



SAR response to wetland marshes: combination of satellite observations and models

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Wetlands are areas where the frequent and prolonged presence of water at or near the soil surface drives the natural system. Next to Buenos Aires, the Lower Delta islands of the Parana River constitute a fresh water wetland characterized by a complex mosaic of natural and man made ecosystems and a hydrologic regime defined by the Parana and De la Plata rivers. Junco and Cortadera marshes cover the main portion of this region. Marshes play an important role in driving the dynamics of water level, and constitute an important indicator of the degree of disturbance caused by burnings (natural and/or intentional), flood condition, climate conditions (dry or wet year), and land use (pasture). Therefore, it is important to identify and classify their presence, to estimate their extent and density, and to monitor burning and re-growth processes.

The aim of this paper is to assess the potential of spaceborne radar in the applications indicated above. In the recent years, the Parana area was observed by several satellite instruments, operating both in the optical and in the microwave bands. In particular, signatures collected by SAR systems mounted over ERS, Radarsat and Envisat were analyzed. It was found that a dual polarization C band radar is powerful in identifying marsh extent and classify between different marsh species. It was also found that ERS multitemporal observations are able to monitor burning and re-growth processes. This paper shows these experimental results and interprets them by using an electromagnetic scattering model of vegetated areas. The same model is also used to investigate the improvements in sensitivity which could be acquired by future systems, operating at L band and in full polarimetric mode.