Near-real time change detection in Subtropical Thickets.

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Introduction

A transitional vegetation category located between other vegetation classes (Lubke et al., 1986; Mucina and Rutherford, 2006; Parker, 2017).

Low (2-5 m) dense, semi-succulent, spinescent, evergreen, thorny shrubs (Mucina and Rutherford, 2006; Parker, 2017).

Supports many endemic and threatened plant species (Stickler and Shackleton, 2015).

Introduction

Albany Thicket
Azonal Vegetation
Desert
Forests
Fynbos
Grassland
Indian Ocean Coastal Belt
Nama-Karoo
Savanna
Succulent Karoo

Only 11% remains pristine and 63% is severely degraded (Stickler and Shackleton, 2015).
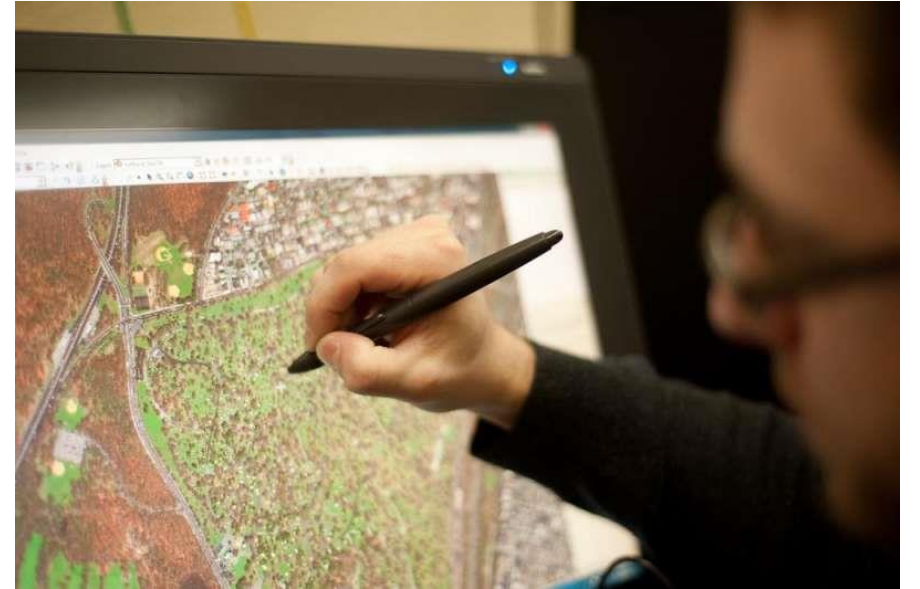
The main threats are grazing and agriculture

Alexandria is an example

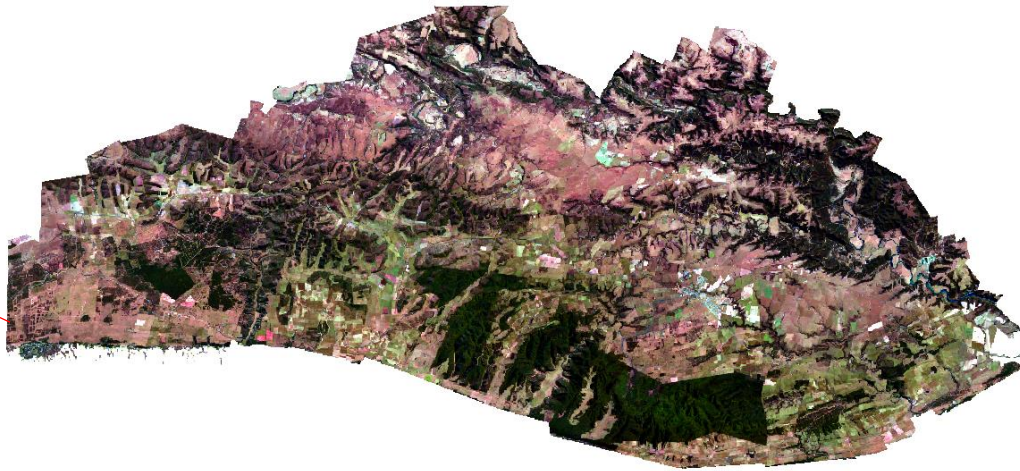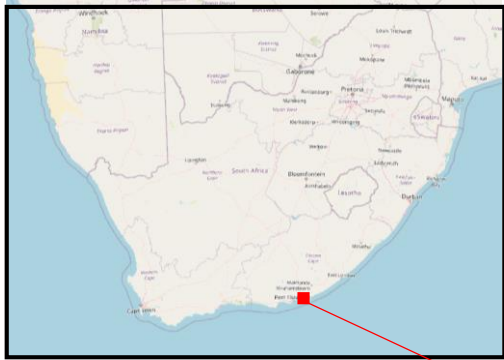There is a need for timeous detection of clearing of thickets.
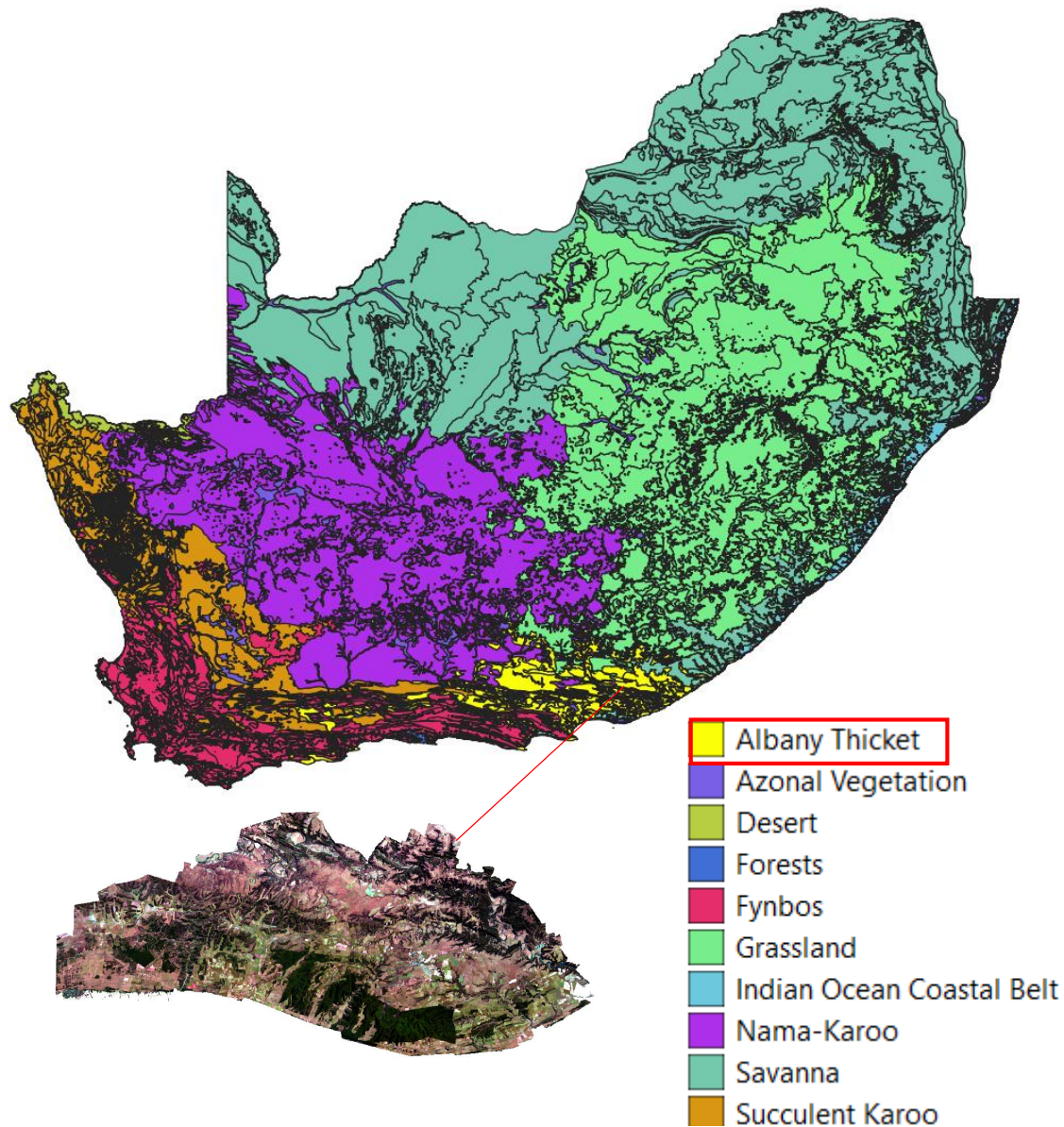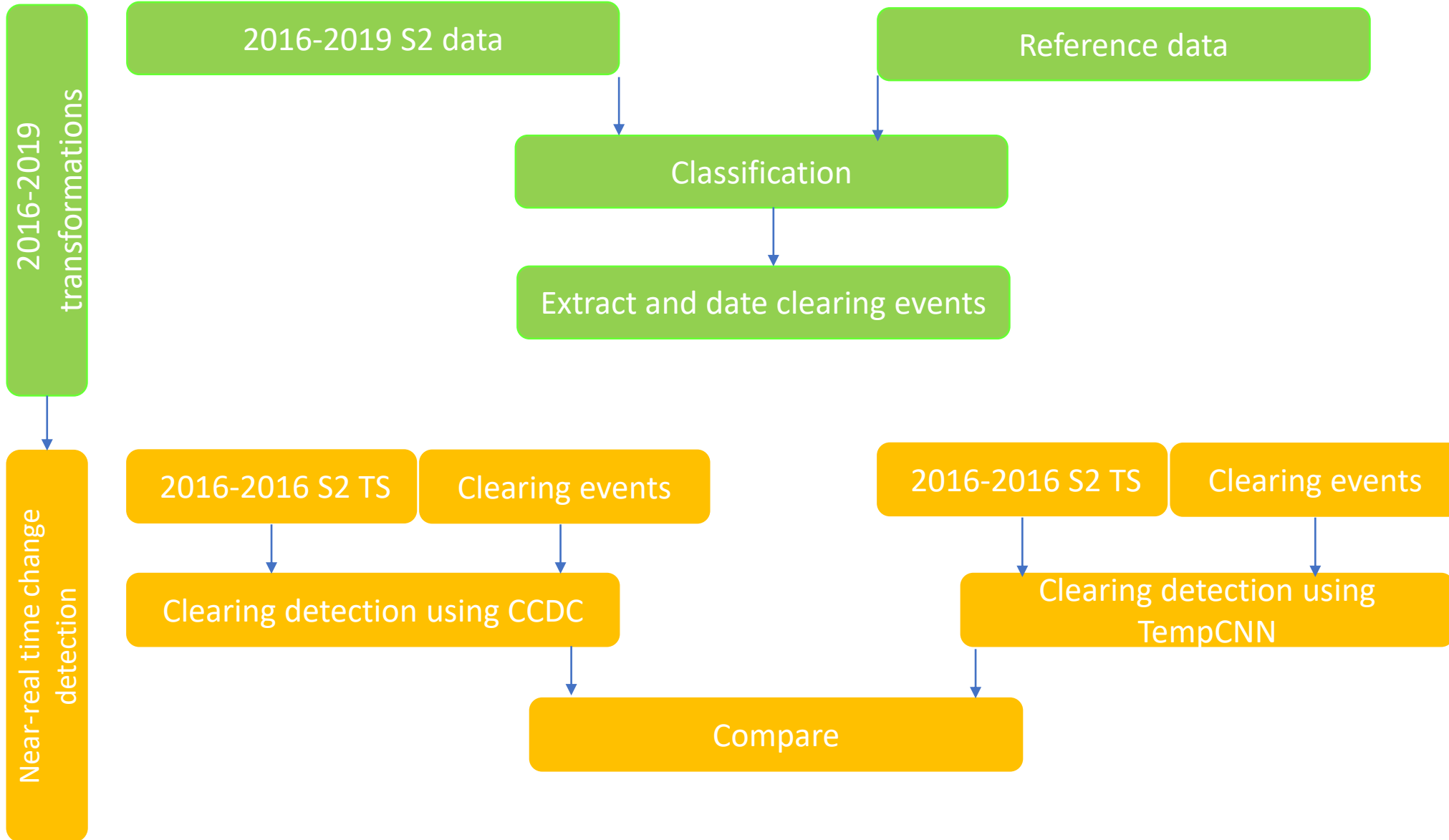
Introduction

Aim and Objectives

The study aims to detect clearing of Subtropical Thicket in near-real time using remotely sensed data.

- To generate transformation map documenting the changes in Alexandria biome between 2016 and 2019

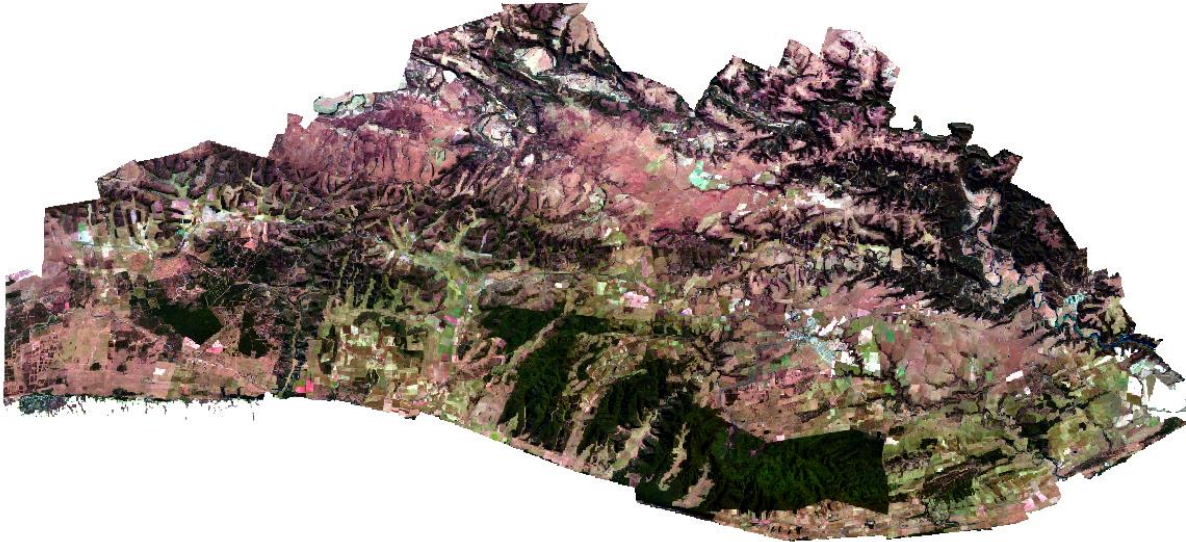- To perform continuous clearing detection.

Aim and Objectives

2016-2019 change

Data

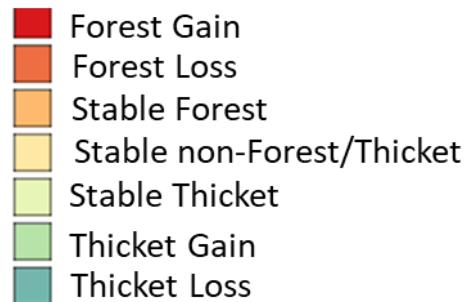
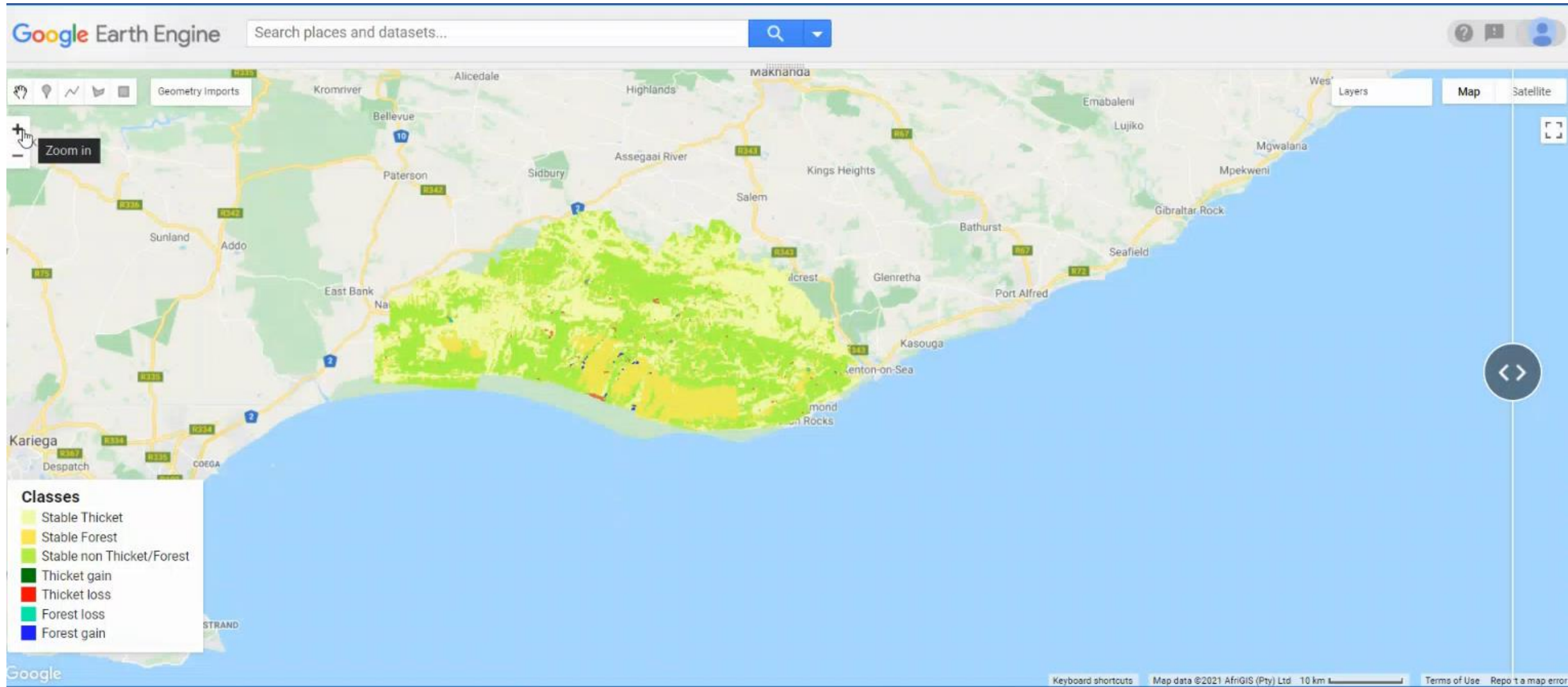Multispectral Sentinel 2 (S2) imagery European Space Agency
Copernicus

Adapted from Lunderstedt, 2016   1017 Samples
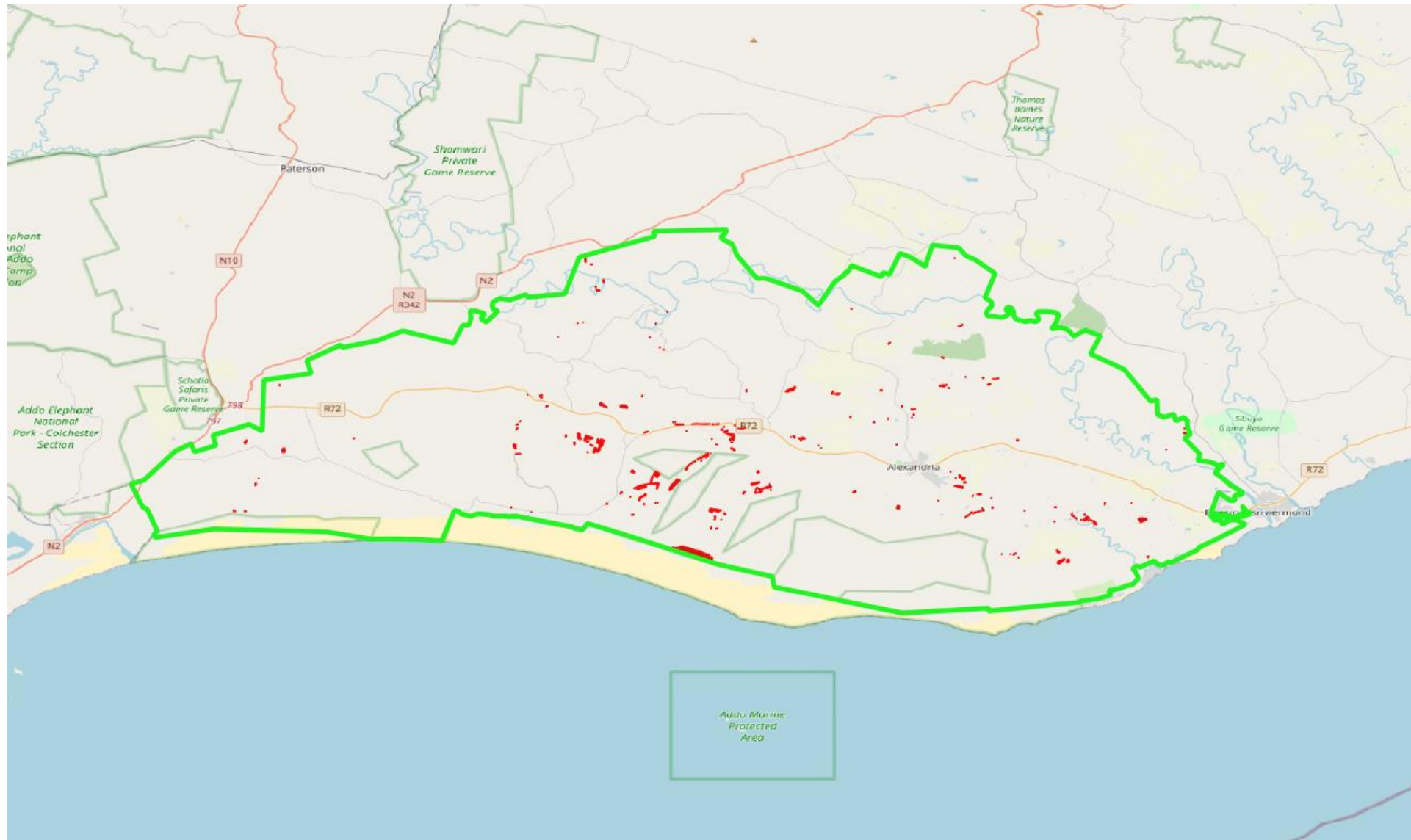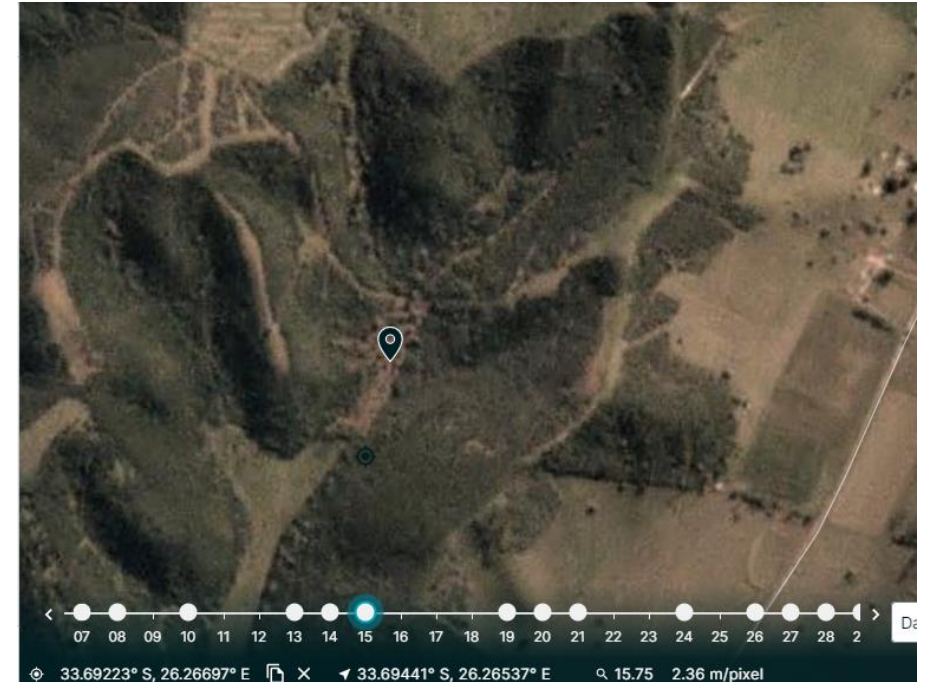
December 2016
November 2017
December 2018
December 2019

Forest Gain
Forest Loss
Stable Forest
Stable non-Forest/Thicket
Stable Thicket
Thicket Gain
Thicket Loss

2016-2019 change

2016-2019 change
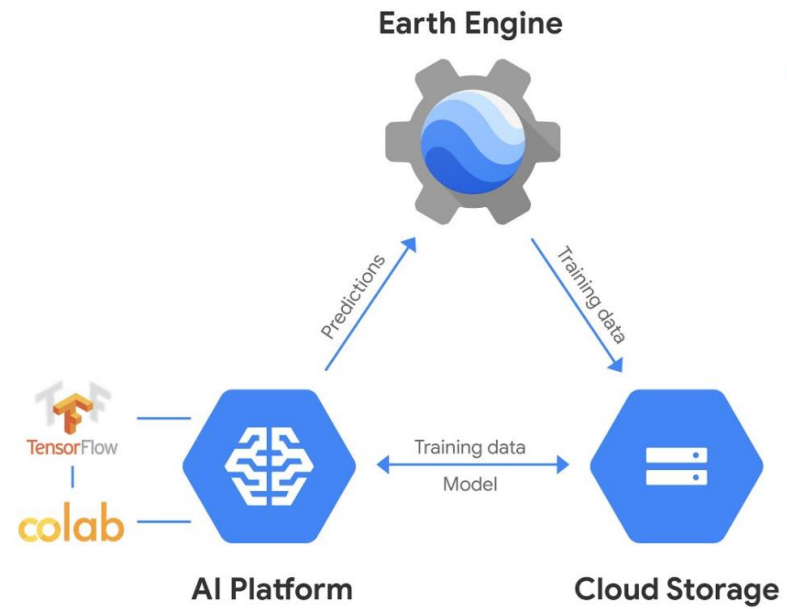
Dating clearings

4 July 2017

15 August 2017
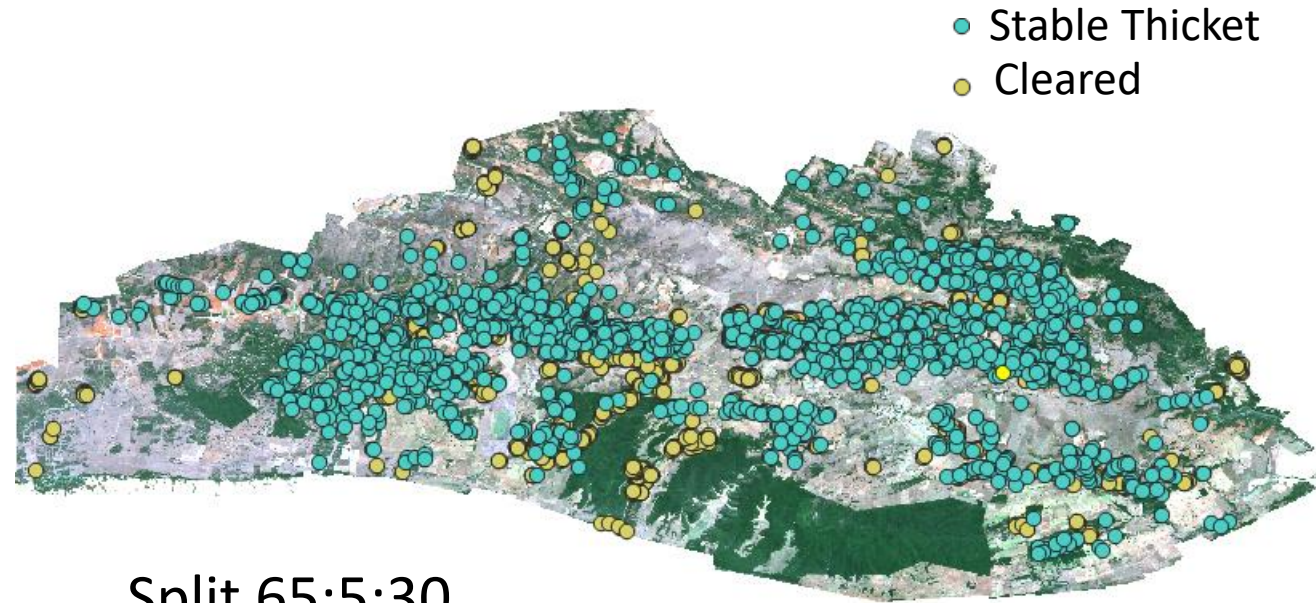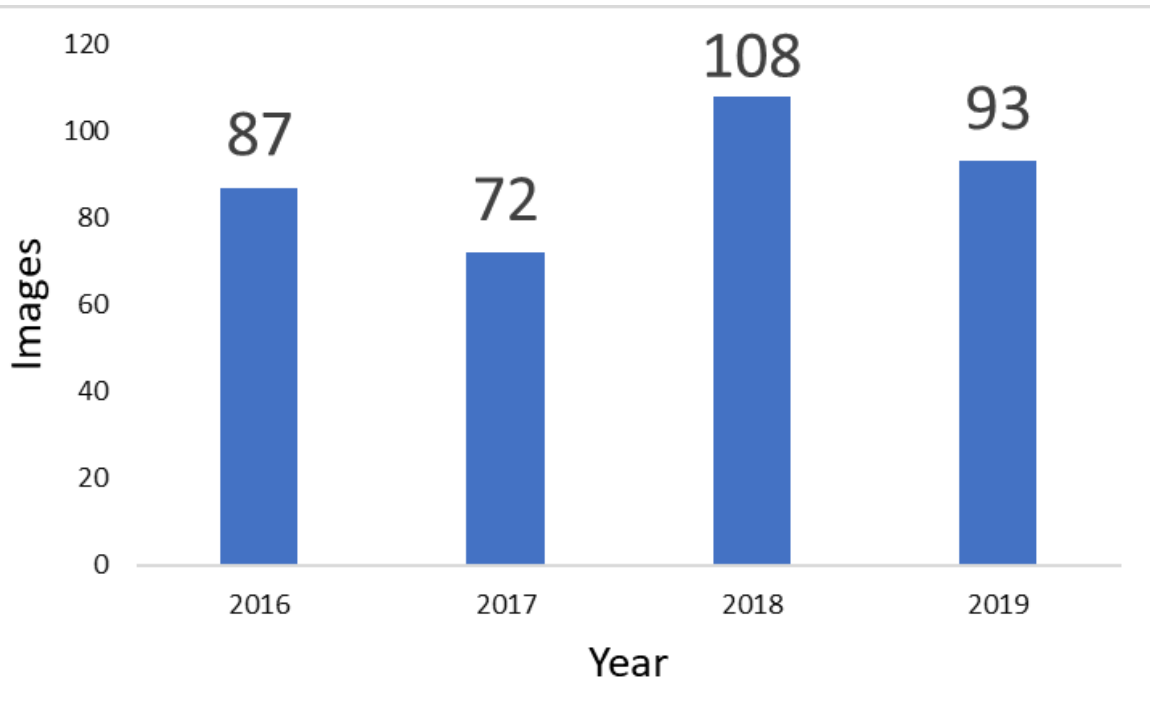
Near-real time clearing detection

Data

2016-2019 time series of S2 1C images

Cloud filling and scaling to reflectance

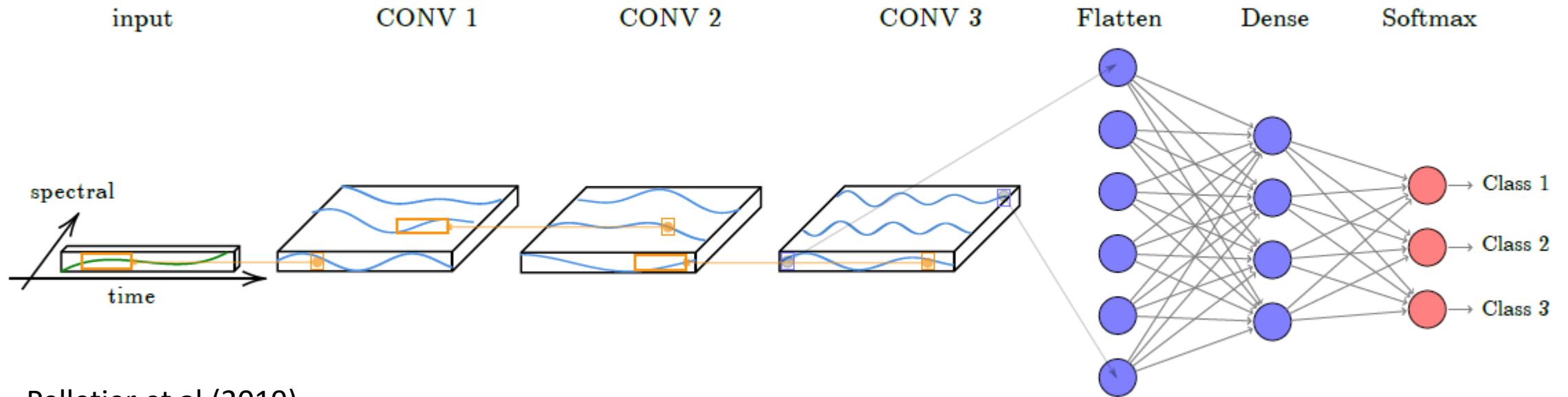Reference data of 1879 cleared and 1927 Stable Thicket examples

Split 65:5:30

Data

Subsampled the time series into windows with a fixed length of 120 observations.

Stable Thicket   Disturbed   Cleared

Time

TempCNN

input   CONV 1   CONV 2   CONV 3   Flatten   Dense   Softmax

spectral

time

Pelletier et al.(2019)

Class 1

Class 2

Class 3

Results

Metrics	Score
Accuracy	0.93
Loss	0.40
Stable Thicket Precision	0.93
Cleared Precision	0.91
Stable Thicket Recall	0.92
Cleared Recall	0.93

Results

Cleared
Stable Thicket
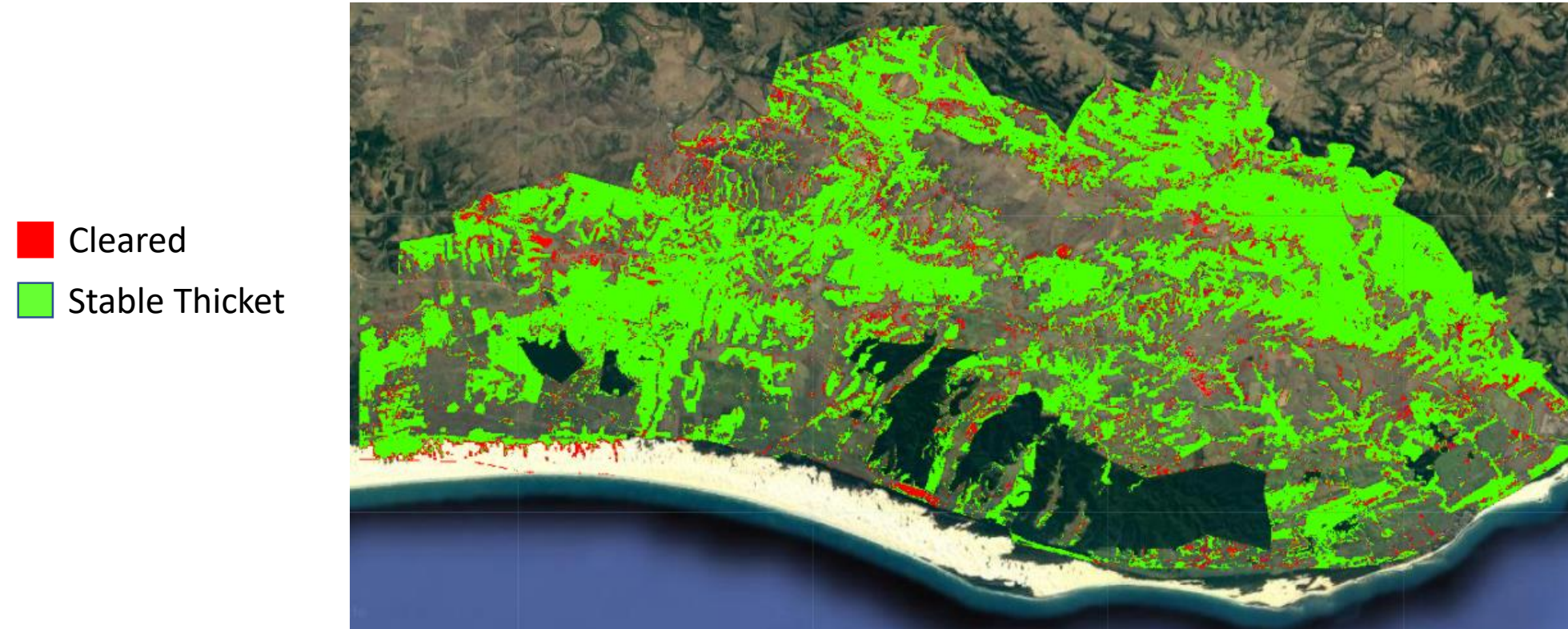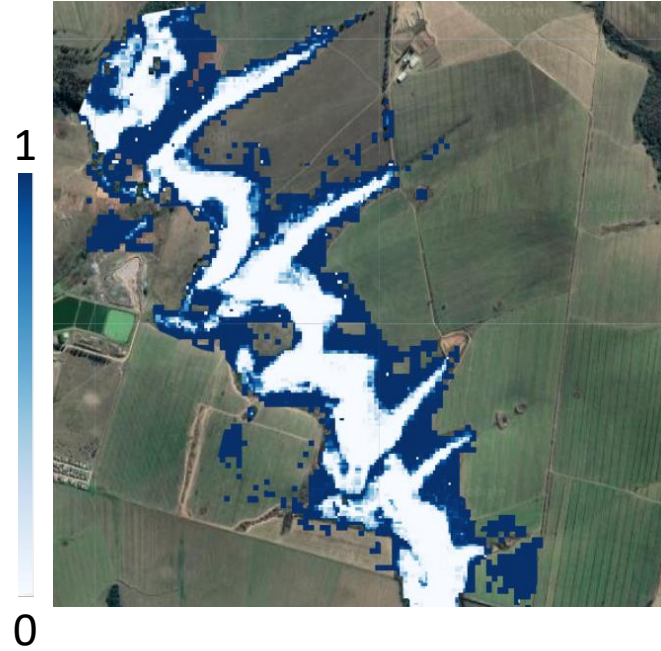
Clearings as of October 30

Results

Start of times-series

Clearing probability

30 October 2021

Thank You

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