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Context

- **Only partial knowledge of Mayotte's agricultural land use**
Agriculture based on associated crops, orchards, and agroforestry
Very small farms (<0,5ha) } ➔ **very heterogeneous plots**
➔ **complex landscape**
- **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**



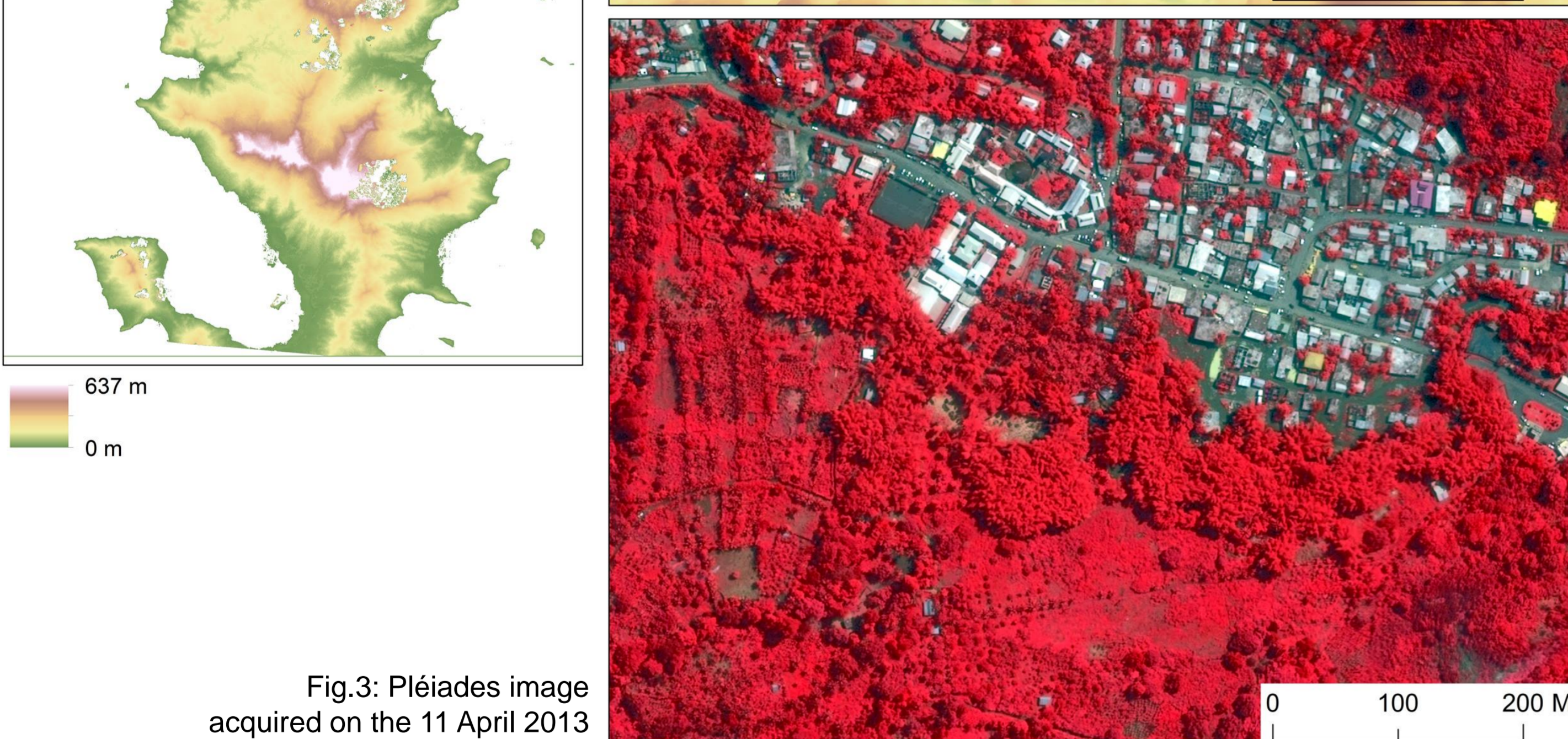
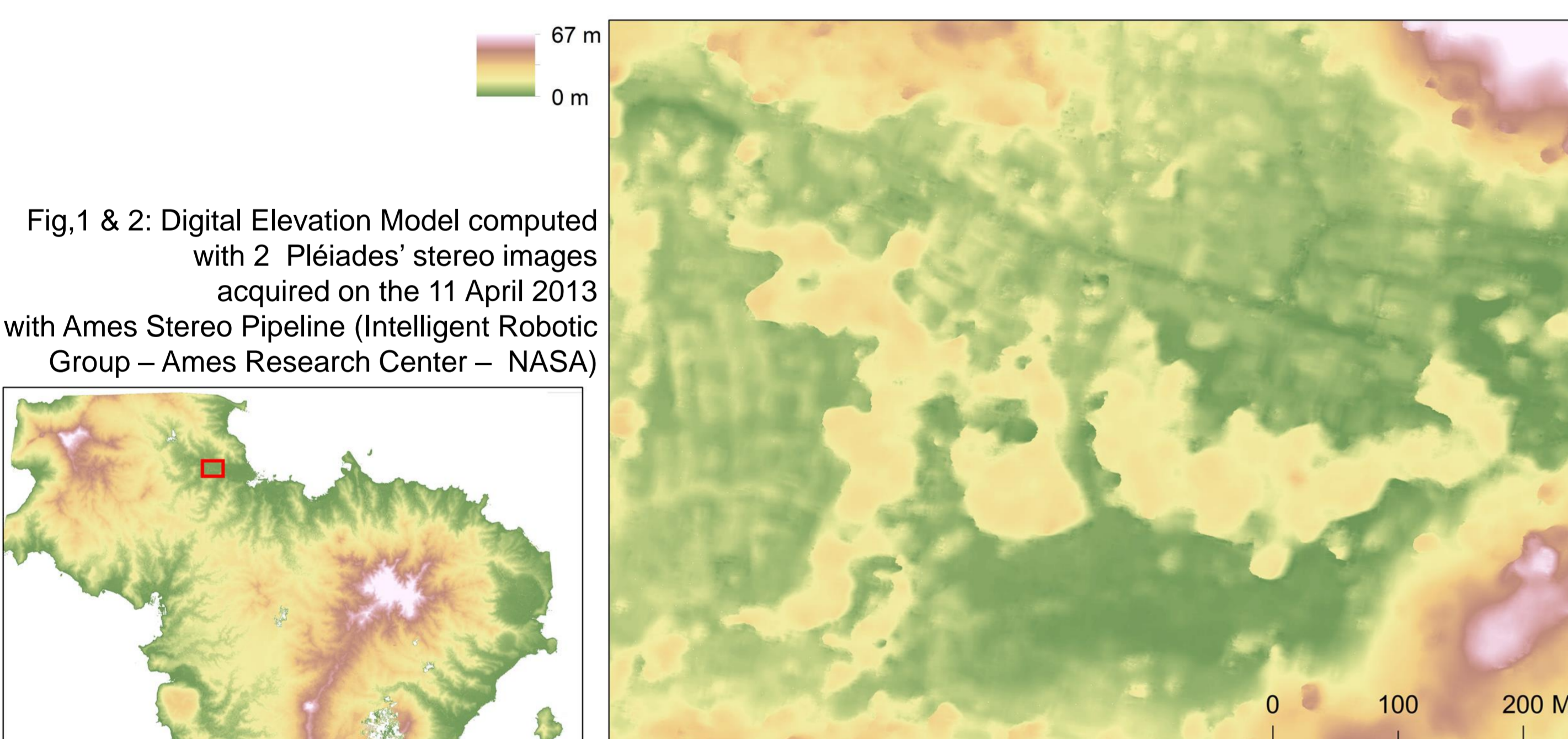
➔ **Is Pléiades' VHSR images acquired in Tri-stereo mode a relevant tool for the characterization of Mayotte's production systems?**



Objectives

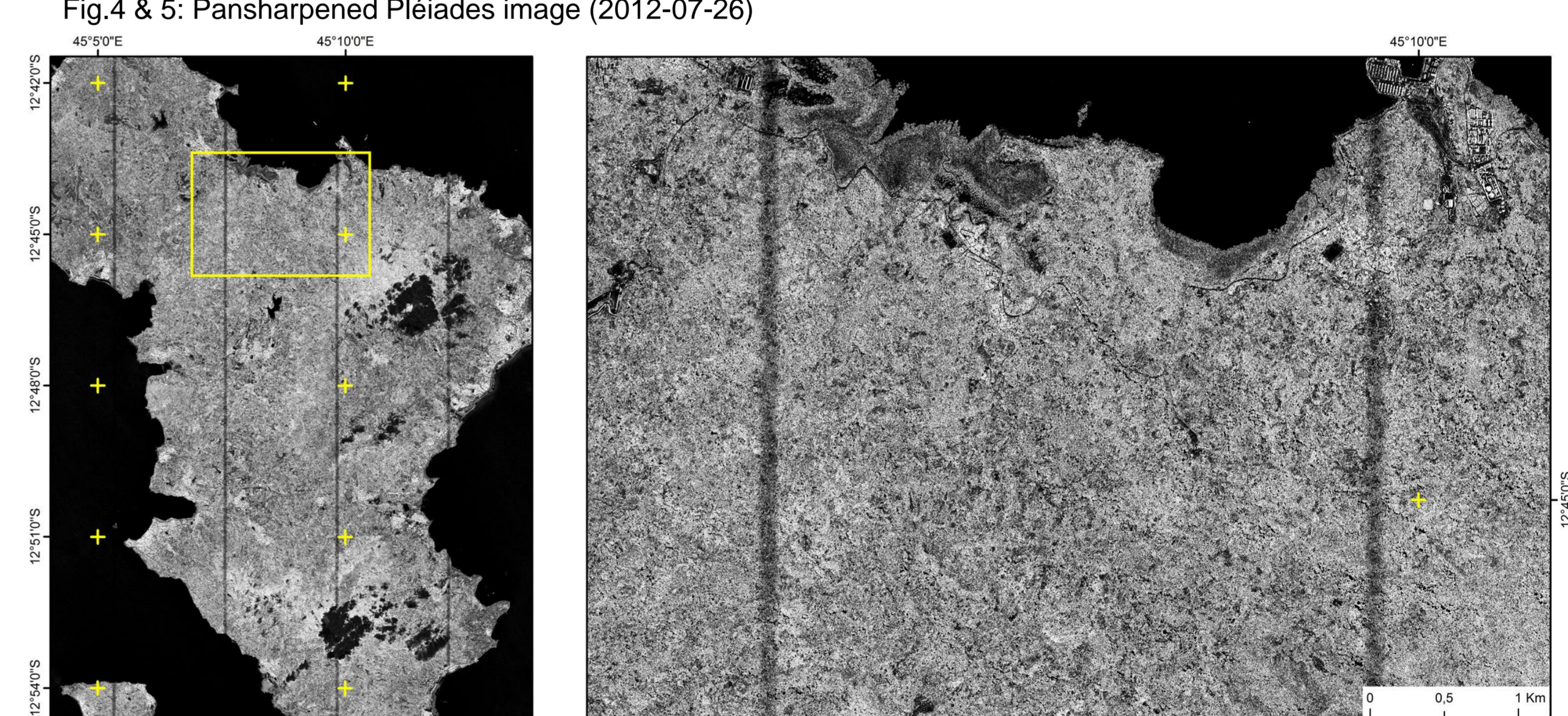
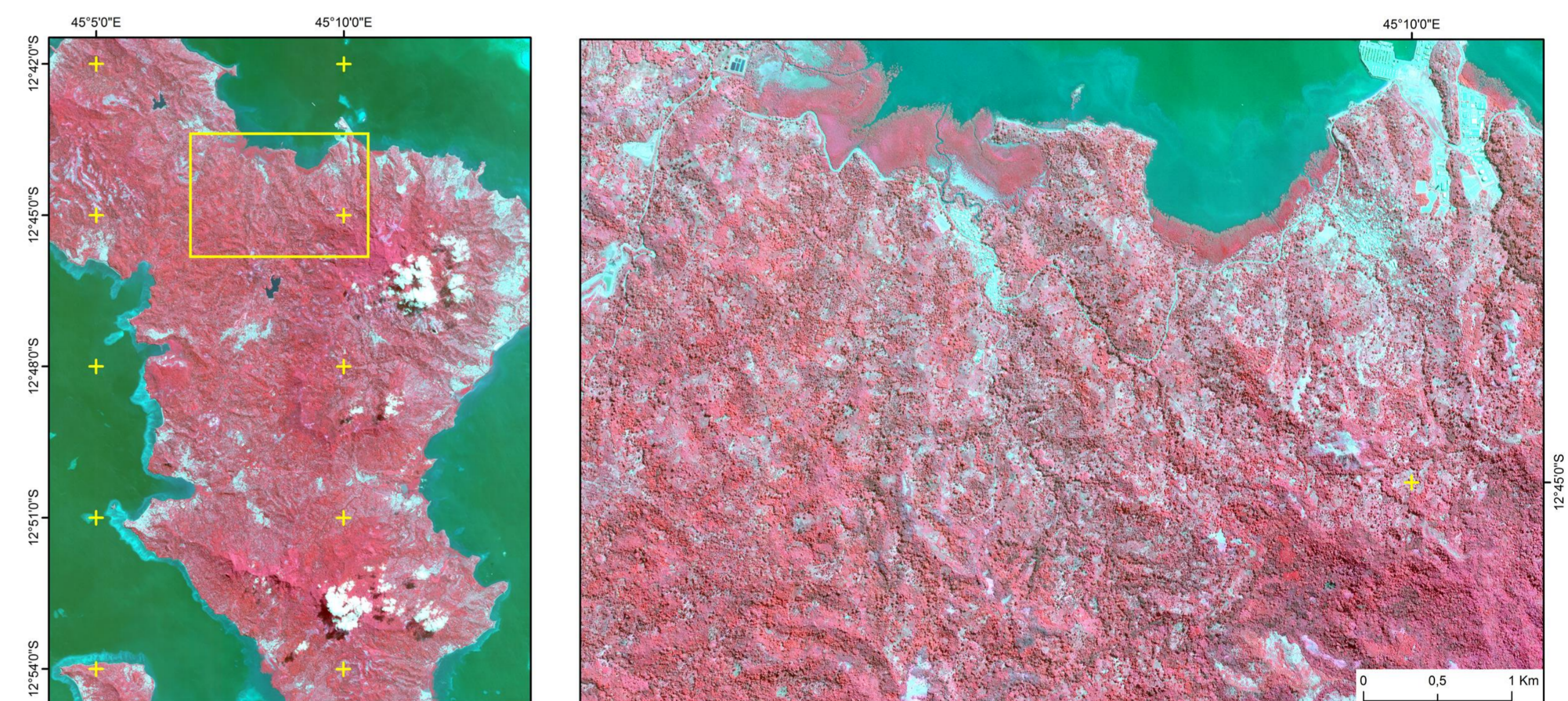
- **Pléiades' tri-stereo images analysis and computing, to derive tree heights**
 - Tuning of the DEM production method for 3-stereo data
 - Evaluation of the produced DEM
 - Feasibility study of a DTM derivation from the data to produce a DSM
- **Pléiades' mono- & tri-stereo images textural analysis, 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 objected 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
- } **work under progress!**

References:

Dupuy, S., Lainé, G., Tassin, J. and Sarrailh, J.-M., 2013. Characterization of the horizontal structure of the tropical forest canopy using object-based LiDAR and multispectral image analysis. International Journal of Applied Earth Observation and Geoinformation, 25(0), 76-86.
Dupuy, S., Lainé, G. and Tormos, T., 2012. OBIA for combining LiDAR and multispectral data to characterize forested areas and land cover in a tropical region. Proc. International conference on geographic object-based image analysis, 4. (GEOBIA), Rio de Janeiro, May 7-9, 279-285.
Lainé, G., Dupuy, S., Tassin, J. and Sarrailh, J. M., 2010. Etude de la Typologie Forestière de Mayotte. Agrifor Consult - Cirad, Montpellier, France, pp. 220.