

REMOTE SENSING OF MANGROVES



TO ANTICIPATE CHANGES

ON THE GUIANAS COAST

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3rd PROGYSAT Workshop, Session 'Earth Observation and Application', 26-30 June 2023

Long-term partnerships with



The Amapá-Guianas coast



- The world's longest muddy coast (1500 km): longshore redistribution of Amazonian sediments
- Drift of giant mudbanks: dominant macroscale geological controls
- Leading to considerable ecological and socio-economic impacts.

MANGROVES VERSUS CLIMATE CHANGE IN THE NORTH ATLANTIC ?

Mudbanks drift along the Guianas coast

Surinam

Guyana

French Guiana

Cape Orange

Brazil (Amapá)

Giant mudbanks



Spreading mangrove



Mangrove-based ecosystem



Diversity of plant forms and coastal environments



Diversity of habitats



Erosion may rage during inter-bank phases



Erosion impacts on mangroves



Erosion impacts on human infrastructures



But mangrove recover on new mudbanks



At the forefront of changes in the North Atlantic

Decadal wave regimes influenced by the NAO

Journal of Biogeography (J. Biogeogr.) (2015) 42, 2209-2219



Fluctuations in the extent of mangroves driven by multi-decadal changes in North Atlantic waves

Romain Walcker^{1,2}*, Edward Jamal Anthony³, Christophe Cassou⁴, Robert Curwood Aller⁵, Antoine Gardel⁶, Christophe Proisy⁷, Jean-Michel Martinez⁸ and François Fromard^{1,2}

Wave swells caused by extreme climatic events can reach the Guianas



El Niño (persistent drought) and La Niña (persistent flooding) ?

- 1. Mortality of mangrove forests
- 2. Indirect effects (insect infestation and defoliation)





Towards a regional mangrove observatory



Explaining coastal vulnerability through multiscale modelling



Seasonal coastal vulnerability to erosion by waves



Anticipating regional coastal vulnerability with mangroves



Ad hoc satellite-based methods now scientifically ~operational

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https://doi.org/10.1016/j.margeo.2019.106048

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Brunier et al. (2019). Exceptional rates and mechanisms of muddy shoreline retreat following mangrove removal. https://doi.org/10.1002/esp.4593 Proisy et al. (2016). A multiscale simulation approach for linking mangrove dynamics to coastal processes using remote sensing observations. <u>https://doi.org/10.2112/SI75-163.1</u>

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Proisy et al. (2016). Mangrove forest dynamics using very high spatial resolution optical remote sensing. http://dx.doi.org/10.1016/B978-1-78548-160-4.50007-8

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Mudbanks