

Wireless sensor networks to assess the impacts of global change in Sierra Nevada (Spain) mountains

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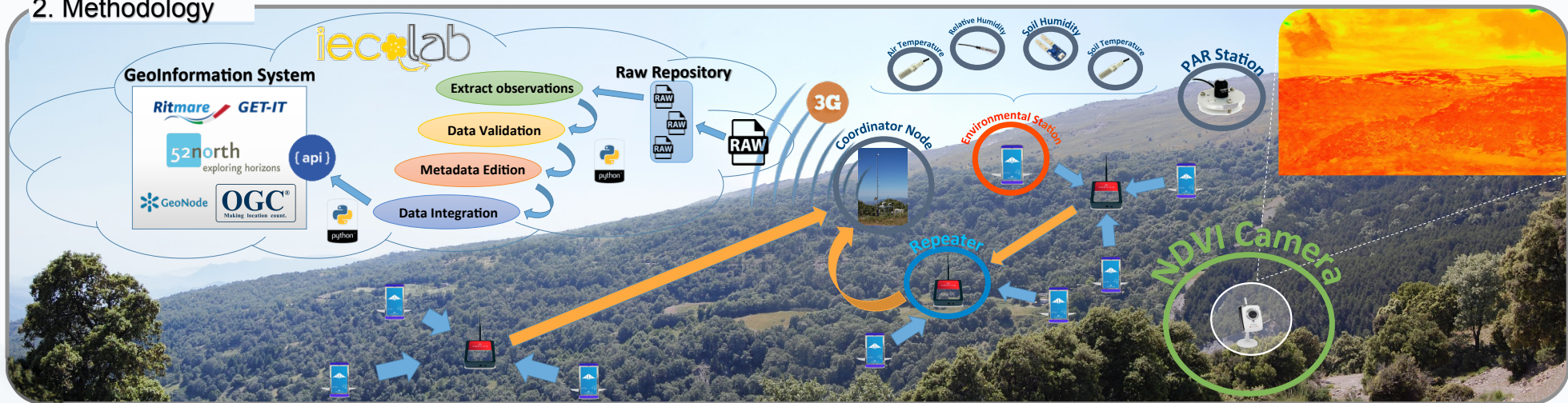


1. Introduction, objectives and study area

Sierra Nevada Global Change Observatory is a long term monitoring program research infrastructure aiming to assess the effects of global change in Sierra Nevada LTER platform. To this end, a monitoring program has been implemented based on the collection of long time series on a multitude of biophysical variables. This contribution describes the design and management of a sensor network that is intended to monitor several biophysical variables with high temporal and spatial resolution in Quercus pyrenaica forests located in this mountain region. Specifically the described sensor network is being used to assess changes in the ecosystem provoked by several managerial activities carried out in the area. The underlying hypothesis is that these management actions will promote the regeneration of Q. pyrenaica stands as well as to increase their resilience to face up global change. Our wireless sensor network will help to validate this hypothesis.



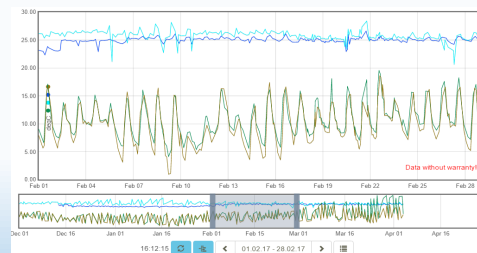
2. Methodology



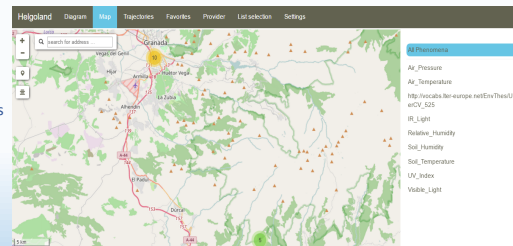
3. Results

- We summarize some **preliminary results**:
- The monitored surface reaches one square kilometer
- 10 environmental stations provide remote data daily
- 40 environmental stations and 2 ndvi cameras are ready to be deployed
- All monitoring systems exposed are powered by solar energy

- Regarding to the **Geoinformation system**:
- Follows OGC standards
- Other LTER sites are plug in via API
- Provides data persistence and data visualisation tools



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4. Acknowledgments and conclusions

- Improve understanding of the relationships between abiotic factors and ecosystem functioning / structure
- Combine geographic information with observational data by coupling GeoNode with SOS implementation by 52° North
- This research has been funded by eLTER (Integrated European Long-Term Ecosystem & Socio-Ecological Research Infrastructure) Horizon 2020 EU project, and Sierra Nevada Global Change Observatory (LTER-site)

5. References

- Diseño y puesta en marcha de una IDE temática con servicios SOS de observaciones meteorológicas: IDEaRM. Erena, Manuel; López, Juan A.; Sánchez, Diana; García, Pedro; Atienza, Joaquín F.; Hernández, Zaida; Caro, Manuel; Dupke Sören; Quest Benjamin. November 2015
- <http://52north.org/>, 52° North official website
- <http://www.get-it.it/>, Get-IT official website
- <http://www.tern.org.au/Newsletter-2017-Mar-Sentinel-Phenocam-pg31941.html> Sweet as Raspberry Pi: TERN's new sensor technology for easier, cheaper ecosystem surveillance
- <https://publiclab.org/wiki/near-infrared-camera>, Near-Infrared Camera at PubliLab