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EDITORIAL

Citizen Science and its Impacts on Spatial Data Infrastructure Research*

Sven Schade

European Commission – DG Joint Research Centre (JRC),
s.schade@ec.europa.eu

Abstract

Citizen Science crystallised as an umbrella term for public participation in scientific research, Volunteered Geographic Information (VGI), Citizens' Observatories, and many more. Technological advancements clearly power the wealth and spread of related initiatives, and organisational structures could be established over the past few years. On the one hand, most of the data collected or analysed by these initiatives, such as biodiversity records, air quality information or waste maps, have a spatio-temporal component. On the other hand, many Citizen Science initiatives rely on spatial data in order to plan or carry out their activities. Thus it is legitimate to ask if and how these recent developments might influence Spatial Data infrastructure (SDI) research. In 2018, the International Journal of Spatial Data Infrastructure Research (IJS DIR) for the first time showcases possible future scenarios in a dedicated Special Section on Citizen Science. The editorial at hand sets the scene for this Special Section.

Keywords: Citizen Science, VGI, Spatial Data Infrastructure, Editorial

1. INTRODUCTION

Recent technological advances, such as mobile internet, smart phones and the Internet of Things (IoT), resulted in an unprecedented wealth and diversity of data. Big Data, i.e. tailored knowledge extraction from these new sources, became popular in almost all sectors of industry and research (Tsinaraki and Schade, 2016). Especially user-generated Web content from crowd sensing provides new and

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sometimes unique sources of environmental information. The integration and application of these sources – often termed crowdsourced Geographic Information or Volunteered Geographic Information – VGI (Goodchild, 2007) – forms an interdisciplinary research area spanning across multiple spatial and temporal scales.

EU-funded COST actions – such as ENERGIC (IC1203) or Mapping and the Citizen Sensor (TD1202) in the past, “Citizen Science to promote creativity, scientific literacy, and innovation throughout Europe” (CA15212) and AlienCSI (CA17122) today – already contribute to this research field. The FP7-funded Citizens' Observatories projects, Citeclops, CITI-SENSE, COBWEB, Omniscientis and WeSenseIt, collectively developed novel technologies and applications in the domain of Earth Observation and citizens' involvement, aiming at crowd sensing of observations in various domains such as air quality, water quality, flooding, land use and biodiversity. Now, a new set of Citizens' Observatories is ongoing as part of the Horizon 2020 call SC-5 in order to ensure further development, testing and demonstration in real conditions. These include, groundtruth 2.0, GROW observatory, scent and LandSense, as well as, the Collaboration and Support Action WeObserve. All together, these activities help to quickly advance the theoretical underpinnings of Environmental Crowd Sensing, Citizen Science and Big Data, but also propose new methods and tools for data capture, information extraction and knowledge creation¹.

In parallel to the evolution of these research projects, the international Citizen Science community keeps organising itself better and better. After the American, European and Australian Citizen Science Associations were formed a few years ago, we now see also other regions appearing, and this year we saw the launch of the Global Citizen Science Partnership. While the contributions from Citizen Science keep being used in scientific research, we increasingly see recognition by governments, too. As one consequence, the demand for Citizen Science data and metadata standards is high. According work is ongoing and supporting material for data management practices becomes available, for example, through the work a dedicated International Working Group on Data & Metadata.

Giving these quickly evolving developments, for the first time this year, the International Journal of Spatial Data Infrastructure Research (IJSDIR) issues a Special Section on Citizen Science. This is set up to report about some of the most recent developments, but also to raise possible upcoming implications for research on Spatial Data Infrastructures (SDIs).

¹ For a deeper dive into the topic of Citizen Science and the terminology used by this vibrant and diverse community we recommend reading the article by Eitzel and others (2017).

2. EARLY REFLECTIONS ON CITIZEN SCIENCE AND SDIS

The geospatial dimension of data collected by Citizen Science initiatives but also the requirements of many of these initiatives to use spatial data for setting up and preparing their work provide an opportunity to reflect on a possible new role of SDIs. Two possible directions are highlighted below, always considering that the Citizen Science community represents a new audience with their own background and vocabulary, i.e. easy to understand and clear communication is required.

First, previous research indicated a need to advance the capacity of Citizen Science projects in respect to data management, especially regarding licencing and the handling of personal data (Schade et al., 2017). Here, especially the SDI community could offer technical solutions, recommendations and training material. Second, user requirements provide a new perspective to standardisation. Obviously, existing SDI standards need to become digestible and useable tools should be provided to projects that might not have many resources to invest in technology uptake. At the same time, due to the nature of Citizen Science, existing standards might need to be profiled. For example, detailed information about participants and their motivations might affect parts of OGC's Sensor Web Enablement (SWE), or the social values and intentions behind a data gathering activity might need to be discussed in the context of data quality.

All in all this is a research area worth to explore and we are looking forward to future submissions that will help advance on the topic.

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