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The Impacts of Landscape Offsets on the 30-metre SRTM DEM

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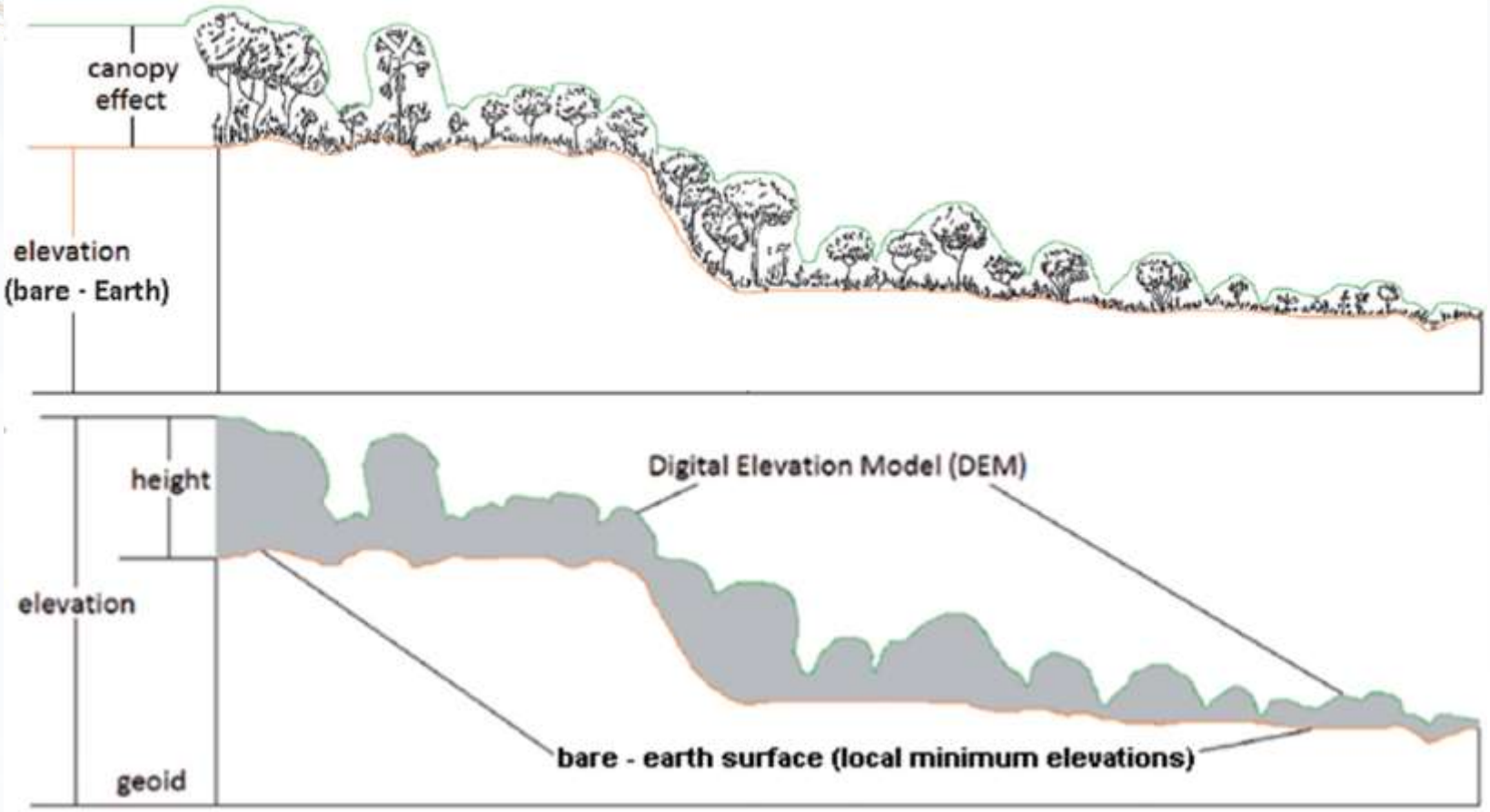
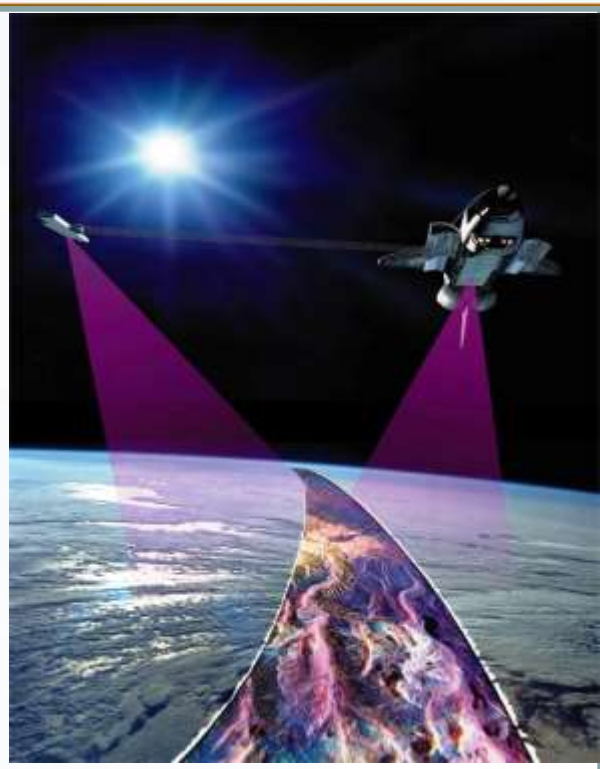
INTRODUCTION

- Digital Elevation Models (DEMs) have a wide application in infrastructure planning & environmental management
- SRTM DEMs suffer from the shadowing effect of landscape obstructions
- The applications of SRTM DEM is limited due to shadowing effect caused by the landscape obstructions



Tree canopy effect on DEMs

- This study utilised the 30m SRTM data to investigate the impact of landscape obstructions
- The extraction of the terrain height from SRTM is challenging
- Addressing this problem will yield meaningful and useful results
- This study addresses this problem to understand the DEM's accuracy from variable landscapes

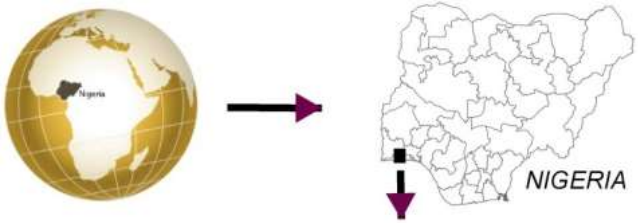


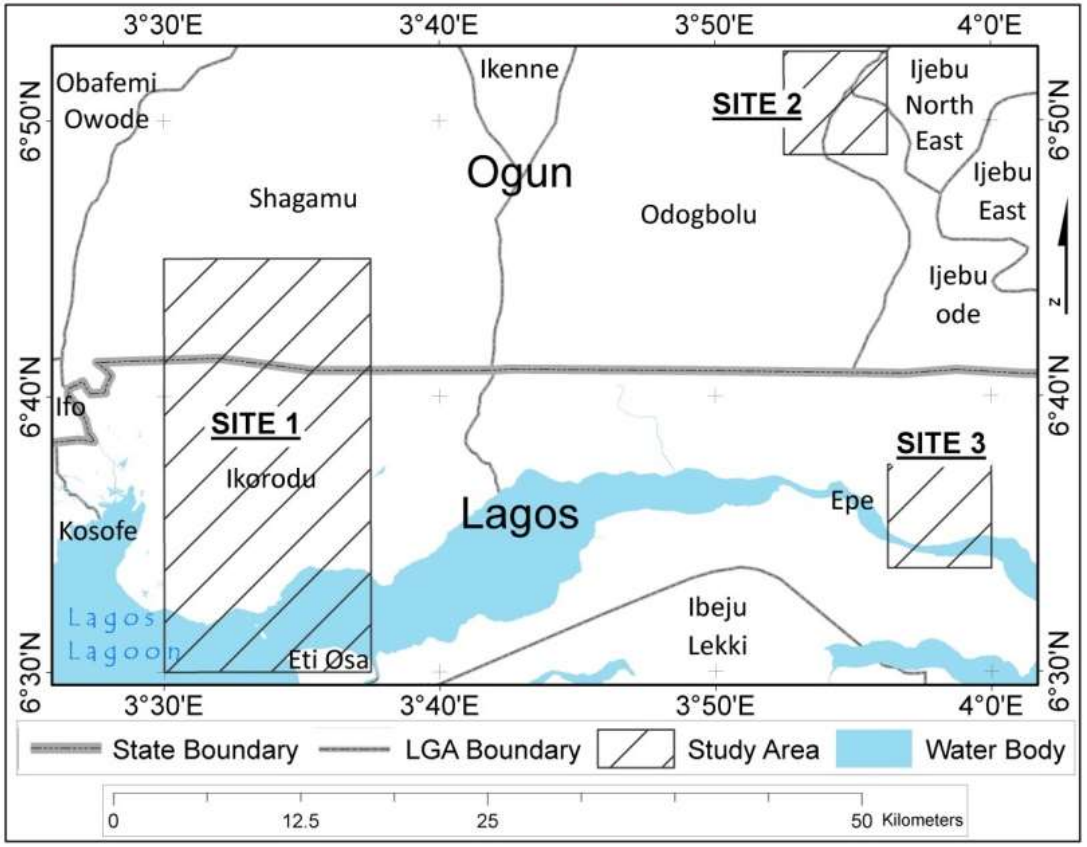
The Shuttle Radar Topography Mission (SRTM)

STUDY AREA

The landscape types are:

1. Built-up area
2. Bare land
3. Grasses, shrubs, and croplands
4. Mixed-forest
5. Wetland forest





METHODS

Data acquisition & compilation

- 30-metre SRTM
- Topographic Maps
- Landsat Imagery

Data processing

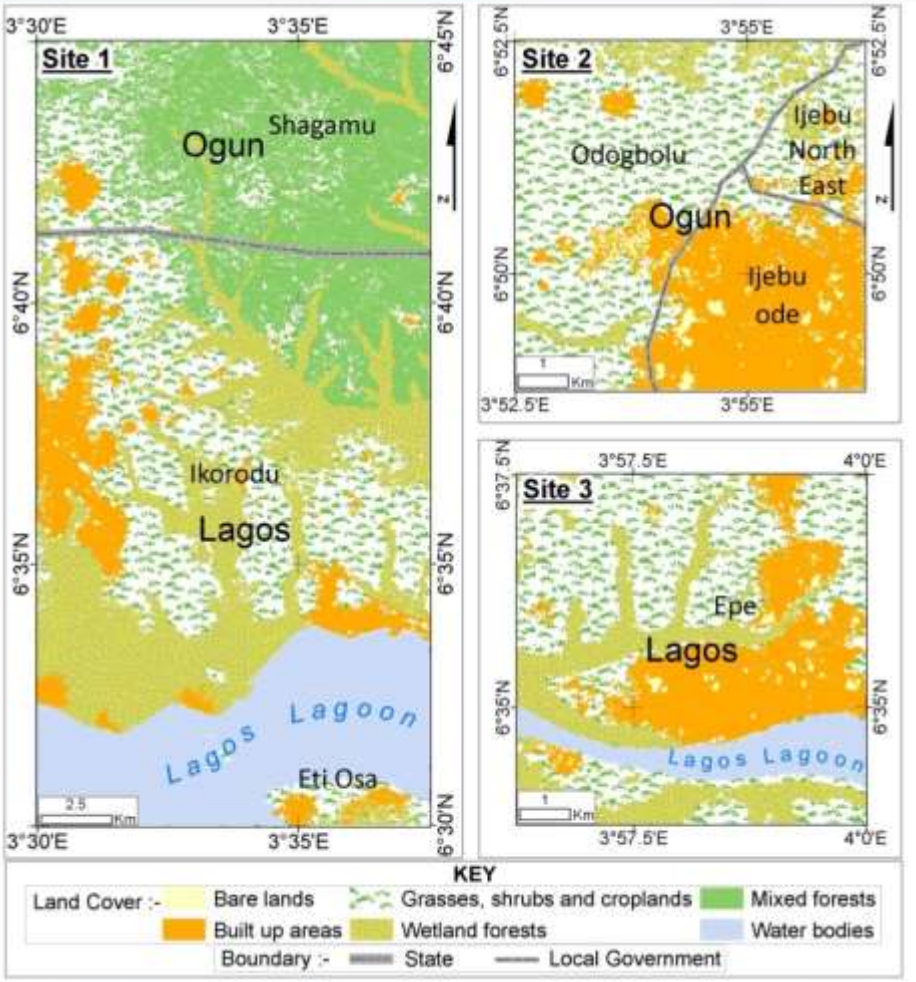
- Datum Harmonization
- Interpolation of Reference DEM
- Land Cover Extraction

Separation of landscape offsets from the SRTM DEM

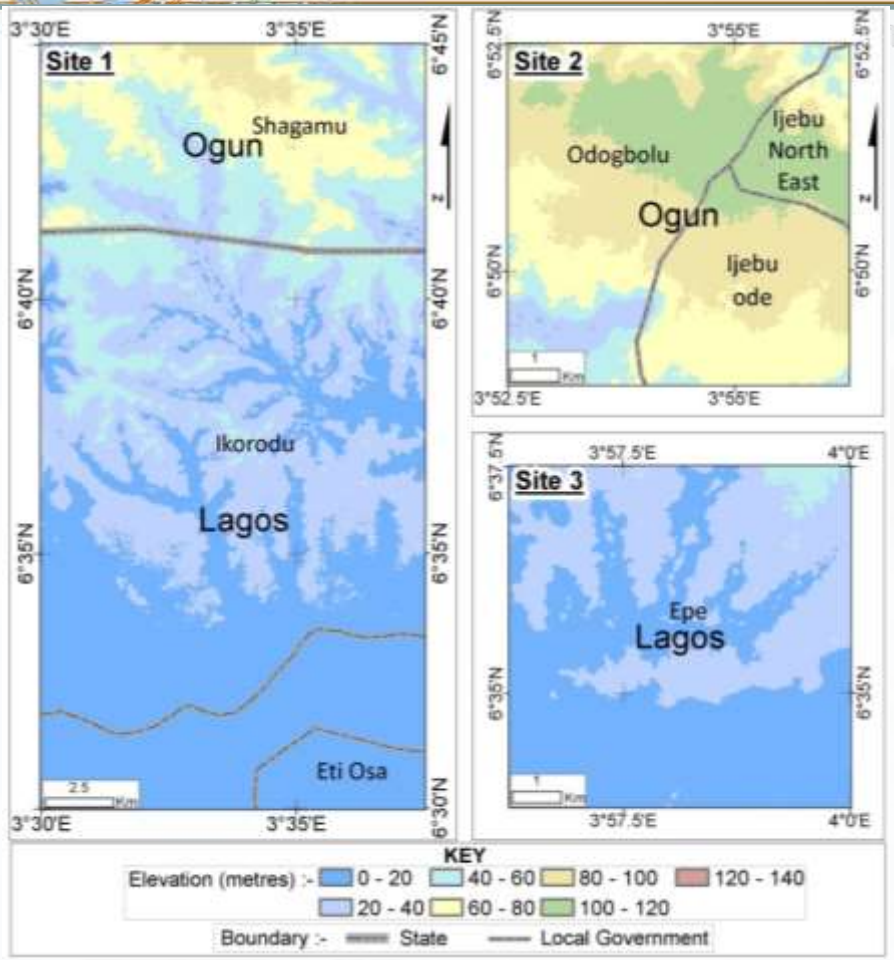
Analysis and results presentation

RESULTS

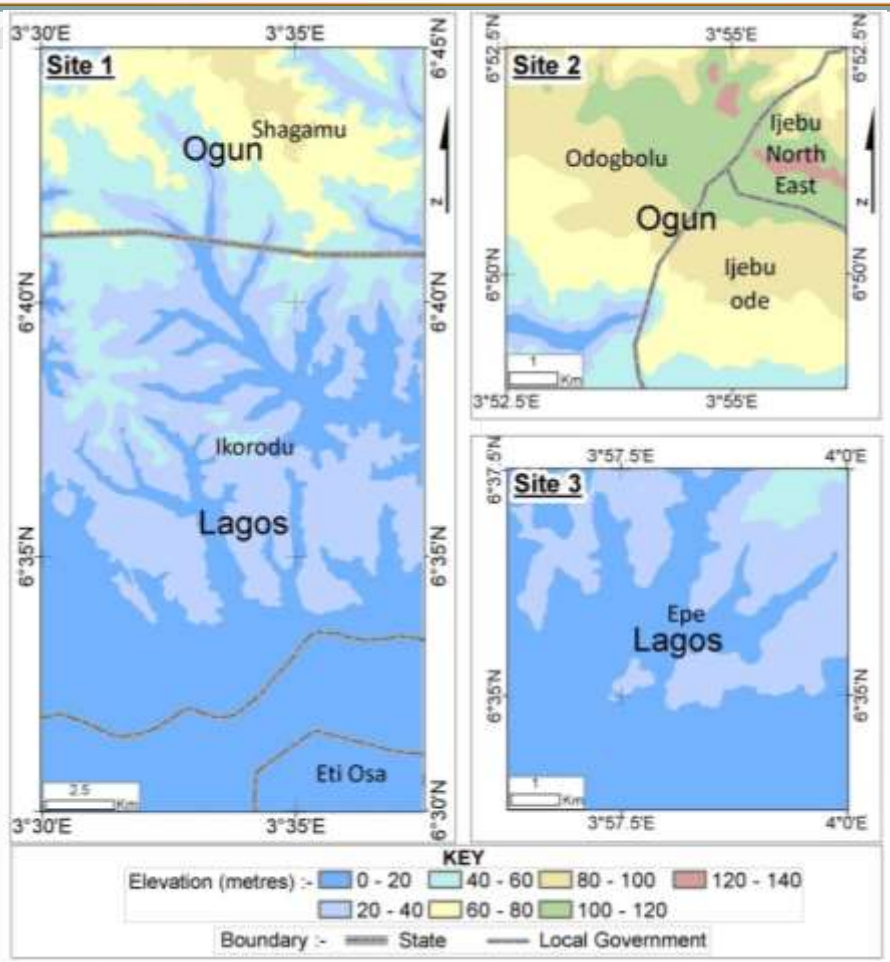
Typical wetland forests in the study area



Land cover: Sites 1 - 3

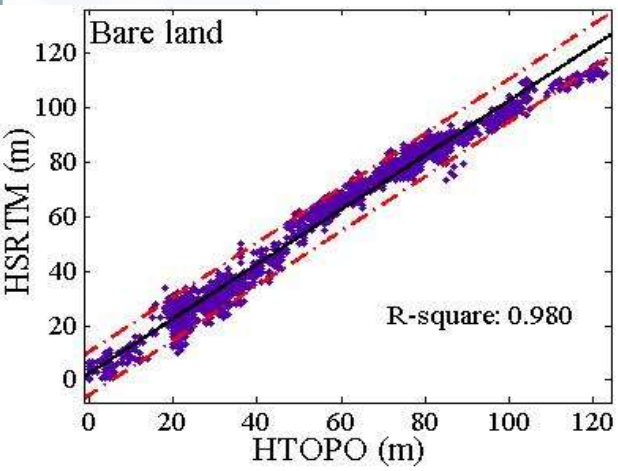


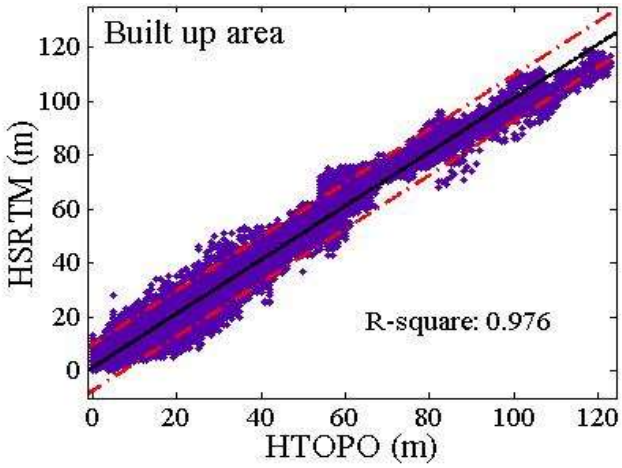
Elevation surface from SRTM DEM, H_{SRTM}

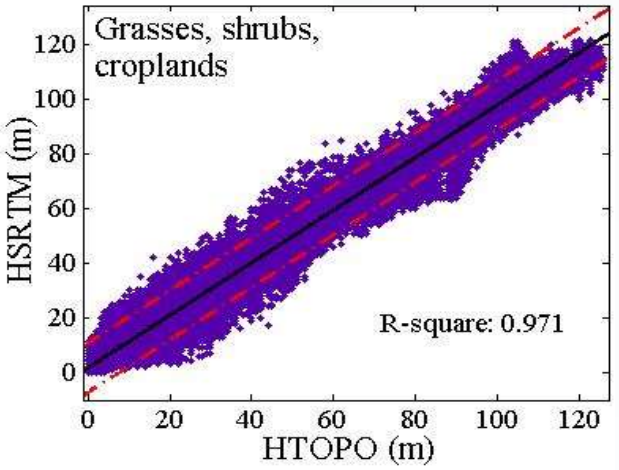


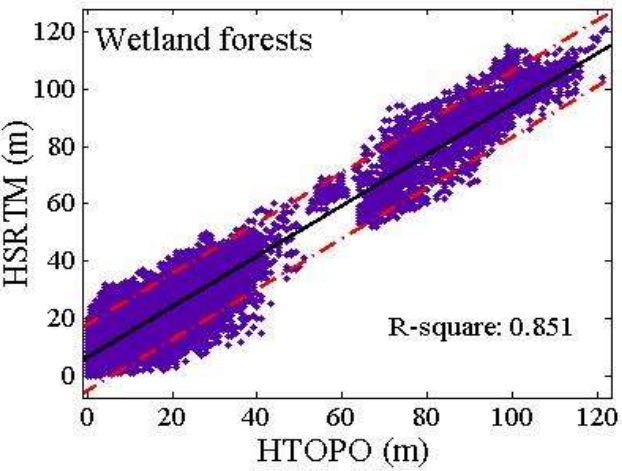
Reference DEM interpolated from Topographic maps, H_{TOPO}

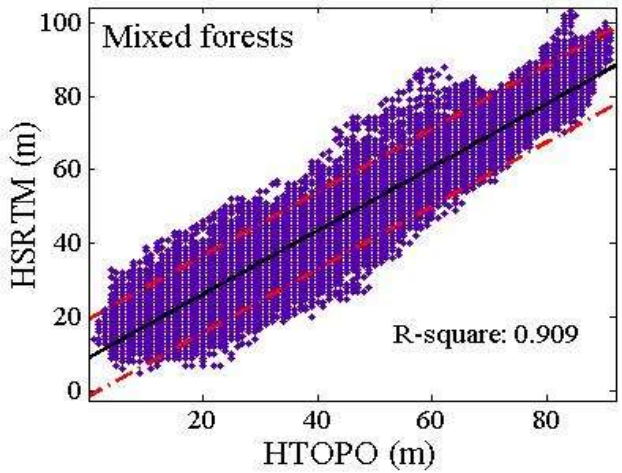
H_{SRTM} vs. H_{TOPO} at 95% confidence bounds











Land Cover	Standard Error - H_{SRTM}
Bare lands	4.023
Built up areas	4.359
Grasses, shrubs and croplands	4.606
Wetland forests	5.858
Mixed forests	5.34

CONCLUSION

- This study has investigated the impacts of variable landscape obstructions to 30m-SRTM DEM accuracy
- The landscape types have significant impact on the obtainable accuracy (from wetlands to bare lands)
- The SRTM DEM over-estimates the terrain height in forested areas much more than in built-up areas and bare lands

CONCLUSION

- The characteristics of the landscape exhibit predictable trends
- This can be modelled to derive the bare-earth surface from SRTM DEMs
- The effect of obstructions on other terrain parameters as well as more case studies will be required for generalisation of results
- Further research is recommended to maximise the benefits of SRTM data

Thanks for listening!