



Mapping water bodies over tropical basins from SMOS L-band brightness temperature

Marie Parrens, Al Bitar Ahmad, Yann H. Kerr, Rémi Côté, Philippe Richaume, Jean-Francois Cretaux, Selma Cherchali, Jean-Pierre Wigneron

► To cite this version:

Marie Parrens, Al Bitar Ahmad, Yann H. Kerr, Rémi Côté, Philippe Richaume, et al.. Mapping water bodies over tropical basins from SMOS L-band brightness temperature. EGU 2015, European Geosciences Union General Assembly, European Geosciences Union (EGU). DEU., Apr 2015, Vienne, Austria. hal-02740165

HAL Id: hal-02740165

<https://hal.inrae.fr/hal-02740165>

Submitted on 2 Jun 2020

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



Mapping water bodies over tropical bassins from SMOS L-band brightness temperature

Marie Parrens (1), Ahmad Al-Bitar (1), Yann Kerr (1), Rémi Cote (1), Philippe Richaume (1), Jean-François Crétau (2), Selma Cherchali (3), and Jean-Pierre Wigneron (4)

(1) Centre d'Études Spatiales de la Biosphère (CESBIO), UMR5126, BPI 2801, 31401 Toulouse Cedex 9, France, (2) LEGOS, UMR 5566, Université de Toulouse III, Toulouse, France, (3) CNES, 18 Avenue Édouard Belin, 31400 Toulouse, France, (4) INRA, UR1263 ISPA, F-33140 Villenave d'Ornon, Centre INRA Bordeaux, Aquitaine, France

Wetlands and land surface waters play a crucial role in the global water and biogeochemical cycles. Since the 80's, remote sensing techniques provide quantitative estimates of open water surfaces over land. They appear to be a valuable tool to monitor natural and anthropogenic evolution of this variable over the globe. A large array of frequencies has been used to retrieve surface water over land: visible, infrared, radar and passive microwave. In this work, the passive microwave L-band acquisitions from Soil Moisture and Ocean Salinity (SMOS) mission are used to retrieve the water fraction. At this frequency, the signal is highly sensitive to surface waters. At L-band, the signal is expected to penetrate deeper in vegetation than signal in other frequency, such as visible and infrared and to some extent C-Band microwave. This asset permits to L-band signal to be more sensitive to open water under dense vegetation. In this study, authors focus on the Amazon and Congo basins. It is shown from a preliminary analysis of multi-angular, full polarized brightness temperature data that the dynamics observed over these study areas are related to the changing water bodies than the change in physical temperature. Based on this conclusion, a simple model had been built to obtain open water maps over the Amazon and Congo basin from SMOS brightness temperature at a coarse spatial resolution (25 km x 25 km) and high temporal frequency (2-days). These maps reveal the potential of L-band to monitor the evolution of open water and inundation over land. This new SMOS product is validated with visible data LandsAT. It is also compared to altimeter data (Jason-2) over the Rio Negro river. It was found that the water fraction estimated by SMOS was highly correlated with water levels measured by Jason-2 ($R > 0.98$). These maps exhibit also a phase shift of three months in the precipitation regime between the South and the North of the Amazon basin.