

“Mangrove Maps”

Synthetic Aperture Radar (SAR) data from the ERS sensors has been used in DIVERSITY to detect changes in the extent of mangrove areas for two sites (coast of Belize / Mexico and Térraba Sierpe, Costa Rica) between the mid 1990ies and 2007. Therefore two mangrove maps showing the extent (one for the mid 1990ies and one for 2007) were generated for each site and the changes that occurred within this period were derived by using the status maps as input.

Changes in the extent of the mangrove areas between both dates were calculated. In both regions a decrease of mangrove areas in the order of 13% was observed.

The ability to penetrate clouds makes RADAR a unique tool for the observation of land cover change processes in regions which have a persistent cloud cover during most of the time, like the region of the demonstration sites.

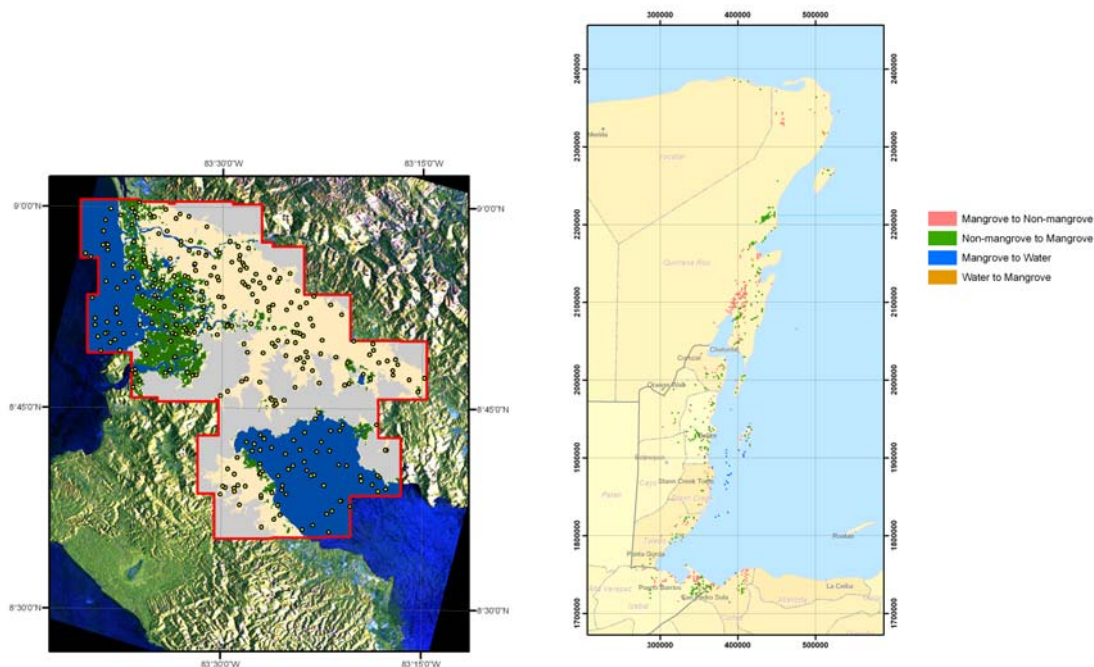


Figure 1: Mangrove extent (with validation samples) in Terra-Sierpe / Costa Rica (left) and mangrove change areas along the Caribbean coast of Belize/Mexico

During the production for each of the mangrove maps three to four individual ERS SAR images were used as input for the detection and identification of mangrove forests. The processing of the multi-temporal SAR images resulted in three different layers of information which allowed a precise mapping of mangrove areas:

- 1) The *average brightness layer* represents mean intensity values received by the radar sensor.
- 2) The *temporal variability of brightness layer* makes it possible to distinguish different land cover classes by means of their changeability over time.
- 3) The *average texture layer* provides further information for discrimination of mangroves from other land cover classes.

As fourth layer, a digital elevation model served as additional information source to discriminate mangrove areas from their surroundings. By putting these four information layers together in composite images, it was possible to map mangrove forests by using the novel object-oriented classification approach.

Changes in mangrove forest extent could then be calculated by using the historic extent and the current extent. For both demonstration sites changes from mangrove to non-mangrove and non-mangrove to mangrove were prevalent.

Changes from mangrove to water can be explained by natural causes, like floods and hurricanes, but also by human influence. The use of mangrove areas for aquaculture is wide-spread in the region and has led to the destruction of significant mangrove areas.



Figure 2: Aquaculture in a mangrove area of the Golfo de Fonseca in Honduras

For further information, please have a look at the Deliverable D10 (Operational Documentation), or contact Stefan Kleeschulte (kleeschulte@geoville.com, Phone: +0043 (0) 512 562021 10).