THE TERRESTRIALISATION TRENDS OF STRESSED MANGROVE FORESTS USING SATELLITE IMAGES CLASSIFICATION: STUDY CASE FOR CUBATÃO, SÃO PAULO STATE - BRAZIL

Flandroy Julien[1], Marília Cunha-Lignon[1,2], Ricardo Menghini[2], Milton Kampel[3] and Farid Dahdouh-Guebas[1,4]

[1] Complexity & Dynamics of Tropical Systems, Université Libre de Bruxelles (ULB), Avenue Franklin D. Roosevelt, 50, 1050, Brussels, Belgium
E-mails: jflandro@ulb.ac.be , marilia.cunha@ulb.ac.be, fdahdouh@ulb.ac.be

[2] Instituto BiomaBrasil, Rua Laboriosa, 80, 05434-060, São Paulo – SP – Brazil,
E-mails:marilia.cunha@biomabrasil.org, ricardo.menghini@biomabrasil.org

[3] Instituto Nacional de Pesquisas Espaciais (INPE), Av. dos Astronautas, 1.758, 12227-010 São José dos Campos – SP Brazil
E-mails: milton@dsr.inpe.br

[4] Mangrove Management Group, Plant Biology and Nature Management, Vrije Universiteit Brussel (VUB), Pleinlaan, 2, 1050, Brussels, Belgium

Most of the world's population inhabits the coastal region and human pressure is reducing mangrove areas around the globe. Mangroves are amongst the most threatened ecosystems, subjected to pollution, overexploitation and land conversion. The documentation and study of the response of mangroves to human pressure is still incomplete and sometimes controversial. Activities like urbanization can produce an irreversible ecologic degradation. This paper presents the importance to investigate the terrestrialisation trends of stressed mangrove forests using satellite images classification. Landsat images were used to classified mangrove in the area of Cubatão, São Paulo State – Brazil. For a satellite image of the year 2008 different segmentation processes and classifications (supervised and unsupervised) were done with SPRING GIS (Georeferenced Information Processing System - INPE, version 5.0.4). Supervised classification like Batthacharya occurred to be the best in this case. It is still difficult to do a supervised classification if the study area is not well known. In order to improve this classification; ground truthing was realized in the study area, totalizing 30 hours of navigation into and around the estuary. The 51 places where there were doubts for the classification of the 2008 image were visited. For the different places we took GPS coordinates and some pictures, including views of soil, canopy and general aspects of the forest. A visual description of the vegetation was done as well in order to characterize mangrove forests, Atlantic forests and *restinga* vegetation. These data were used to correct the classification. The stressed mangrove forests studied had trends to terrestrialisation, and patches of typical mangrove vegetation - *Rhizophora mangle* (L.)*, Laguncularia racemosa* (L.) Gaert. and *Avicennia schaueriana* (Stapf and Leechman) - and associated species (*Acrostichum aureum* L.*, Hibiscus pernambucensis* Arruda and others species) were registered. This study will point out the importance to investigate stressed mangrove forests and their trends to terrestrialisation using satellite images classifications. Ground truth methods cannot be neglected to understand the real environmental conditions. The produced maps are important tools for the conservation and management of natural resources of the coastal zone.