

Creation of a Landsat Time Series of Cloud-free Mosaics and Modeling of Forest Characteristics of Puerto Rico and the Virgin Islands

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The team

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Photo: TJ Brandeis

Methods

1. Removal of clouds and cloud shadows

- Imagine models
- Thresholding of various bands
- For cloud shadows, compared results of thresholding with a topographic shadow layer created for each image
- Much manual editing still needed
- Clouds confused with beaches
- DEM used in creation of topographic shadow layers too coarse for some areas

2. Co-registration of images

- Autosync

3. Mosaic images

- Cubist: regression tree normalization and RSAC tools for Imagine provided Forest Service

Modeling Forest Characteristics and Common Tree Species Distributions

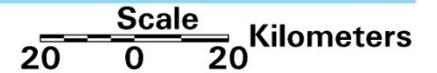


Photos: TJ Brandeis

Puerto Rico and the U.S. Virgin Islands



Kennaway and Helmer, 2007; Kennaway et al., in review; Helmer and Ruzycki, unpubl.



Dry to Dry-Moist Forests - Drought Deciduous/Semi-deciduous

- Open Woodland
- Dense Woodland
- Mixed Forest or Shrubland, with or without Succulents
- Alluvium and Volcanic Substrates
- Karst/Carbonate Substrate (incl. Semi-evergr. Forest)
- Serpentine Substrate (incl. Seas. Evergr Gallery Forest)

Forested Wetlands

- Mangrove
- Seasonally Flooded Savannas and Woodlands
- Pterocarpus Swamp

Moist to Moist-Wet Forests - Seasonal Evergreen/Evergreen

- Karst Substrate (Semi-deciduous and Seas. Evergr. mosaic)
- Alluvium and Volcanic Substrates
- Abandoned Coconut Palm on Alluvium
- Karst Substrate (Seas. Evergr. and Evergr. mosaic)
- Serpentine Substrate

Wet to Rain Cloud Forests - Evergreen

- Sierra Palm, Transitional and Tall
- Elfin and Sierra Palm

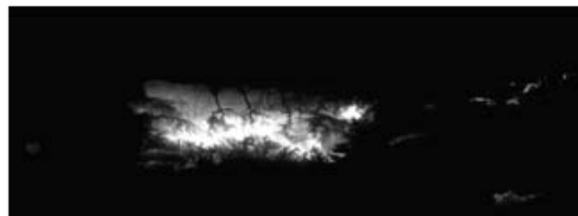
And other predictor layers...

assembled by CEMML, TR Ruzycki



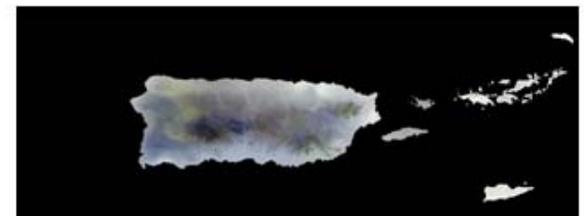
Geology

Available for Puerto Rico
Digitized for VI by CEMML



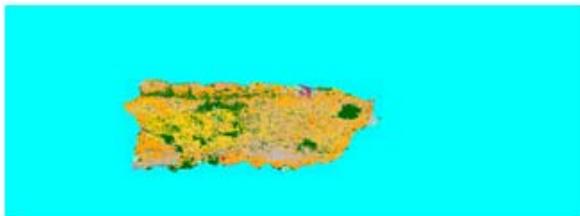
Topography (SRTM"+")

Farr and Kobrick, 2000
Sherrill, Lefsky for karst



Climate

Daly, Helmer, Quiñones, 2003
Daly, Helmer, unpubl. (for VI)



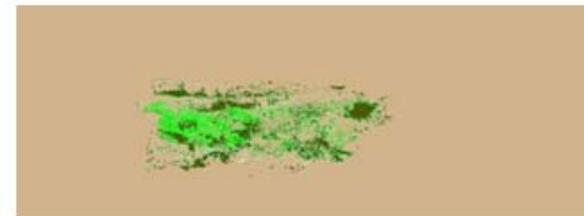
1951 Land cover (PR only)

Brockman, 1952
Digitized by CEMML
(Kennaway, Helmer, 2007)



1977 Land cover (PR only)

Puerto Rico DNER and USGS
Assembled by CEMML
(Kennaway and Helmer, 2007)



Forest age class (PR only)

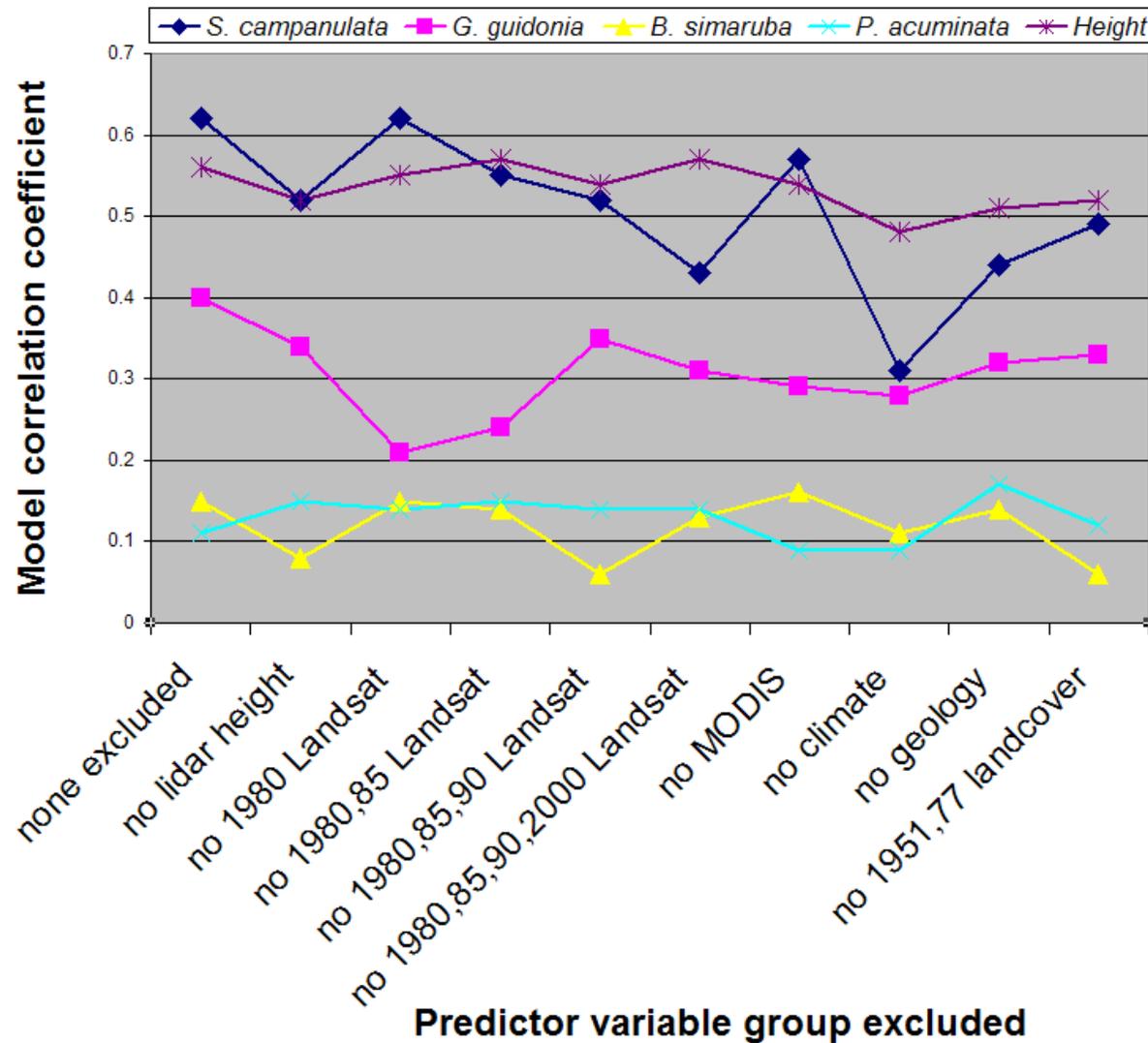
(Kennaway, Helmer, 2007)

Predictor Layers

- **Climate:** for each month: mean precip, mean temp, min temp, max temp
- **Landcover:** 1951, 1977, 2000
- **Topography**
- **Geology**
- **Forest vs. Non-forest**
- **Distance to roads:** including road classes
- **Distance to coast**
- **Soil orders**
- **SPOT Pan imagery**
- **Life Zones**
- **Managed areas**
- **Landsat mosaics**
- **Tassel cap for Landsat mosaics**

Models excluding selected variable groups

Cubist models for height and BAH of 5 species



Models including only selected variable groups

Cubist models for height and BAH of 2 species

