

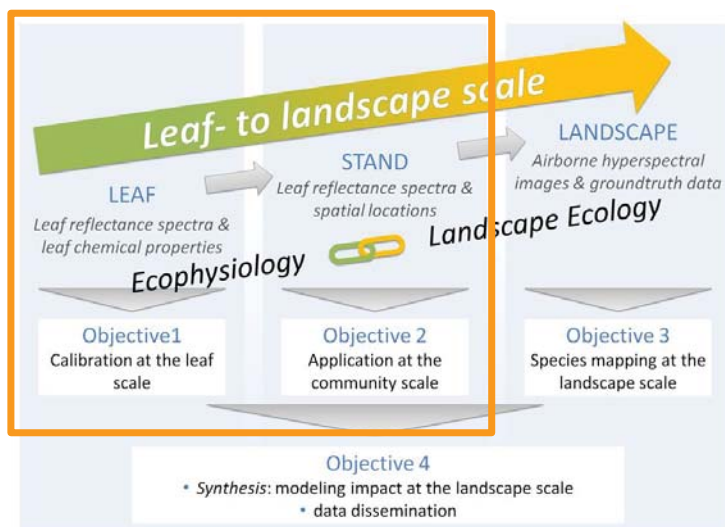
Identifying the invasive *Acacia longifolia* at leaf and canopy level

Full spectrum versus hyperspectral vegetation indices

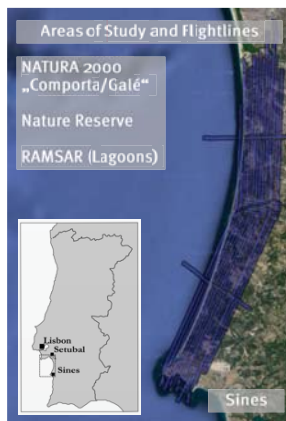
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Introduction & Aim of the Study

The aim of the study is to test if the non-native, invasive tree *Acacia longifolia* can be distinguished from adjacent vegetation based on leaf and canopy field hyperspectral data. Two approaches will be compared: using (1) full spectrum data and using (2) vegetation indices and red-edge parameters.



Area of Study & Data



Study Site

- NATURA 2000 site "Comporta/Galé" in South-West Portugal
- Mediterranean dune ecosystem with problematic invasive *Acacia* species

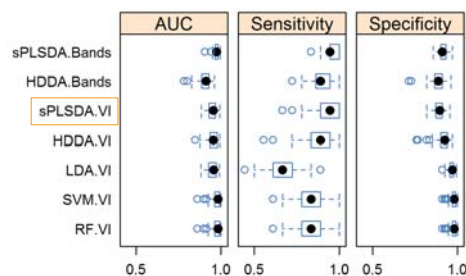
Field Sampling

- Data: Full range (350 – 2500nm) ASD FieldSpec data
- Sensor: contact probe at leaf level and bare fibre at canopy level
- Species: native and exotic shrubs and trees including *Acacia longifolia*
- Dates: April 2011 and April 2014

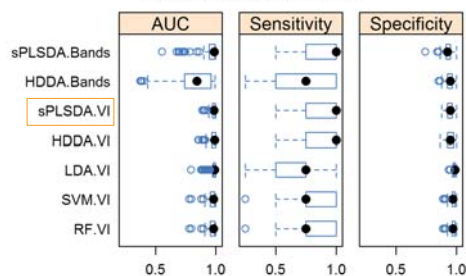


Results

Leaf Spectra: 2011 and 2014



Canopy Spectra: 2011 and 2014



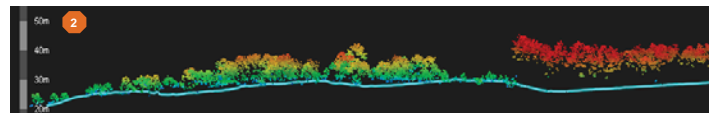
Model Performance: Distinguishing *Acacia longifolia* from adjacent vegetation using hyperspectral full range (*.Bands) and vegetation index (*.VI) data comparing 5 algorithms

Conclusions

- The target species *Acacia longifolia* can be distinguished from all other shrub and tree species across the years at leaf and canopy level.
- Using Hyperspectral Vegetation Indices combined with the sPLS algorithm ("sPLSDA.VI") is a promising approach in terms of model performance, model stability, computing efficiency and interpretability.
- Identifying *A. longifolia* at field canopy level gives strong indication for discrimination potential using high-resolution airborne data.

Outlook

The separability of *A. longifolia* at landscape level will be tested joining airborne 1 hyperspectral and 2 LiDAR data together with hyperspectral and biochemical field data. This will generate a distribution basemap for impact assessment.



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References

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