Geophysical Research Abstracts
Vol. 16, EGU2014-11762, 2014
EGU General Assembly 2014

Quantification of rain gauge measurement undercatch and wind speed correction

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Hydrological processes are adversely affected by systematic rain gauge inaccuracy due to wind induced undercatching. The implications of this are discussed and addressed. Despite evidence of the undercatch problem being cited in the past and the difficulty in solving such a complex problem; it has become an inconvenient truth to hydrologists that major inaccuracies in rainfall measurement exist. A two year long experiment using new equipment and improved data logging and telemetery techniques enriches this formative work to redress the wilful neglect with which accurate rainfall measurement has been treated in recent decades. Results from this work suggest that the annual systematic undercatch can be in the order of 20 percent in the UK. During specific periods (measured at high temporal resolution), this can rise to as high as 50 percent for a single wind impacted event.

As one organisation, responsible for the environment in the UK, moves towards using fewer instruments (15 percent fewer in the next year), it is scarcely possible to overstate the importance in solving this problem. It had been hoped that new equipment, such as acoustic distrometer and weighing gauge technologies, would be able to reduce the magnitude of the bias. However, through data gathered in the 2 year experiment and through secondary sources from the 1970s and 1980s, it is demonstrated that this is not the case and that the same problems with undercatching remain now as they did then. We further postulate that wider, denser networks of inexpensive telemetered equipment are now possible but they must still address the undercatch issue.

There is little merit in pointing out an age old problem if no solution is put forward to fix it. The aforementioned experiment has furnished new ideas and further work has been commissioned to address this problem. This will be achieved via the medium of a Knowledge Transfer Partnership between Newcastle University and an innovative equipment manufacturer (EML).