for assessing the long-term risk of landslides and heavy rain events in the area.

Methods:

Lidar photos were analyzed to understand changes in the area, and datasets will be analyzed to determine elevation changes using QGIS.

Results:

Understanding the current location of the sediment is crucial for forecasting future events, as few people in the region are aware of landslides and debris flows.

Hi Alex! You have all the components here but need to pull it together in a paragraph with connecting sentences.

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GIS of the rockies:

- Title = <15 words or ~100 characters
- Abstract = <250 words
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I am Alex Shinn. I am a student at Front Range Community College, working on my Bachelors in Geospatial Science. Right now, I am working at CIRES researching sediment, debris flows, and landslides in the Front Range.

This project is located in Colorado and the Front Range. From September 9 through the 11th of 2013, a convective storm hit the Front Range. Its impact caused flooding, debris flows, and landslides, especially impacting the area between Estes Park and Boulder. I am studying the storm due to its impact on people and animals. I am trying to figure out where the sediment ended up a decade after the storm. To understand what happened during the event we have to understand what the landscape looked like before the event, immediately after the event, and what the area looks like now.

Before the event, in early 2013, everything was “normal” in the Front Range. There are steep and shallow surfaces to the plains. There are some forests, and creeks. The deer and the open space were fine.

During and immediately after this event, debris flows and landslides caused by the rain impacted people, animals, and trees.

There is a lot of work that has been studied on the immediate effects of the flooding and what caused slides to occur.

However, there has not been an update on where the sediment is now, 10 years later. Studying where the sediment has gone after a decade helps us understand the longer-term hazard of landslides and large rain events in the Front Range. This is important because there have been a lot of changes/development in the area since 2013 when the event happened, and we know that events like this happened in the past.

After the event, there were a lot of landslides and debris flows. I am trying to figure out what happened in the past 10 years. Is the sediment still where it was in 2013? Have some of it made it is ways to sources of water? I hypothesize that the sediment is sitting mostly on the ground where it came to rest after the 2013 event.

To try to understand what has happened in the area I have looked at the data that is out there using lidar photos. Lidar is a remote sensing method that takes sweeping images of the ground using a plane or drone.

I have learned a lot about the topic to understand the area. I am going to compare the lidar images that were captured using the computer to look for changes in the area.

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The lidar I am looking at is from 2010 (from before the storm), 2013 (immediately after the storm), and 2021 (the most recent data available). Finding the data is a challenge due to the data being in certain focused areas and not all being taken in the same time period (gaps of a few days).

We have accomplished collecting data around the Denver metro area. I have combined the datasets in order to smooth out the differences between collected images.

Next, I will begin to differentiate the data sets to determine how elevation has changed in this area. I will do this using QGIS, working on both a regional scale and specifically at a field site that I will visit in the coming weeks.

It is important to understand where the sediment is now because so few people that live in the region know about landslides and debris flows, so understanding the impact and risk of past events helps us predict future events.