



Building an IT Infrastructure for Citizen Science Research on Climate Change

31 Mar. 2019 | Anudari Batsaikhan, Jens Weismüller





Background

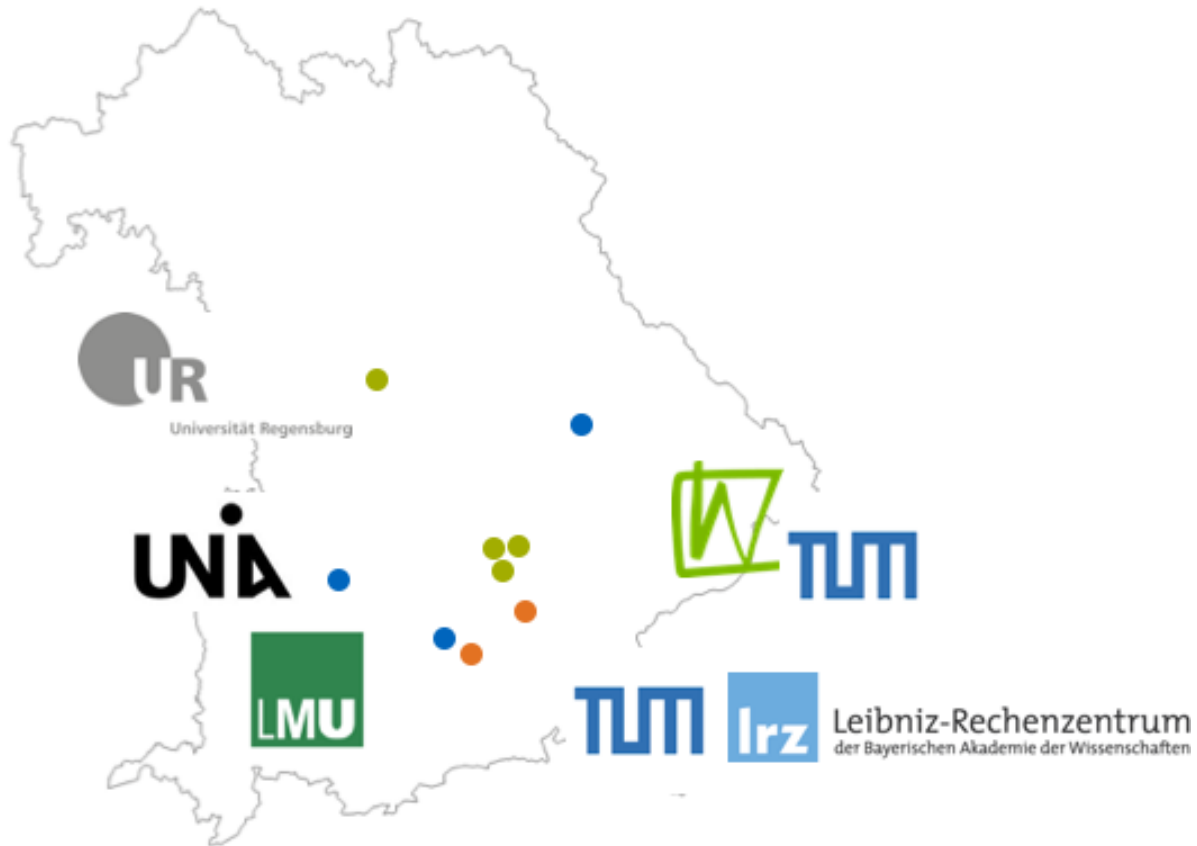


- Far-reaching consequences of climate change
- ↓
- Necessity of extensive adaptation and climate protection measures in Bavaria, Germany
- ↓
- Citizens awareness and their participation are needed





BAYSICS - Bavarian Citizen Science Portal for Climate Research and Science Communication



- 10 partner institutions with researchers in
 - Natural sciences
 - Phenology
 - Pollen
 - Tree heights
 - Animals
 - Environmental education
 - Environmental sociology



Project Aim (1)

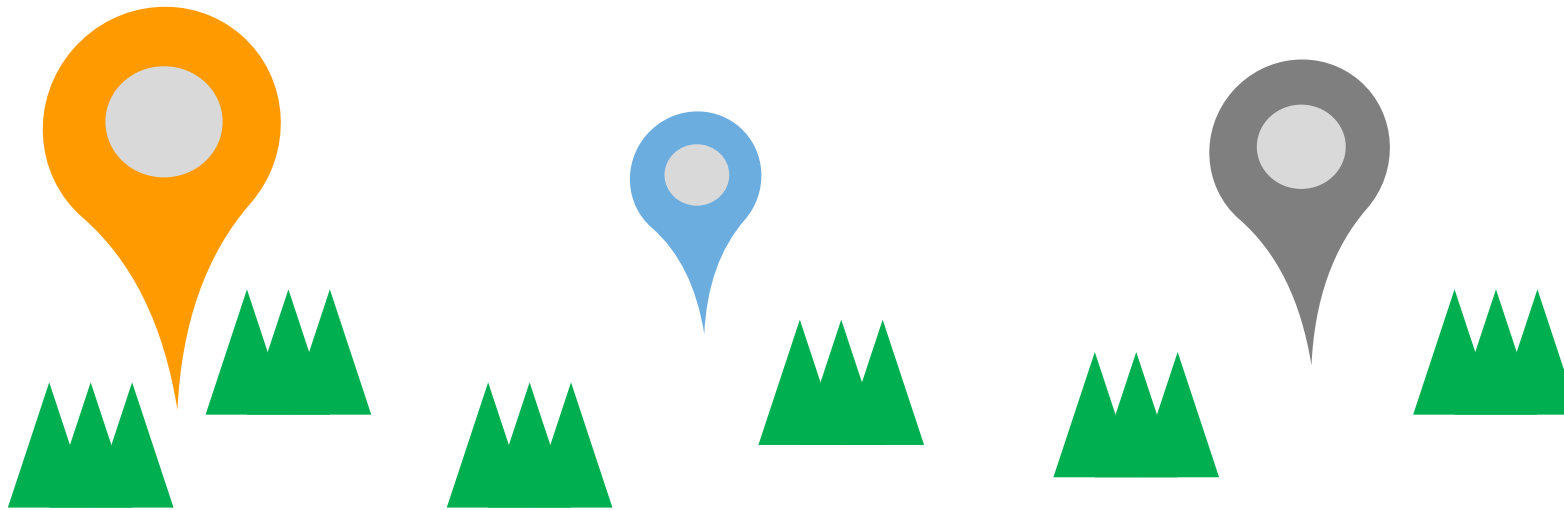
- To encourage citizens' participation in research on climate change through digital platforms





Project Aim (2)

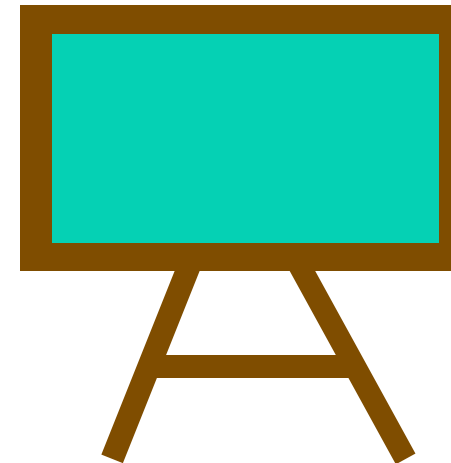
- To promote communication on the complexity of climate change and its local consequences





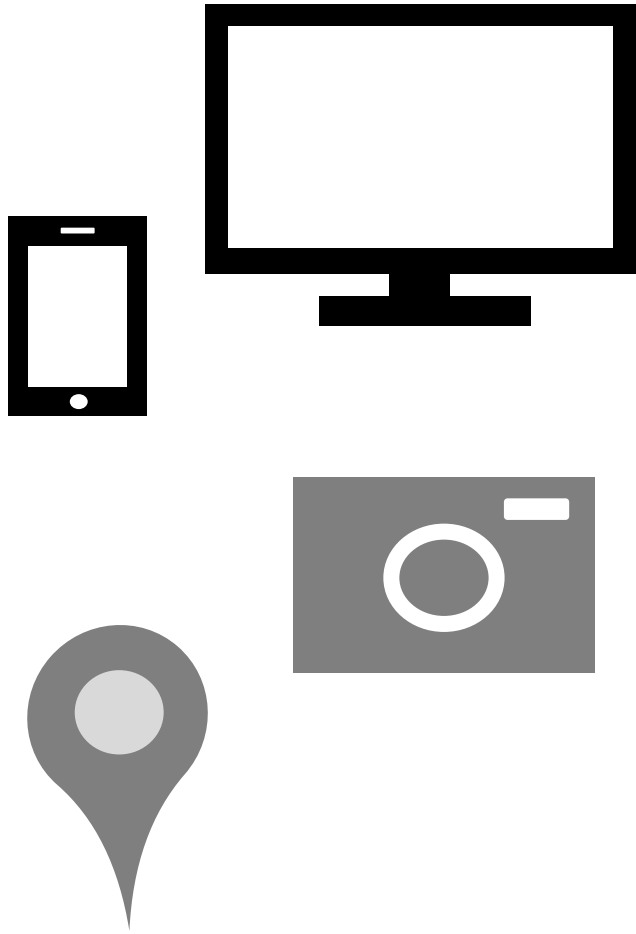
Project Aim (3)

- To achieve joint scientific and environmental education goals





Main Sensor & Data in BAYSICS



- Main Sensor : Smartphone
 - Climate research on own backyards
- Main Data : Data collected by citizen scientists
 - Legal issues (e.g. copyright)
 - The privacy of citizen scientists
 - The credibility of data



Building IT Architecture for BAYSICS



- Implement BAYSICS toolbox
 - Database
 - Web portal
 - Learning modules
 - Design and specification of a smartphone app
 - Sensor network (e.g. climate stations and pollen traps)



Building IT Architecture for BAYSICS



- BAYSICS toolbox are developed
 - based on the needs/requirements of researchers
 - to be used through web portal and a smartphone app
 - to be suitable for storing data collected by citizen scientists
 - to be tested and implemented at educational institutions



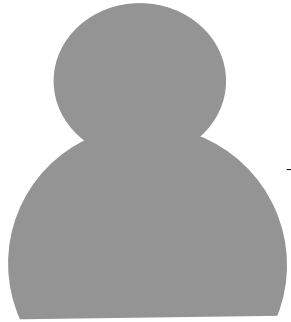
Technical Features



- Use of Open Source Tools
- Single Authentication and Authorization System to be used from both web portal and smartphone app
- Single database

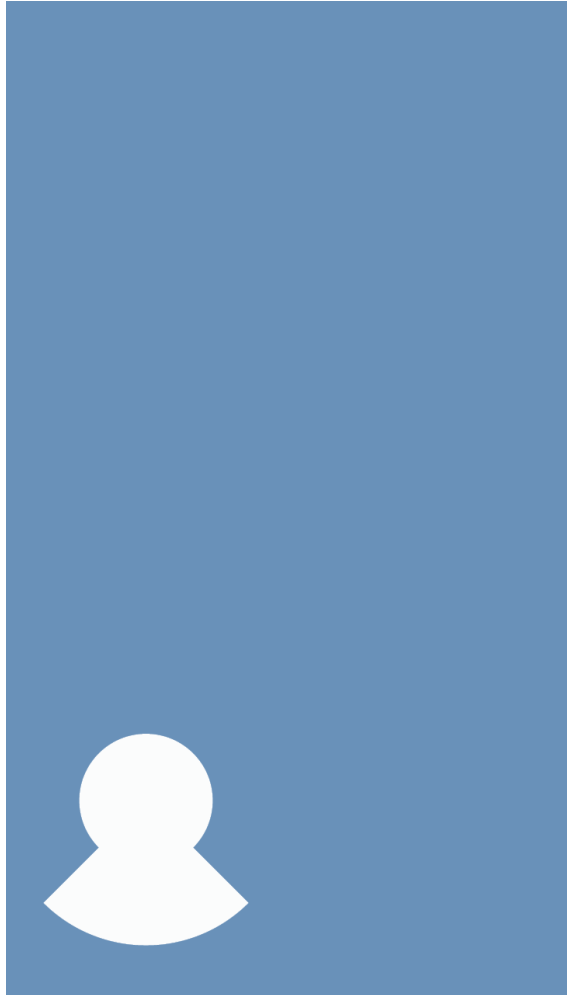


Database





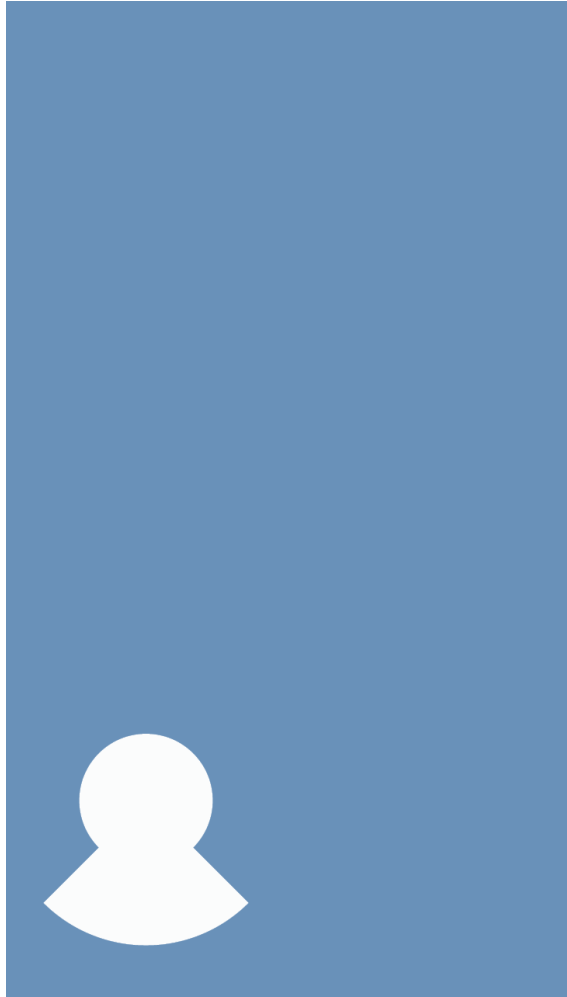
Challenges in Data Management



- How to make data collected by citizen scientists findable, accessible, interoperable and (re)-usable (FAIR Data)?
 - Data can be found/are visualized on the internet (web portal)
 - Possibility to download data collected by other citizen scientists
 - Clear metadata (e.g. on relevant attributes and data usage license) to be prepared for data users
 - Potential integration into a larger scientific database (climate research network of Bavaria)



Challenges in Data Management



- How to increase the credibility of data collected by citizen scientists?
 - Data collection guideline for citizen scientists
 - Potential application of trust metrics to data



BAYSICS Toolbox as Open Educational Source



- To be included in BAYSICS web portal/smartphone app:
 - Knowledge base
 - Gamification/E-learning module
- Cooperation with the researchers in environmental education
 - Test and implementation at educational institutions



Contact



- Further Information about BAYSICS: Website: www.baysics.de
- Anudari Batsaikhan : anudari.batsaikhan@lrz.de

The screenshot shows the BAYSICS website with the 'Infrastructure' section selected in the navigation menu. The page title is 'Infrastructure' with a person icon. The main text asks: 'You would like to know **what** is required to get an App or web application up and running, **who** is responsible for coordinating an interdisciplinary team of project partners, and **how** compiled data can be evaluated and visualized online? Then read up on our three infrastructure projects here and find out more about project coordination, IT-infrastructure and the ClimateEventPortal.' Below this are three subproject cards: 'Coordination and Communication', 'IT-Infrastructure', and 'ClimateEventPortal'. Each card has a 'read more' button. A small 'EN' button is in the bottom right corner.

The screenshot shows the BAYSICS website with the 'Science Communication' section selected in the navigation menu. The page title is 'Science Communication' with a person icon. The main content area has a light blue background and contains three article cards: 'Students explore climate', 'Climate change: the debate', and 'Responsibility for climate protection'. Each card has a 'read more' button. A small 'EN' button is in the bottom right corner.



Acknowledgement



Bayerisches Staatsministerium für
Wissenschaft und Kunst





Leibniz Supercomputing Centre
of the Bavarian Academy of Sciences and Humanities