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Introduction

Why should we care about deforestation?
Earth continues to lose 18.7M hectares of forest land every year. According to FAO, about half of the world's forests have been cleared



Why Sustainable Development Goal 15?

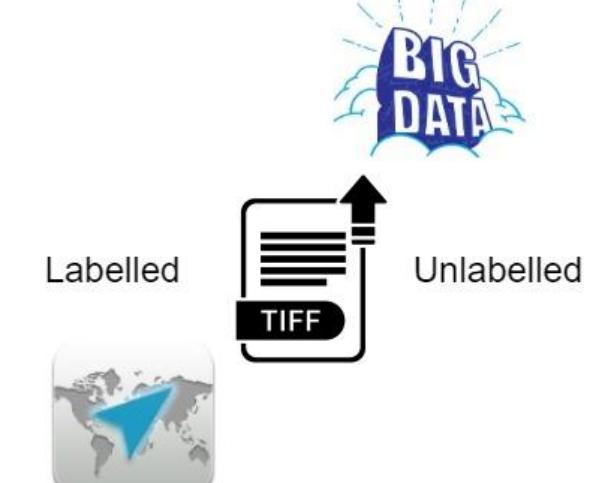
- This development goal seeks to preserve biodiversity.
- Our method aims to curb forest loss by finding similar deforested regions.



Background and Data

Research carried out by Hansen et al :

- Examined global Landsat data at a 30-meter spatial resolution.
- Single pixel represents 30m x 30m.
- GFC maps are composed of several bands (layers).
- Types of Images : Treecover 2000, Gain and Lossyear

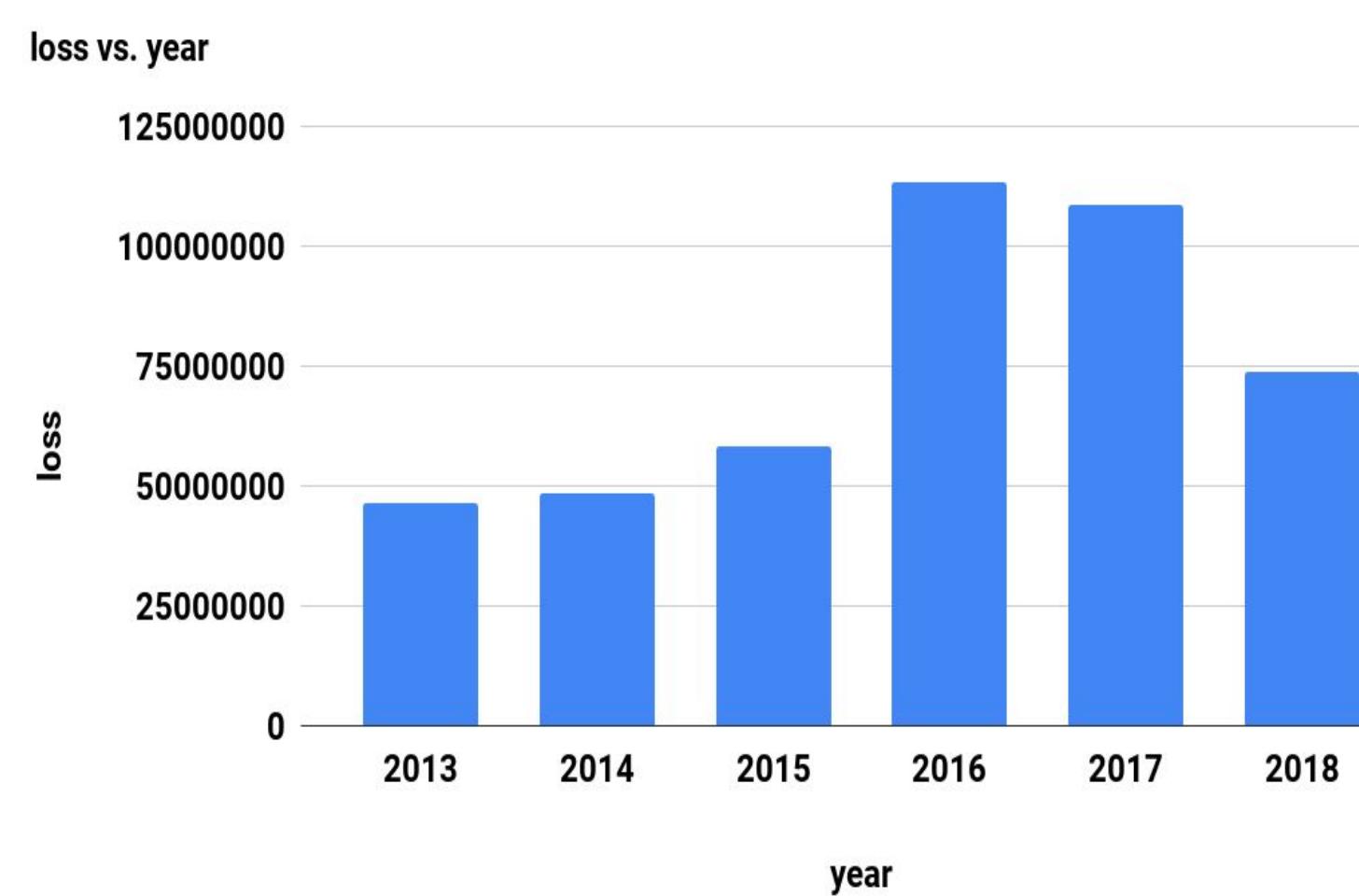


Data

- Each image is in TIFF format with a size more than 1 GB.
- Analysis on 70 image files covering South America region.
- Satisfies the Large Observation Criteria (option-1).
- This warrants the use of Big Data frameworks.



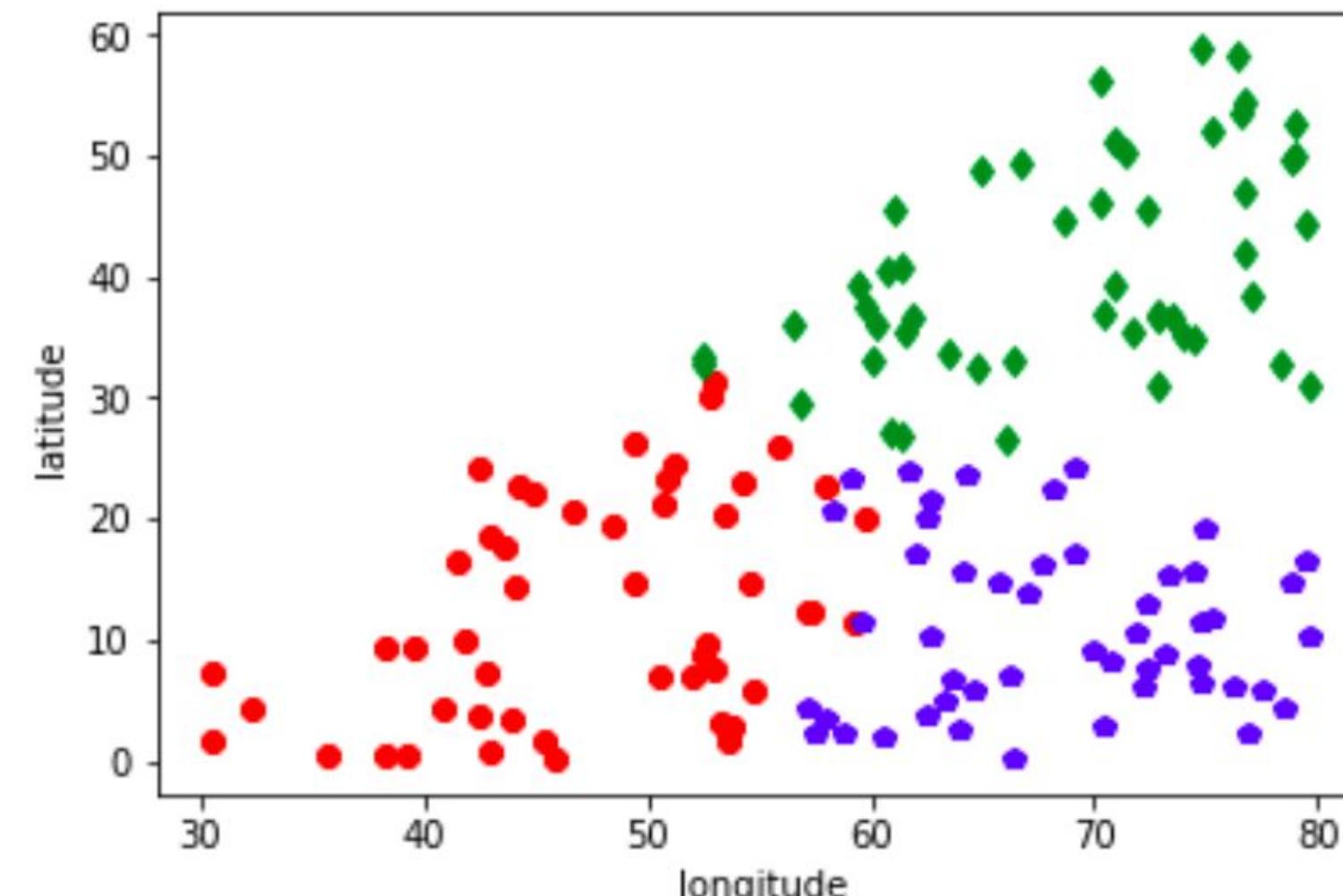
Forest Loss per 900m² vs. Year



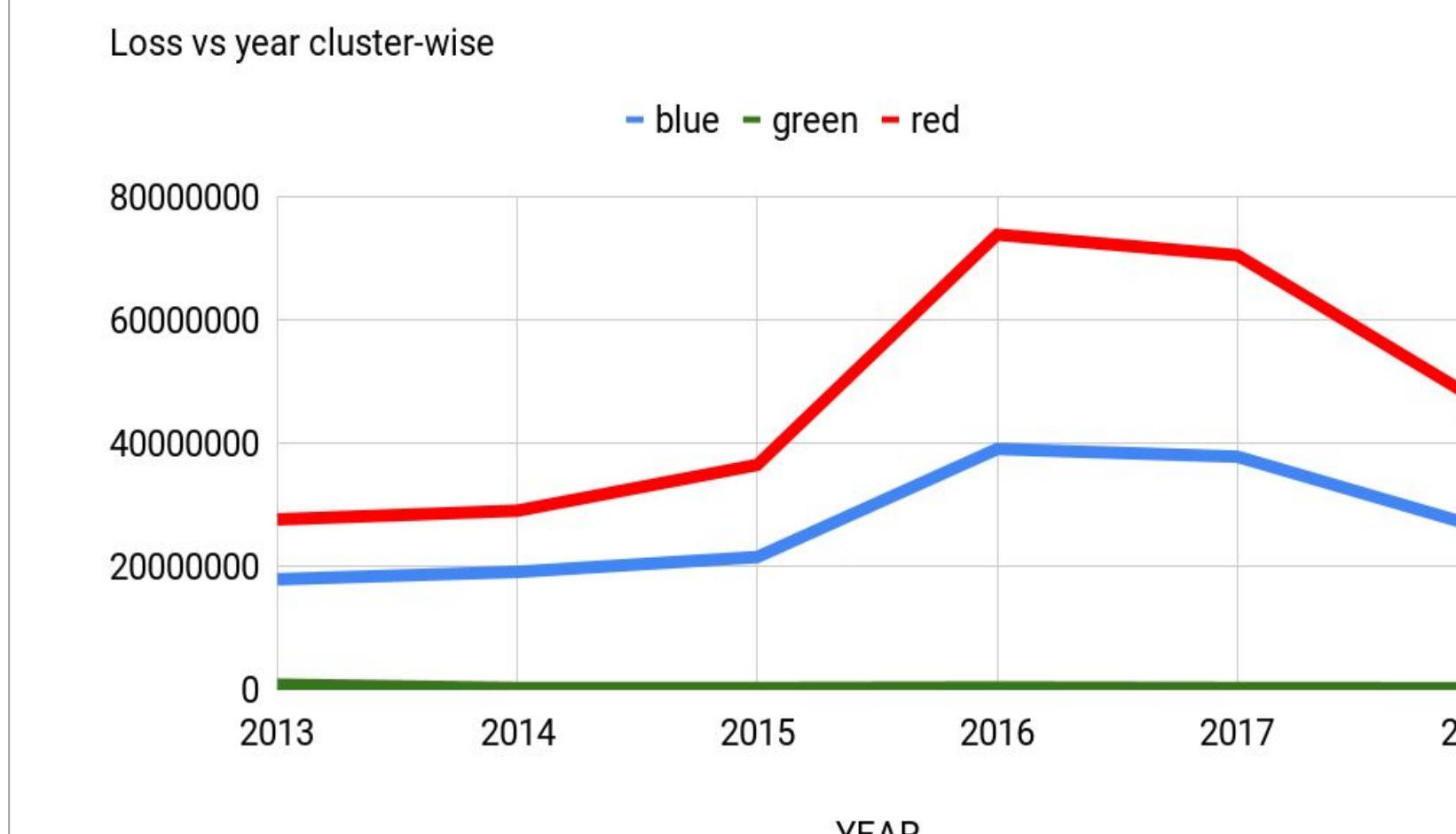
Forest Gain and Loss per 900m² in the 3 clusters obtained from K-means

Cluster	Gain in 2012	Loss in 2012
Green	5052474	785862
Blue	75552754	17872308
Red	202129591	27580910

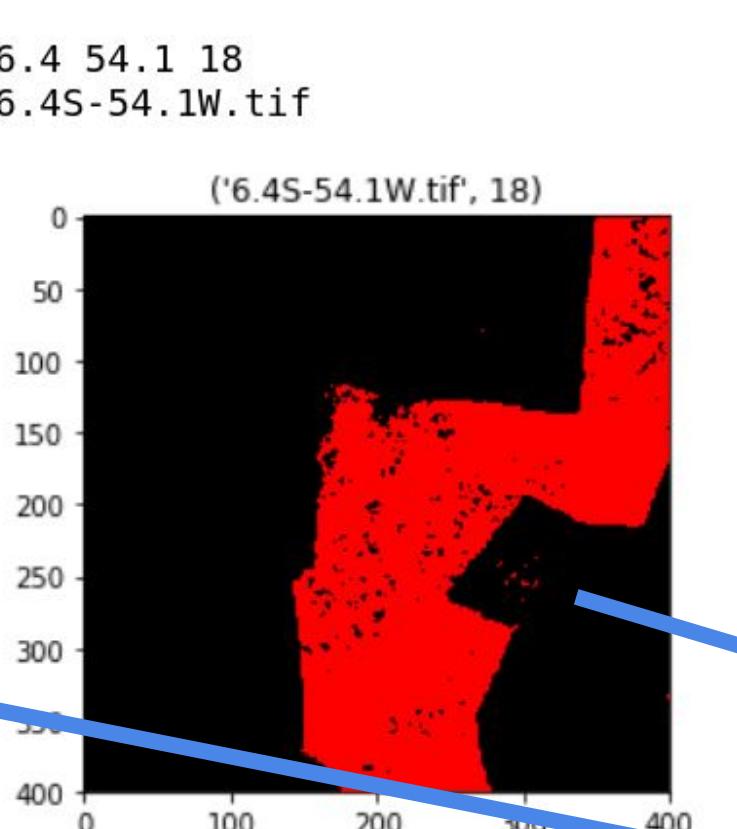
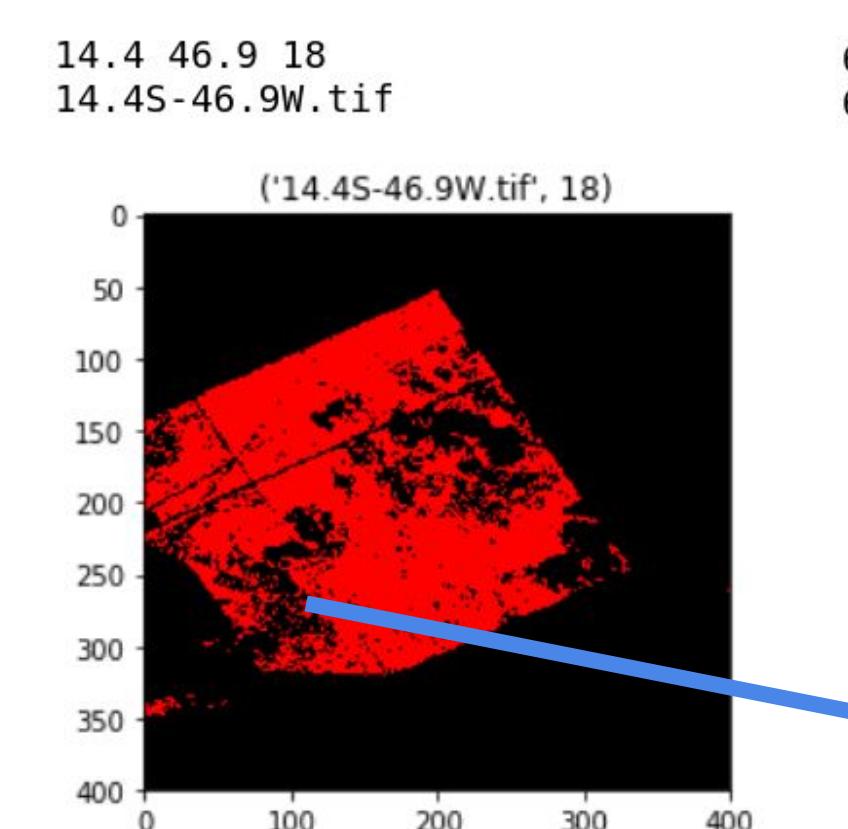
K-means clustering of hand-crafted features (lat, long, year, loss_val)



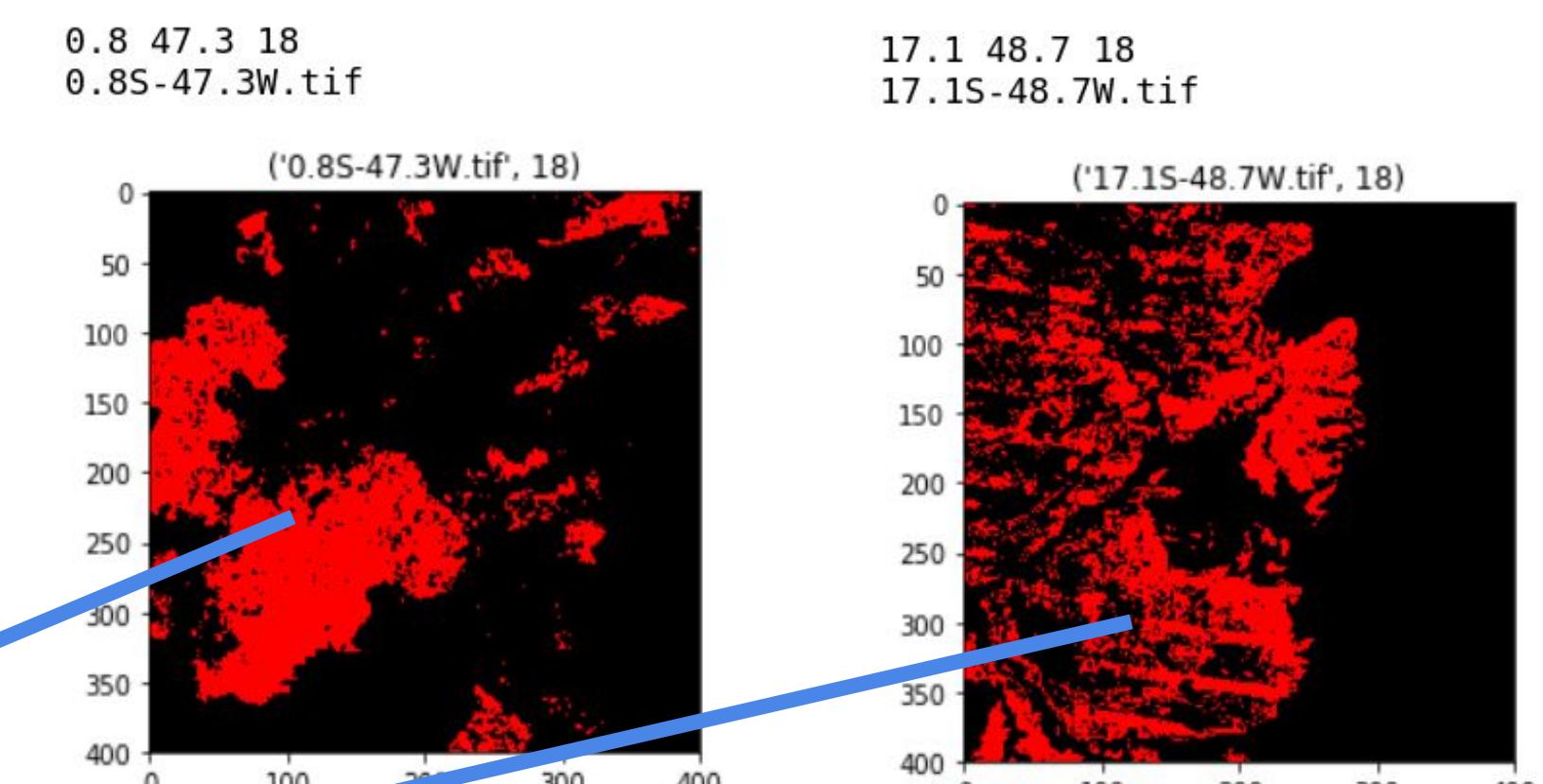
Cluster-wise trends of forest loss per 900m² across years 2013 - 2018



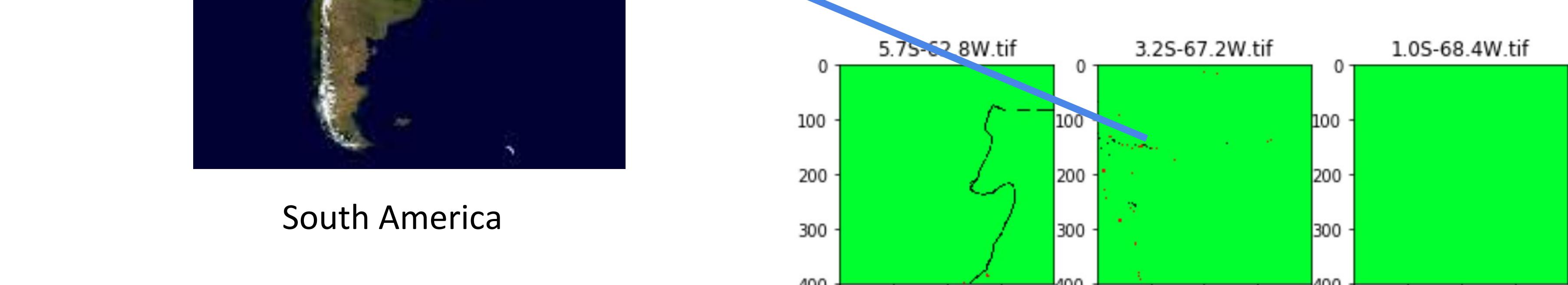
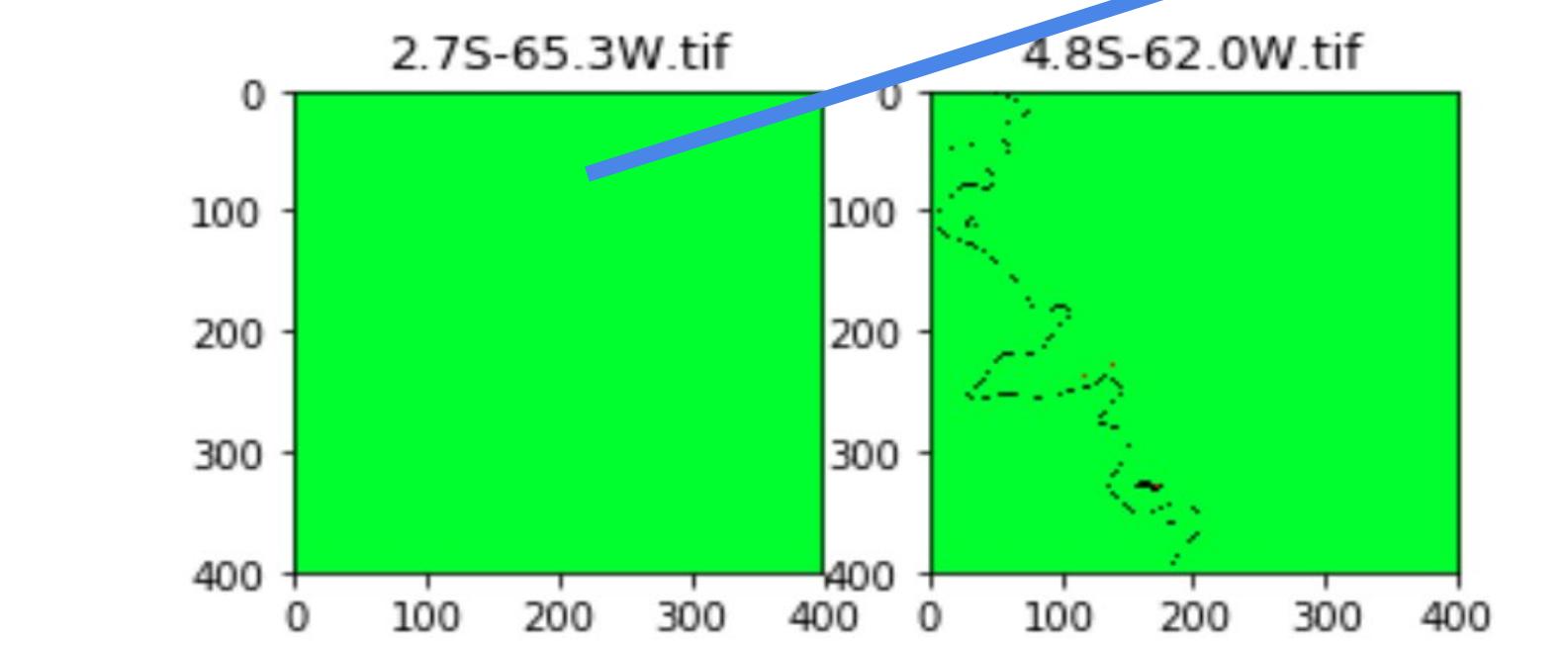
Results



Red pixels denote deforestation in 2018



Green pixels show tree cover, red pixels show deforestation and black pixels represent no forest cover



Conclusions

Cluster	Location	Inference	Activities
Cluster 1	North-Western Brazil	This cluster encompasses the Amazon basin present in the north-western region of Brazil. This has been the center of deforestation due to rich land available for agriculture.	Control slash-and-burn agriculture in this region to curb deforestation. Implement stricter regulations in regards to deforestation.
Cluster 2	Bolivia, Peru, Chile	Rich tropical forests are cleared by the timber industry by logging. This has been the major reason in Bolivia and Peru.	Bolivia has already regulated its forest resource usage, although the timber industry still makes a huge portion of Bolivia's exports. Hence, impose strict timber mining rules.
Cluster 3	Northern Argentina	No major forests are present in this region. This cluster denotes region with less loss/gain activities.	We can promote reforestation activities in these areas as most of the land is under agricultural use.