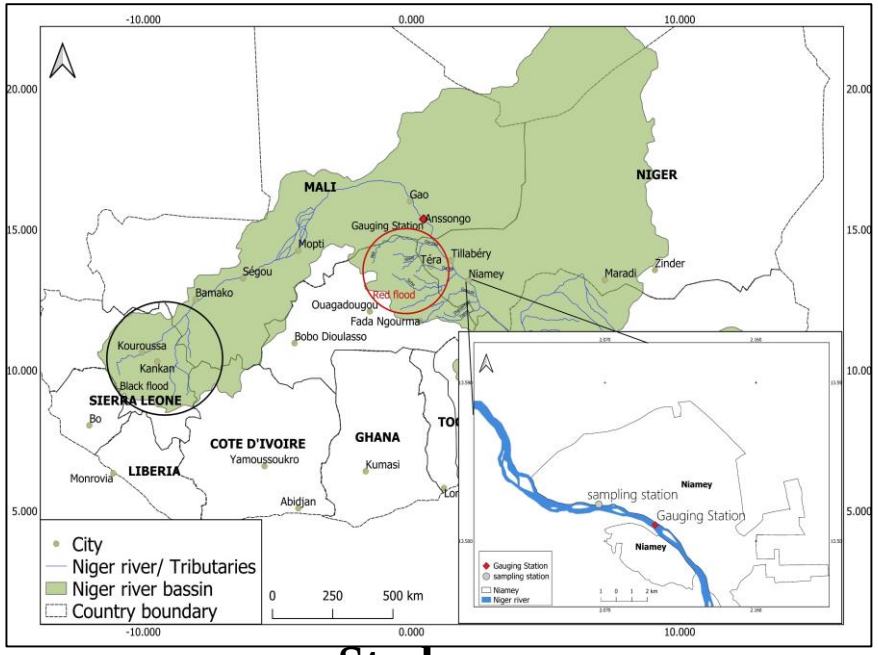
« Hydrological variability and suspended particulate matter in the middle river Niger basin »

Boubacar Moussa, M.[1,2], Abdourhamane Touré, A.[2], Lartiges, B.[1], Rochelle Newall, E.[3], Kergoat, L.[1], Robert, E.[4], Gosset, M.[1], Alkali Tanimoun, B.[5], et Grippa , M[1].

[1]Géoscience Environnement Toulouse (GET) UMR 5563 CNRS
[2]Université Abdou Moumouni, Département des Sciences de la Terre,Niamey/Niger
[3]Sorbonne Université - Faculté de Sciences - iEES Paris, place Jussieu 75252 PARIS cedex 05
[4]LETG - UMR 6554, Université de Nantes, BP 81227, 44312 Nabtes CEDEX 3
[5]Autorité du Bassin du Niger (ABN), BP.729, Niamey, République du Niger

EGU General Assembly 2021
HS9.1 session



Middle Niger river basin

2 floods regimes

Study area

Objectives

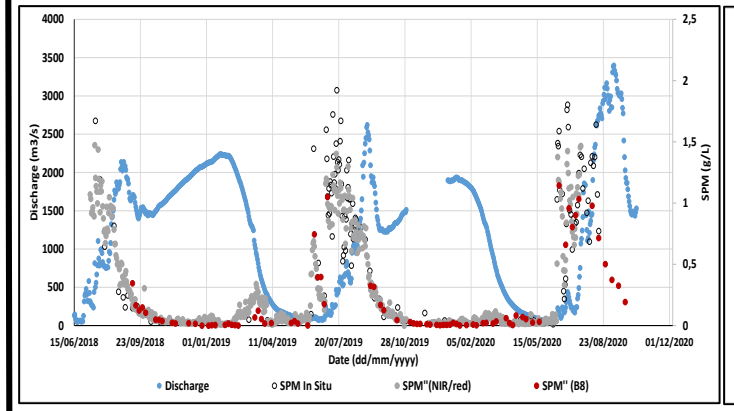
- Characterize the SPM (quantity and quality) according to the hydrological cycle
- Analyse the relationships between in situ SPM measurements and those deduced from radiometric data to validate remote sensing approaches

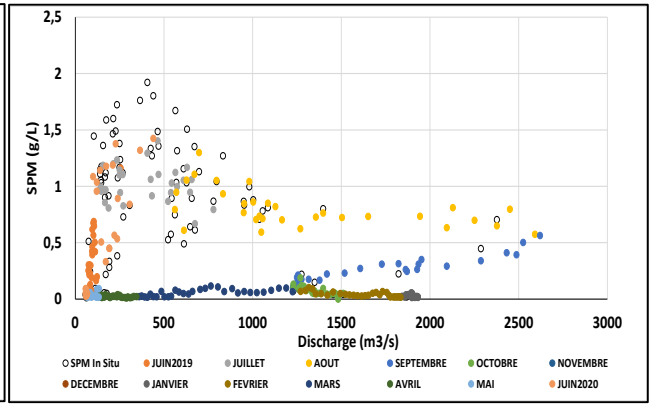
Reference:

Boubacar Moussa, M. et al. Hydrological variability and suspended particulate matter in the middle river Niger basin, 2021 (in preparation)

Results

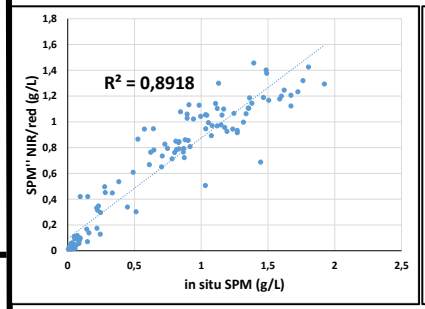
Relationship between SPM and discharge

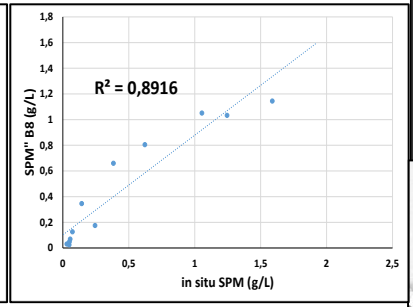


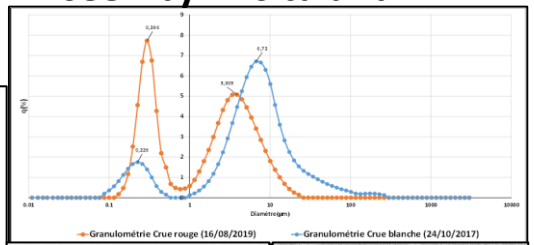


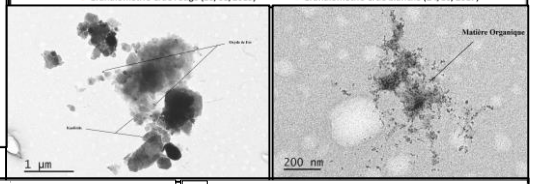
SPM and discharge show a complex relationship: a rapid increase of SPM at the begining of the rainy season (june-july) while discharge is still low, followed by a stabilisation at high SPM values during the red flood and then a decrease that goes on also during the second discharge peak (black flood).

Relations between optical reflectances and SPM seen by in-situ and satellite radiometers









Remote sensing (Sentinel2) and in-situ (SKYE) réflectances in the red and NIR bands are well correlated to in-situ SPM.
Sentinel 2 allows to monitor the SPM spatio-tempral variability in the Niger river and over the major tributaries (the Sirba tributarie).
Suspended particules are found to be koalinic and iron oxyde of very small size (main volumetric modes at around 200nm and 4 µm during the red flood and 200nm and 6 µm during the black flood).