Climatematch Academy

# Albedo and Deforestation in Protected Areas in Myanmar

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# Objectives:

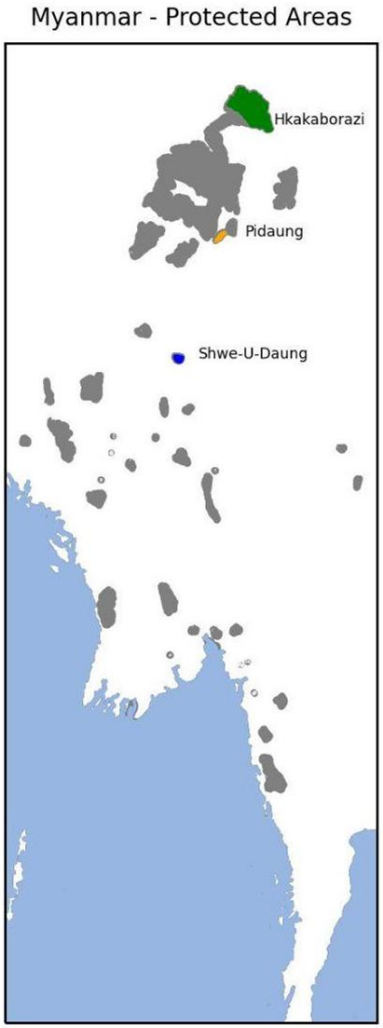
1. Investigating unmanaged protected areas in Myanmar (Burma) for land cover changes
2. Understanding how land cover changes correlate with albedo and temperature changes

# Hypothesis:

Albedo changes affect local temperature profiles and subsequently climatological parameters such as precipitation.

# Methods:

Albedo, temperature and precipitation data sourced from ERA5




# Area of Study:

1. Myanmar is part of the Indo-Burma global biodiversity hotspot
2. Only 5% of the hotspot region remains pristine
3. Based on literature we chose three **unmanaged protected areas**:

| **Name** | **Size** ($km^2$) | **Year established** | **Altitude (m)** | **Land use changes** |
|---|---|---|---|---|
| Hkakaborazi national park | 3,812.5 | 1998 | 900-5710 | Permanent human settlements |
| Pidaung wildlife sanctuary | 698.3 | 1918 | 155-665 | Settlements, roads, plantations military camps, permanent cultivation |
| Shwe-U-daung wildlife sanctuary | 119.1 | 1918 | 180-1845 | Extraction of timber species |

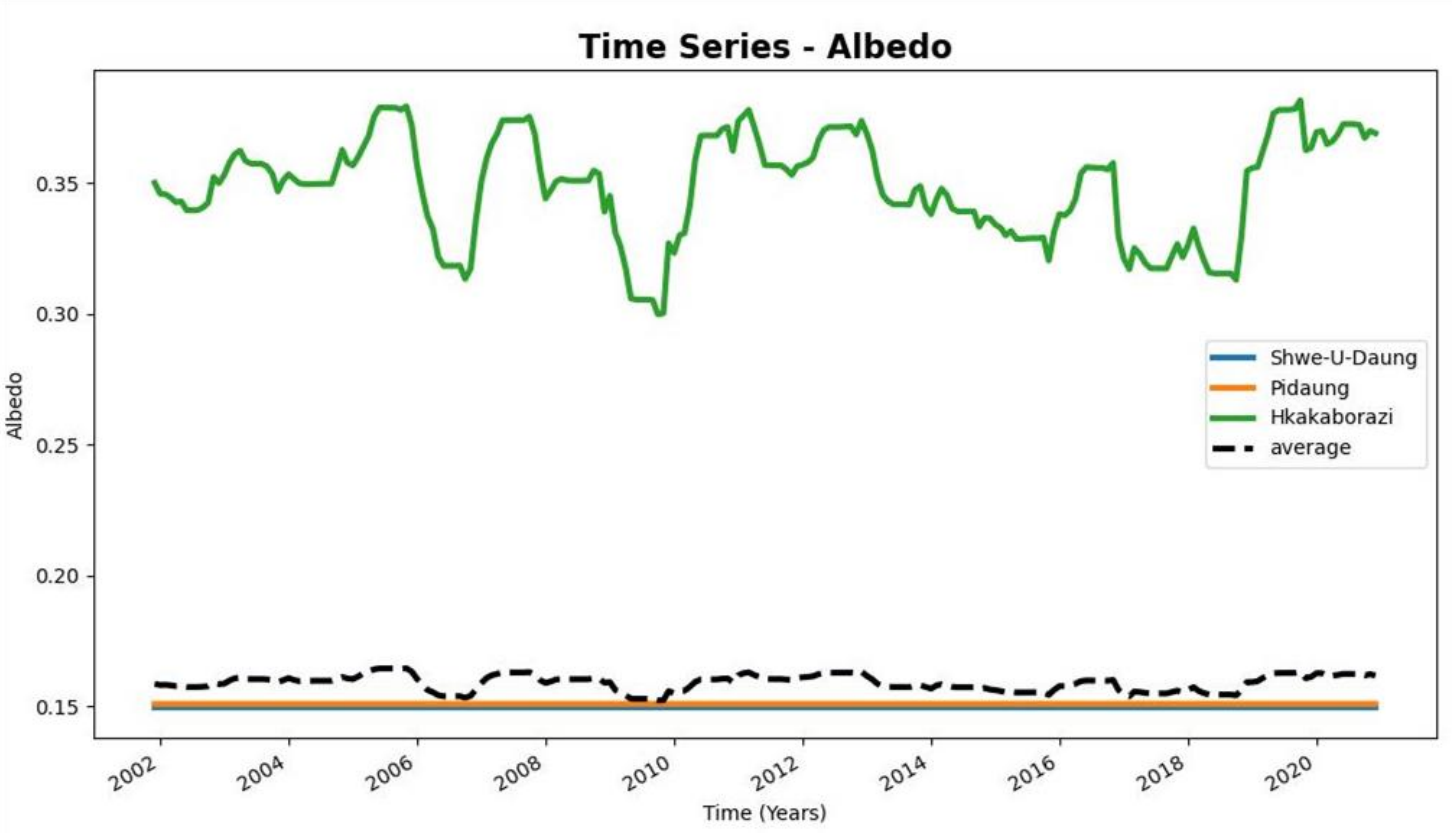
# Geographical background

Myanmar stands as one of the most densely forested nations in mainland Southeast Asia. These forests play a vital role in supporting numerous significant species, some of which are found exclusively in this region, making them highly valuable for global biodiversity conservation endeavors.

Between the years the 1990s and early 2000s forest cover has have declined by 0.3% annually.

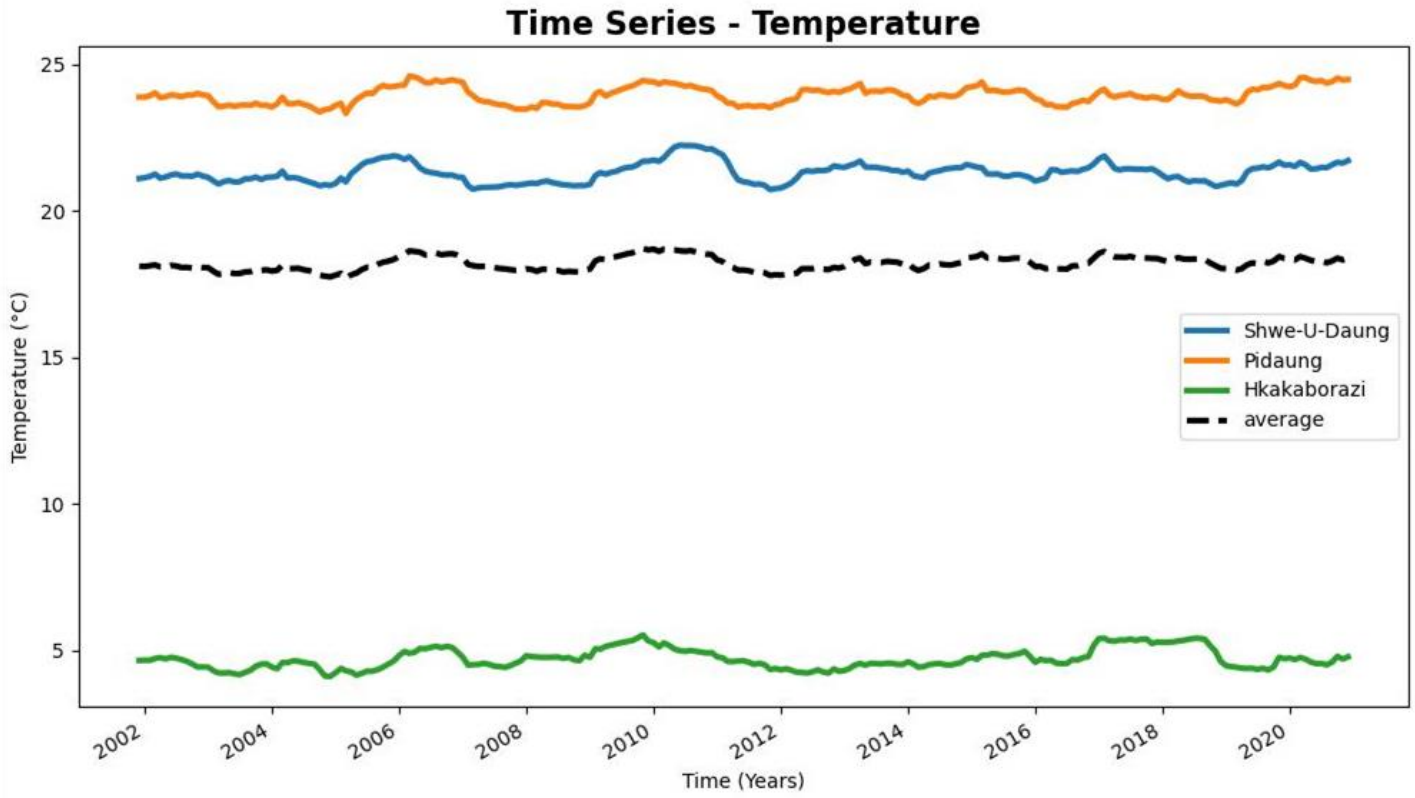
Forest cover change patterns in Myanmar (Burma) 1990–2000

# Albedo time series



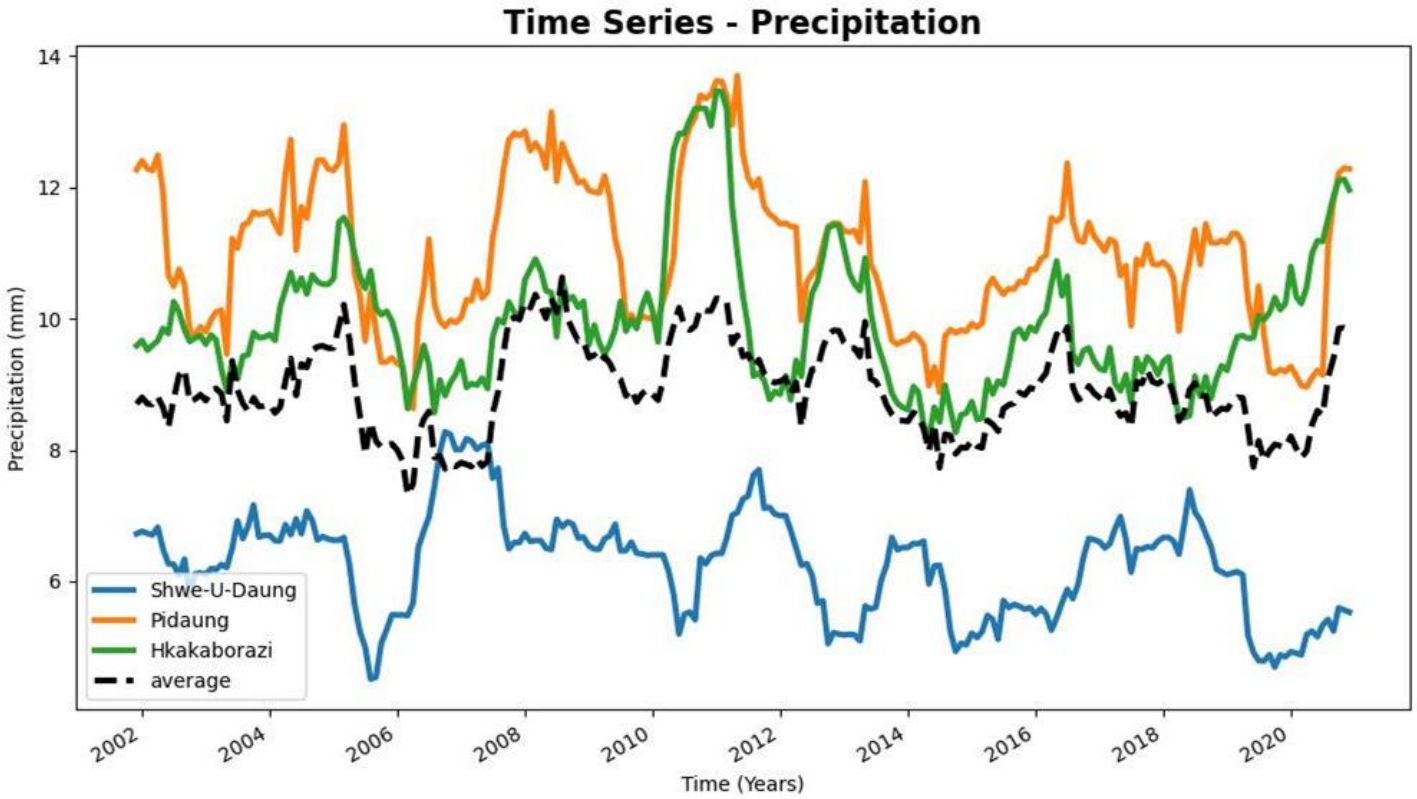

Averaged albedo values per year between 2001-2020

# Temperature time series




Averaged temperature values per year between 2001-2020

# Precipitation time series

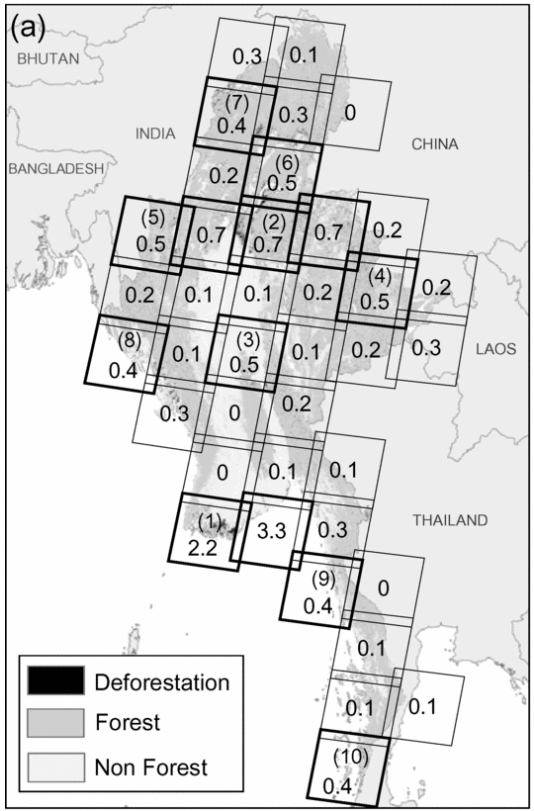



Averaged precipitation values per year between 2001-2020

# Results analysis

- Hkakaborazi national park had the highest albedo variability over the studied period.
- Hkakaborazi national park has the lowest average temperature out of the three protected areas.
- Shwe-U-daung and Piduang showcase higher than average temperatures.
- The precipitation records show lowest average precipitation (monthly) in the Shwe-U-daung region, half as much as the other two sites.
- Significant variation in the precipitation over all three sites with Pidaung receiving the highest rainfall.

# Conclusions




Per cent annual forest loss from 1990–2000, thick black lines indicate deforestation hotpots, numbers inside tiles give annual per cent deforestation [Forest cover change patterns in Myanmar (Burma) 1990–2000]

- Owing to the larger area, higher altitudes and diverse vegetation in the northernmost Hkakaborazi national park, significant variability in albedo is observed.
- Pidaung and Shwe-U-daung wildlife sanctuaries comprise primarily of evergreen forests which may account for their lower albedo values.
- It can be seen that deforestation was mostly observed in the central-northern region of Myanmar where Pidaung and Shwe-U-Daung are located, however, we didn't see a significant albedo change in the time series analysis, since the areas were declared protected well before in 1918.
- Hkakaborazi national park continuous to show high albedo and relatively constant average temperatures in the past two decades indicating that the park is well conserved even though unmanaged.

# References


- Beffasti, L.; Gallanti, V., eds. (2011). *Myanmar Protected Areas: Context, Current Status and Challenges*. Milano, Yangon: Istituto Oikos, Biodiversity and Nature Conservation Association.
- Rao, M., Rabinowitz, A., & Khaing, S. T. (2002). Status review of the protected-area system in Myanmar, with recommendations for conservation planning. *Conservation Biology*, *16*(2), 360-368.
- LEIMGRUBER, P., KELLY, D., STEININGER, M., BRUNNER, J., MÜLLER, T., & SONGER, M. (2005). Forest cover change patterns in Myanmar (Burma) 1990–2000. *Environmental Conservation*, *32*(4), 356-364. doi:10.1017/S0376892905002493