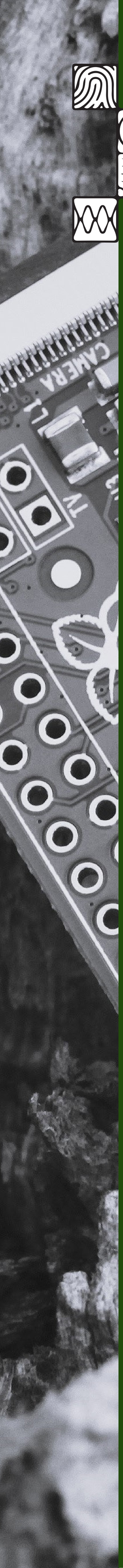

TERRA FORMA

CONCEVOIR ET TESTER LES OBSERVATOIRES DE L'ANTHROPOCENE

ENHANCING OBSERVATORIES WITH FOG COMPUTING

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OBJECTIVES

- Define the current state of practice in environmental monitoring systems used by observatories.
- Underline the challenges and common requirements for future systems.
- Highlight the potendtial of fog computing in observatories.

METHODOLOGY

We conducted a survey with observatories affiliated with :

- OZCAR
- Réseau Zone Atelier

25	**5**	**4**
OZCAR	Rézeau Zone Atelier	TERENO, ANAEE, ...
5	**63%**	**6**
Countries	Full responses	Interviews

CURRENT PRACTICES

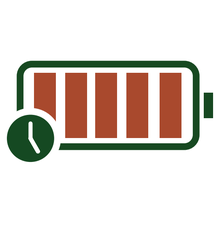
And two types of observatories:

- Event-oriented observatories representing **54%** of the surveyed observatories
- Long-term oriented observatories representing **46%** of the surveyed observatories

The survey identified two distinct data logging techniques:

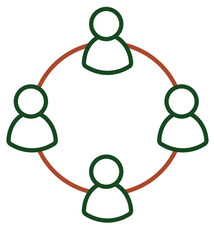
- Manual data logging
- Wireless data logging

Advantages Of Current Systems



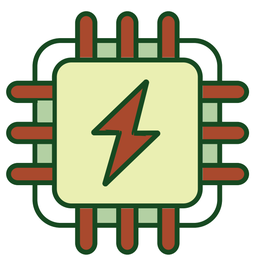
Adapted to power constraints

Durable and tested hardware

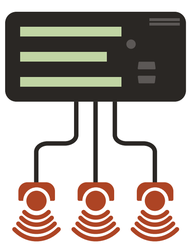


Widely recognized in the community

Drawbacks Of Current Systems



Insufficient processing power

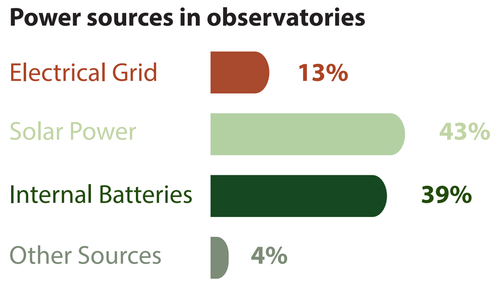


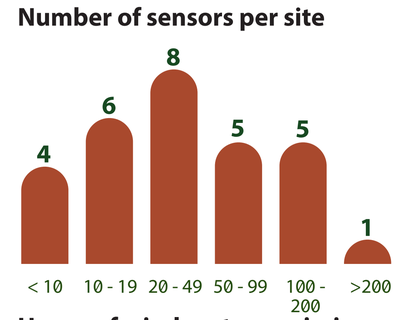
Local view of data

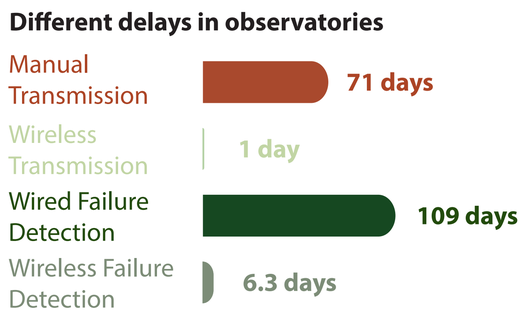
Limited visibility into hardware status

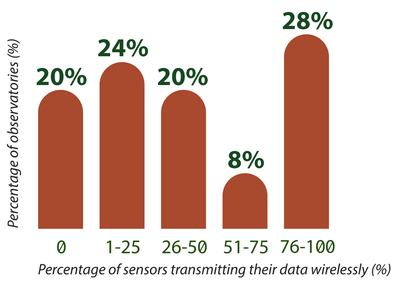
Site internet de TERRA FORMA

anr









COMMON SYSTEM CHARACTERISTICS

Event Detection and Prediction

Utilizing both in situ and external data to detect specific events and forecast them in advance.

Event Response

Updating the environmental monitoring system based on the prediction or detection of an event.

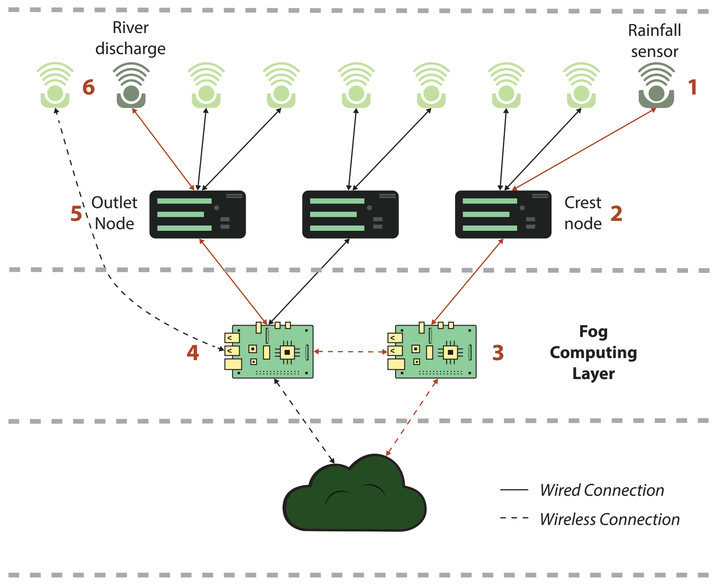
System Health Monitoring

Ensuring the earliest possible detection of any hardware failures within the system.

Real Time data Transmission

Enabling the transmission of data in near real-time as needed.

POTENTIAL OF FOG IN OBSERVATORIES



1. Detection of rain

2. Collection of data from the rainfall sensor

3. A model combines the data from the sensor with external data to detect a rain event

4. Another model is alerted of the event and orders a response

5. Transmits the order to the sensor

6. Starts taking measurments

	Global View Over Data	Remote Control Of Hardware	Integration of External Data
With Fog Computing	✓	✓	✓
Without Fog Computing	✗	✗	✗

CONCLUSION

Observatories' data are strategic. Integrating fog computing into environmental monitoring systems could significantly enhance processing capabilities and provide a comprehensive view of in situ data globally. These key improvements would support the development of essential functionalities. Special attention must be given to the unique challenges in observatories, such as limited energy and connectivity.