



Demonstrating the viability and value of community-based monitoring schemes in catchment science

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Hydrological catchments are complex systems which need to be monitored over time in order to characterise their behaviour on a local level, model, implement mitigation measures and meet policy targets. Despite hydrometric monitoring techniques being well developed, data is often inadequate within rural areas. Local knowledge and experiences are also vital sources of information in this sector but they are not routinely harvested. Long-term evidence is required to provide stakeholders with confidence and innovation is required to fully engage with and inform the public.

Citizen science and volunteered geographical information (VGI) projects are encouraging volunteers to participate in crowdsourcing activities and generate new knowledge, but they have not been fully investigated within catchment science. A citizen science approach has therefore been implemented within the 42km² Haltwhistle Burn catchment (northern England) using effective engagement techniques. This catchment responds rapidly, experiences flash flood events, and like many, it does not benefit from any traditional monitoring equipment.

Participation levels confirm that members of the public do want to monitor their local water environment, with flooding being a key driver. Regular 'River Watch' volunteers and passers-by are sharing their knowledge and monitoring rainfall, river levels, water quality parameters, sediment issues, flood events and performance of flood risk management features. This has enabled a variety of low-cost data collection and submission tools to be tested over a two year period. Training has encouraged good quality data to be collected and volunteers are ready to capture meaningful information during unexpected flood events. Although volunteers are capable of collecting quantitative information, photographs and videos are submitted more readily. Twitter has also been used to share real-time observations successfully. A traditional monitoring network has been running in parallel for the purpose of assessing the quality of citizen science observations. It has been found that citizen science observations are essential for capturing localised convective storms.

Citizen scientists want their observations to be used to gain meaningful information and tackle local issues. Data has therefore been utilised to build, calibrate and validate hydrological models and support a range of catchment management applications. This has further demonstrated the value of citizen science, along with the social benefits it has to offer. Other communities are also beginning to source funding and implement their own monitoring schemes, indicating that they are both capable and self-motivated.

Citizen science makes use of evolving and more readily available technology, providing catchment stakeholders with vital information. Although these types of observations present various challenges, it is argued that a citizen science approach is not intending to replace traditional techniques, rather they can be used to complement them, fill the gaps and/or provide an indication of catchment behaviour across space and through time.