INTERNATIONAL CONFERENCE

Groundwater, key to the Sustainable Development Goals

May 18-20, 2022 - Paris / FRANCE

2. Groundwater contribution to the various SDG targets.
2.c. How to reach universal coverage in drinking water – SDG6.1 – in **Africa hard rock/basement rocks areas**?

Hydrodynamic characterization of basement aquifers productivity at Bagoue area (North of Côte d'Ivoire)

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SPEECH PROGRESSION

Step 1

- Presentation of study area with water supply problems

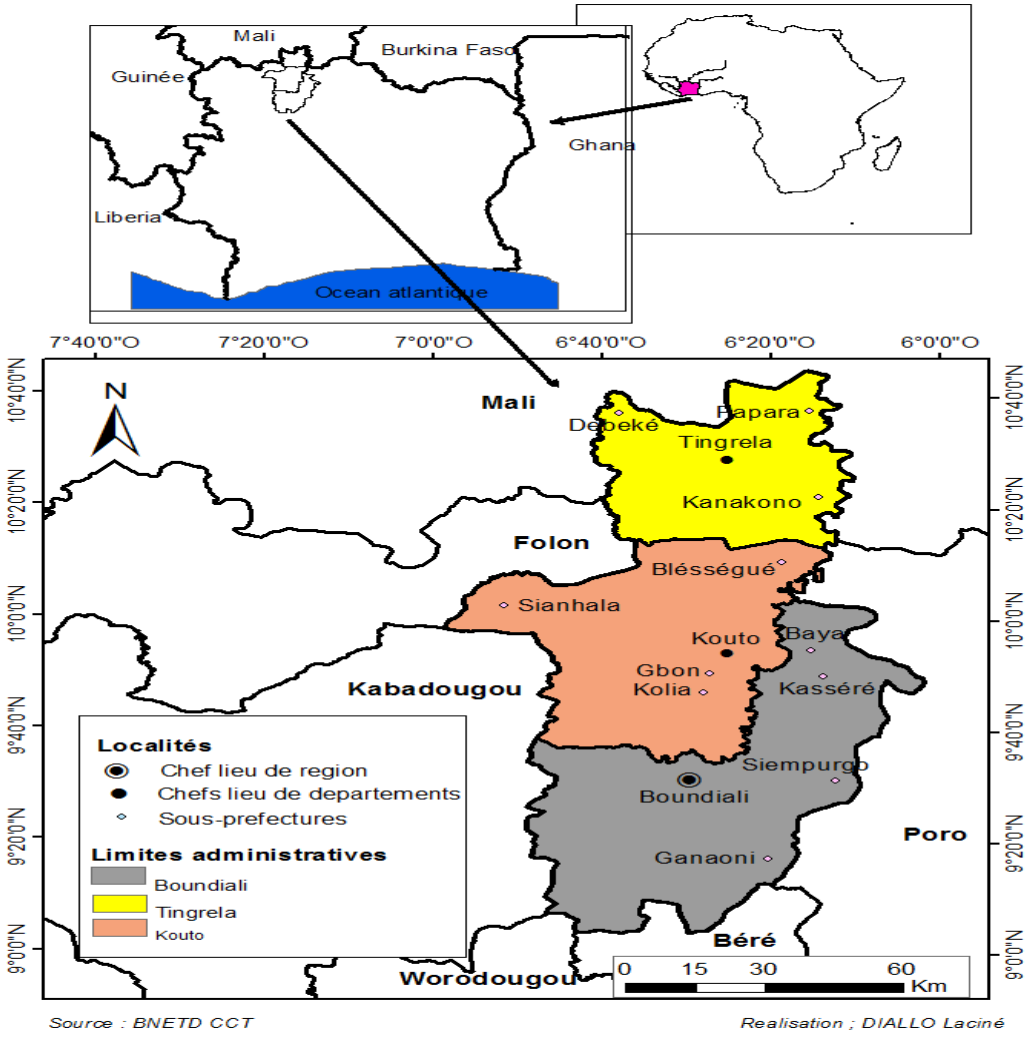
Step 2

- Research question
- Material and methods

Step 3

- Outcomes and their discussion
- Conclusion and futurecomes

Presentation of study area



Geographical location of Bagoue region

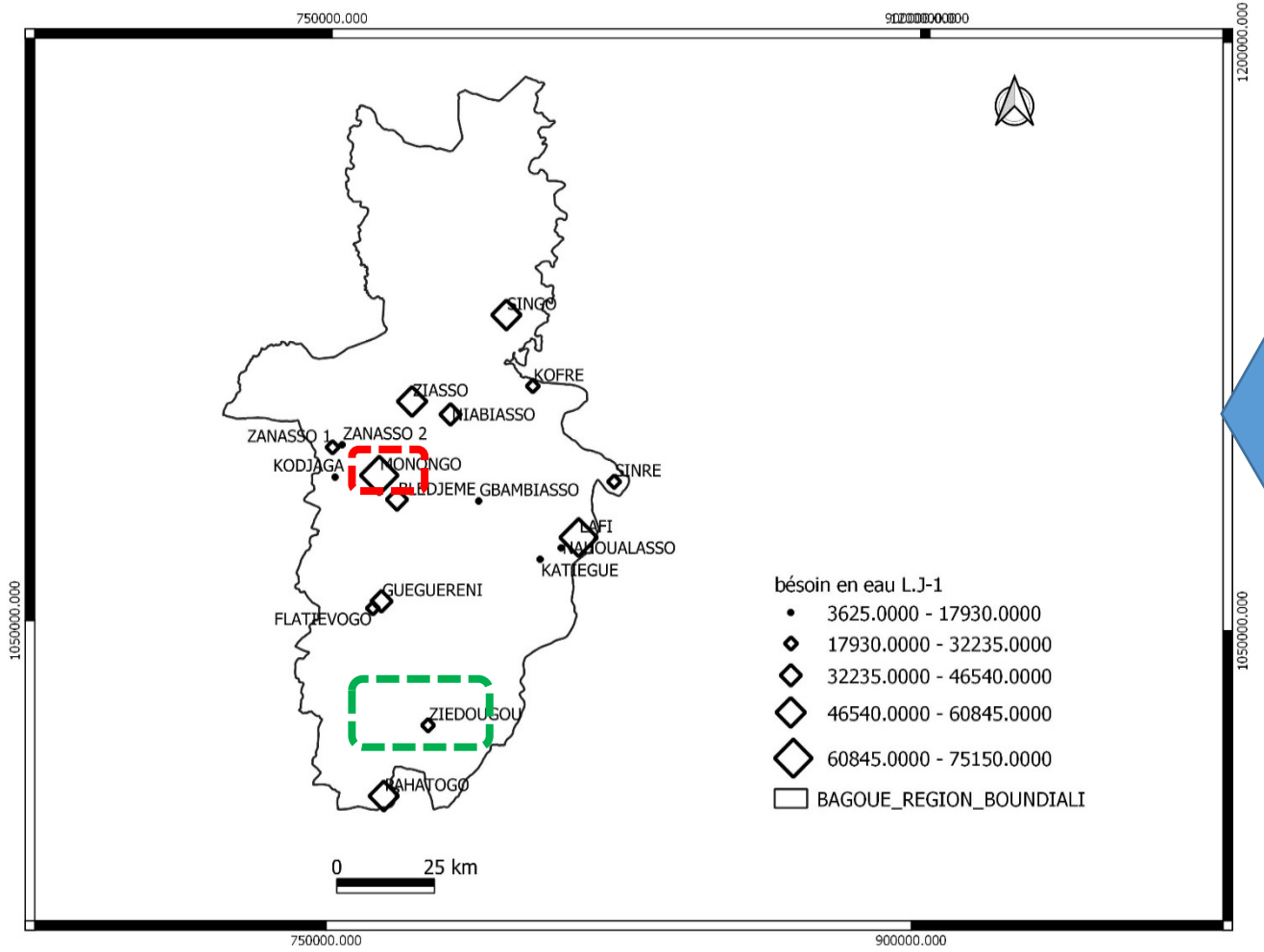
- **10,668 Km² ;**
- **153,220 hbts**
- **Tengrela, Kouto, Boundiali**

- **96 boreholes with pump including 46% not active (2020)**

- **58% of water accessibility at Boundiali (onu-habitat, 2012)**

21% public, 17% private wells.

water needs and Research question



Research question :

How hydrodynamic characteristics of basement aquifer can contribute to reach the best coverage of water needs?

Map of water needs at Bagoué region (ONU-habitat, 2012)

MAIN OBJECTIVE

- ✓ **Assessment of groundwater productivity from aquifers and boreholes for getting the best indicator of groundwater sustainable managment**

Specifics goals

- ➢ **Identify differents types of aquifers**
- ➢ **Evaluate hydrodynamic properties of basement aquifer,**
- ➢ **Estimate spreading of aquifers productivity**

MATERIAL AND METHODS

1- Identification of basement aquifers types

- **Use of log of borehole report to draw stratigraphy of underground**
  - **GW localised into weathered, fissured or deep fractured aquifer**

2- Evaluation of aquifer hydrodynamical properties

- **Use of pumping test data report and OUAIP version 1.9 software**
  - **values of critical yield of borehole pump to use,**
  - **values of aquifer transmissivity, specific yield and storage**

3- Estimation of spreading of aquifers productivity parameters

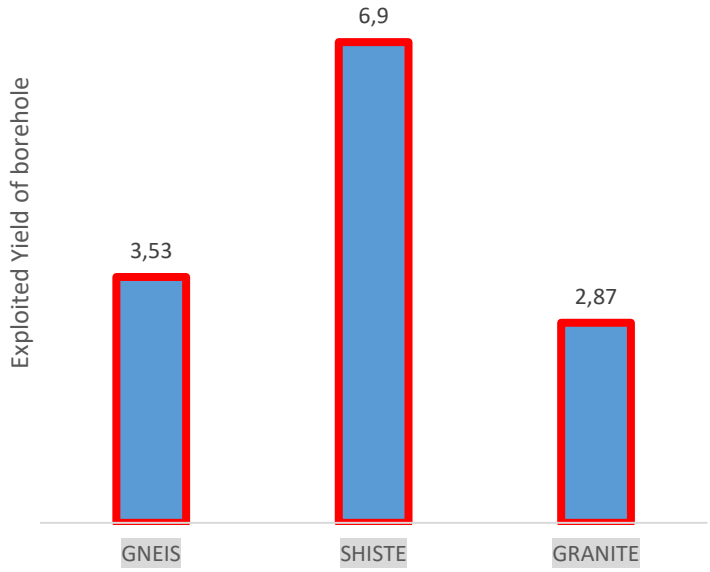
- **Geostatistical analysis by using surfer version 16.1**
  - **which model can fit spatial spreading ? What it's range & kriging?**

OUTCOMES-1

Distribution of aquifers identified (Types, Kind of groundwater and petrology)

Types of AQUIFERS	NUMBER	PERCENTAGE
Weathered materials	10	**55,54**
Fissured layer	6	38,88
Deep fractured	2	5,58
Sum	18	100

Kind of Groundwater	Number	Percentage
unconfined GW	7	38,88
Confined GW	11	**61,12**
Sum	18	100



OUTCOMES-2

hydrodynamic properties and hydraulical characteristics values

Hydrodynamic properties of aquifers

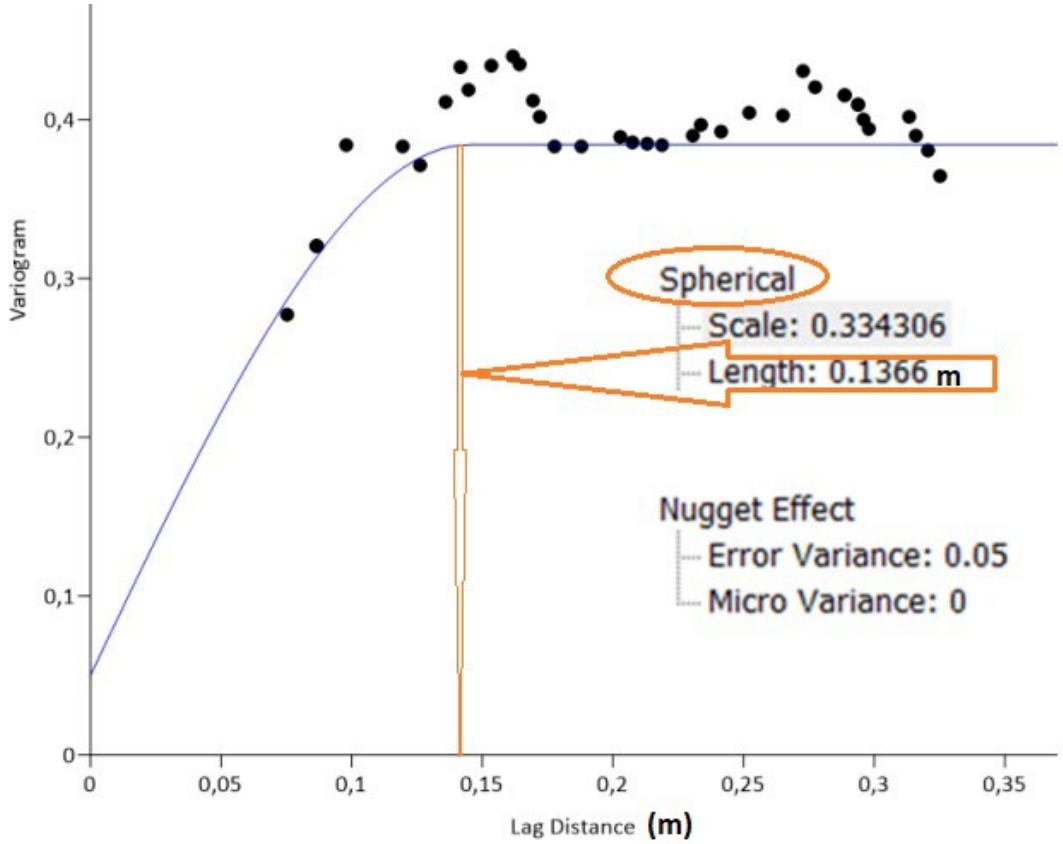
	Average	Standard deviation	Minimum	Maximum	Number
Transmissivity T (m^2/h)	**7.10^{-6}**	9.10^{-6}	1.10^{-6}	4.10^{-5}	18
Specific Yield Q/s (m^2/h)	**4.34**	5.31	0.34	23.07	18

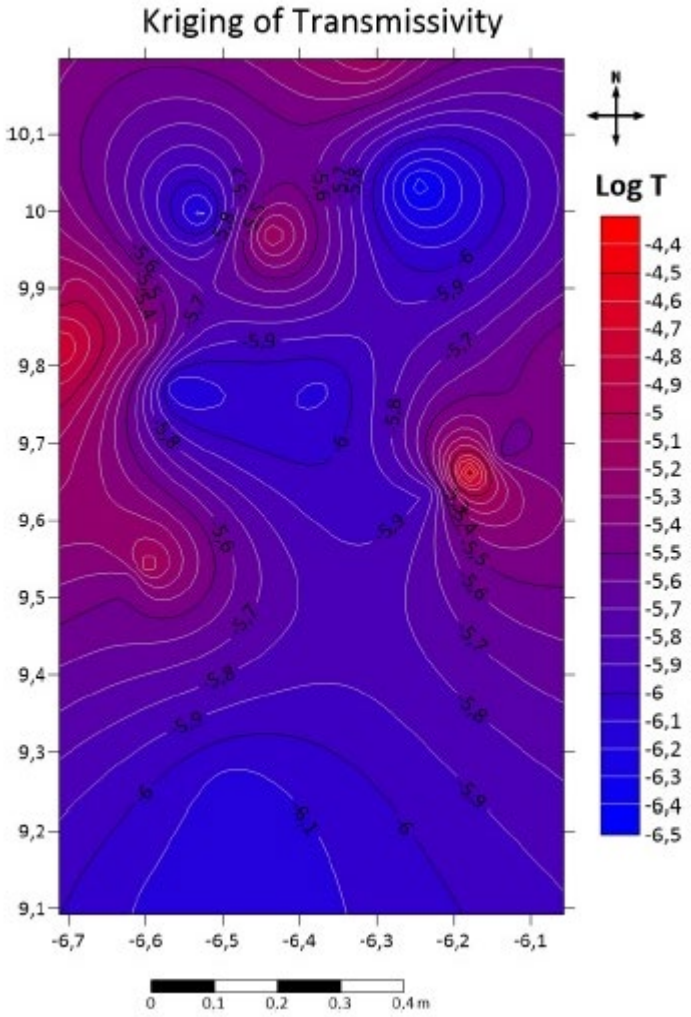
hydraulic characteristics of boreholes

Critical Yield Qcr (m^3/h)	**6.95**	4.98	2.11	18.8	18
Exploited pump yield Q exp (m^3/h)	**3.44**	3.09	0.5	12	18
Drilled depth (m)	**49.2**	7.15	40	65	18
Static level (m)	**30.2**	9.97	17	55	18

Outcome-3a

Variogram and Kriging of Transmissivity

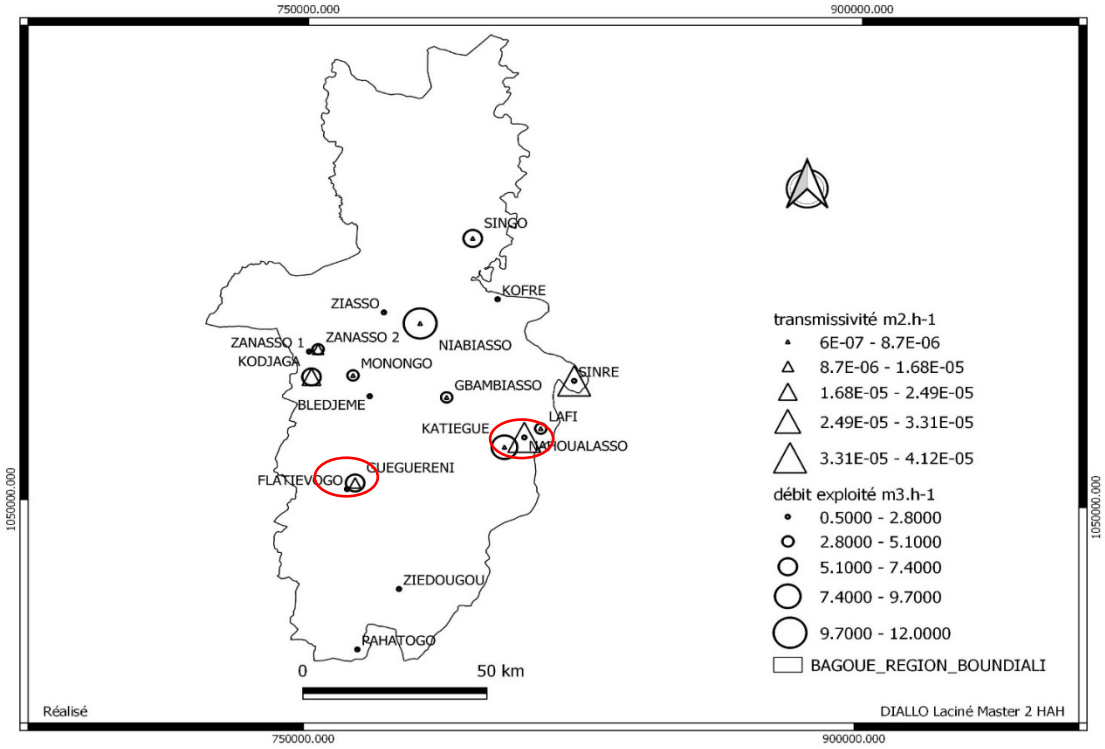


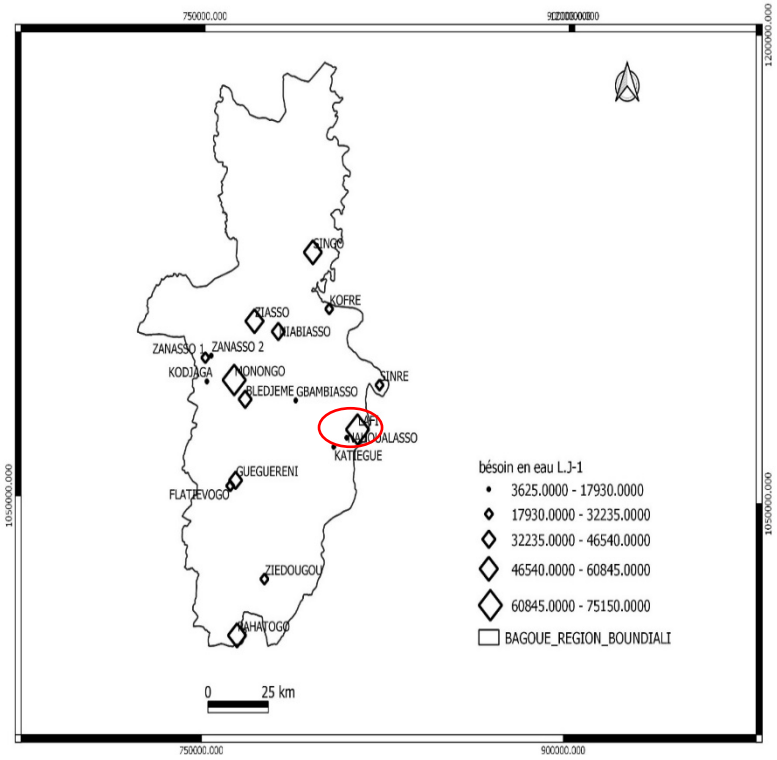


- spreading of Transmissivity adjusted **spherical model** with range value reached **0.1366 m**

Outcomes-3b

Prediction from comparison of Q delivered, Transmissivity and Water needs





- ❖ T+ Q + W+
- ❖ T- Q- W-
- ❖ T+ Q+ W-
- ❖ T- Q- W+
- ❖ T- Q+ W+
- ❖ T+ Q- W-

- ➢ **Little localities are runing under best sustainable management of groundwater.**
- ➢ **Most of Q delivered by BH linked W needs than Transmissivity. SDG 6.1 can not reached**

CONCLUSION

- This study contributed to get **a better knowledge about different types of aquifer as well as hydrodynamic properties values of basement aquifers** (transmissivity and specific yield) **and secure characteristics of hydraulic pump** (critical yield)**.**

Findings from comparative analysis of the hydrodynamic characteristics of underground and the flow delivered by boreholes allow **an acceptable productivity** in rural areas**.** However, it is now possible to propose **indicators of sustainable groundwater management** in that region.

FUTURECOMES

- **we plan to start the modeling of groundwater flow and potential contaminant from industry or agriculture or human activities with negative impacts on drinking water supply.**

THANK for your attention!

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