3-D MODEL OF A MEDITERRANEAN TREE-GRASS ECOSYSTEM FOR REMOTE SENSING APPLICATIONS

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1. INTRODUCTION

- Tree-Grass ecosystems show significant heterogeneity at large scale.
- Mix of species and heterogeneous radiation regimens difficult biogeochemical modeling and proximal sensing.
- Suitable 3-D modeling allows overcoming these difficulties.

2. STUDY SITE AND DATA

- Mediterranean Tree-Grass ecosystem:
  - ➢ Fluxnet site, 3 Eddy covariance towers + AMSPEC-MED
  - ➢ Majadas del Tiétar, Cáceres, Spain
- Airborne and Terrestrial LiDAR data for 3-D modeling

3.1 SUPPORT TO PROXIMAL SENSING

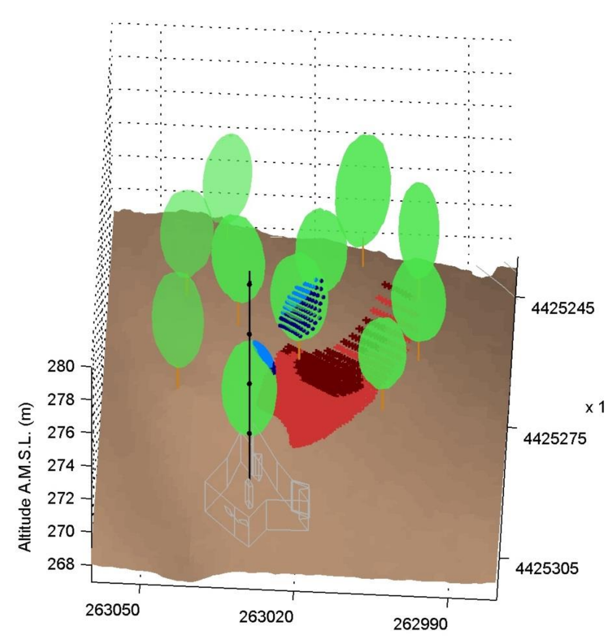
Airborne LiDAR data (PNOA, 0.96 – 0.41 points / m^2)
Classification (Terrascan) → DGM and CHM

Individual crown detection

Ellipsoid fitting

AMSPEC-MED

Ray-casting approach:
Tree/grass
Sunlit/shaded fractions



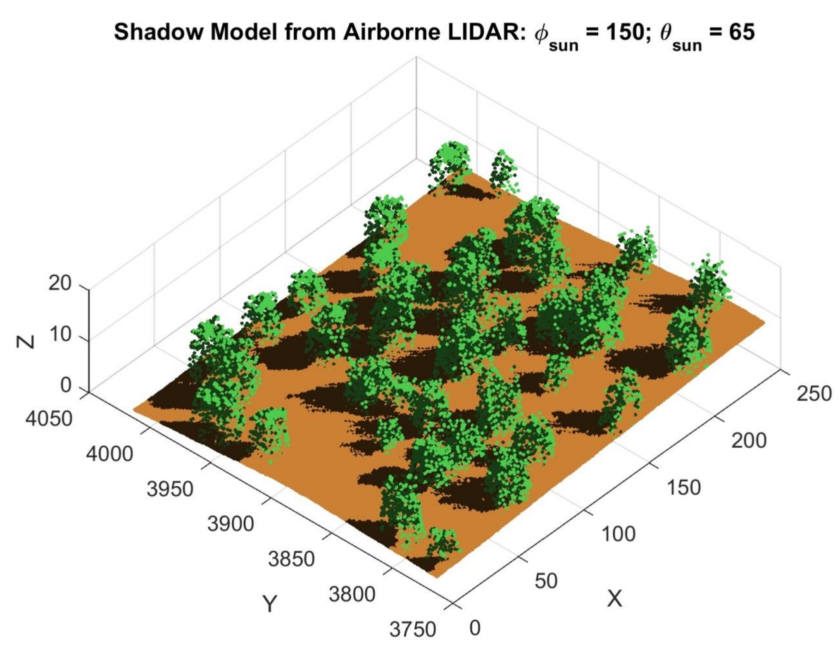
3.2 SPATIALIZED RADIATION REGIMEN

Vector-based model to predict spatialized shadow fractions

- **Vector interception**

+

- **Hillshade model**

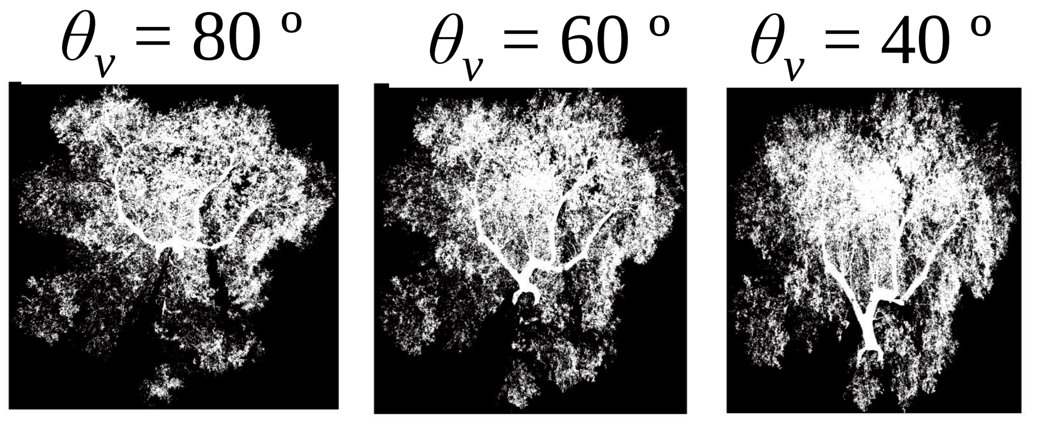


3.3 CROWN TRANSMISSIVITY

Terrestrial LiDAR Scanner + Hemispherical photography

Tree Voxelization
Voxel size 5 mm

Tree observed from different angles to estimate angular dependence of crown transmissivity



4. CONCLUSIONS

LiDAR allows accounting for spatial heterogeneity in the study of Tree-grass ecosystems

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