Geophysical Research Abstracts
Vol. 19, EGU2017-18439, 2017
EGU General Assembly 2017

What do we learn about the impact of extreme hydrological events on tropical wetlands from the synergistic use of altimetry from Sentinel-3/SARAL-Altika and L-Band radiometry from SMOS/SMAP ?

Ahmad Al bitar (1), Marie Parrens (1), Frederic Frappart (2), Rodrigo Cauduro dias de paiva (3), Fabrice Papa (4), and Yann Kerr (1)

(1) CESBIO, Université de Toulouse, Toulouse, France (ahmad.albitar@cesbio.cnes.fr), (2) LEGOS, Université de Toulouse, Toulouse, France, (3) Instituto de Pesquisas Hidráulicas - Institute of Hydraulic Research - IPH/UFRGS CEP 91501-970, Av. Bento Gonçalves 9500, Porto Alegre, Brasil, (4) IRD 44, boulevard de Dunkerque CS 90009. F-13572 Marseille Cedex 02

What do we learn about the impact of extreme hydrological events on tropical wetlands from the synergistic use of altimetry from Sentinel-3/SARAL-Altika and L-Band radiometry from SMOS/SMAP ?
The question of the contribution of the tropical basins to the carbon and water cycle remains an open question in the science community. The tropical basins are highly impact by the wetlands dynamics but the also the link with extreme events like El-Nino are yet to be clarified. The main reason to this uncertainty is that the monitoring of inland water surfaces via remote sensing over tropical areas is a difficult task because of impact of vegetation and cloud cover. The most common solution is to use microwave remote sensing. In this study we combine the use of L-band microwave brightness temperatures and altimetric data from SARAL/ALTIKA and Sentinel-3 to derive water storage maps at relatively high (7days) temporal frequency. This study concerns the Amazon and Congo basin. The water fraction in inland are estimated by inversing a first order radiative model is used to derive surface water over land from the brightness temperature measured by ESA SMOS and SMAP mission at coarse resolution (25 km x 25 km) and 7-days frequency. The product is compared to the static land cover map such as ESA CCI and the International Geosphere-Biosphere Program (IGBP) and also dynamic maps from GIEMS and SWAPS products. Water storage is then obtained by combining the altimetric data from SARAL/ALTIKA and Sentinel-3 to the water surface fraction using an hypsometric approach. The water surfaces and water storage products are then compared to precipitation data from GPM TRMM datasets and river discharge data from field data. The amplitudes and time shifts of the signals is compared based on the sub-basin definition from Hydroshed database. The dataset is then divided into years of strong and weak El-Nino signal and the anomaly is between the two dataset is compared. The results show a strong influence of EL-Nino on the time shift of the different components showing that the hydrological regime of wetlands is highly impacted by these extreme events with a differentiated impact when compared to precipitation. Since the wetlands have particular impacts on the dynamics of the water and carbon cycle of the tropical basins, the results suggest that the current approach using future more accurate SWOT mission data can help better understand the physical processes in these basins.