Context

• Only partial knowledge of Mayotte’s agricultural land use
  
  Agriculture based on associated crops, orchards, and agroforestry
  
  Very small farms (<0.5ha)
  
• Former studies showed the potential of LiDAR DTM and DEM for horizontal structure characterization of woody areas in Mayotte (Dupuy et al. 2013; Dupuy et al. 2012; Lainé et al. 2010)
  
  ➔ what about their use for complex agricultural units classification?
  
• Need of methodological developments towards characterization of tree-dominated landscapes
  
  ➔ association of descriptors based on multitemporal radiometry, texture, and vegetation height

Is Pléiades’ VHSR images acquired in Tri-stereo mode a relevant tool for the characterization of Mayotte’s production systems?

Objectives

• Pléiades’ tri-stereo images analysis and computing, to derive tree heights
  
  ➔ Tuning of the DEM production method for 3-stereo data
  
  ➔ Evaluation of the produced DEM
  
  ➔ Feasibility study of a DTM derivation from the data to produce a DSM

• Pléiades’ mono- & tri-stereo images textural analysis, to highlight the variability of tree patterns
  
  ➔ Choice of the more adapted spectral bands among panchromatic and multispectral channels
  
  ➔ Choice of the relevant neighborhood dimensions for sliding-window parameterization
  
  ➔ Choice of the more discriminant textural indices

• Object-based analysis, to map agricultural areas taking into account simultaneously:
  
  ➔ The radiometric information contained in panchromatic and multispectral data
  
  ➔ The object height as given by the DSM
  
  ➔ The textural information given by the more discriminant textural indices

DEM computed with 2 Pléiades’ stereo images

• Very high accuracy of the DEM derived from 1 couple of images
  
  ➔ derivation from the 3 couples to be tested
  
  ➔ High value integration in the classification process should improve the plots delimitation and extraction

Problem encountered with texture

• Dark vertical strips appear on most of the textural indices, either derived from panchromatic or from multispectral images
  
  ➔ They are due to equalization residuals between sensor arrays and cannot be compensated or corrected.

Conclusion

• High potentialities of Pleiades’ data are perceived but still have to be tested
  
  ➔ Strong limits already appear on the use of Pleiades’ data for large scale textural analysis

References:


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